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IntechOpen Book Series

Education and Human Development

Volume 8

Aims and Scope of the Series

Education and Human Development is an interdisciplinary research area that aims to shed light on topics related to both learning and development. This Series is intended for researchers, practitioners, and students who are interested in understanding more about these fields and their applications.

Meet the Series Editor



Katherine Stavropoulos received her BA in Psychology from Trinity College, in Connecticut, USA and her Ph.D. in Experimental Psychology from the University of California, San Diego. She completed her postdoctoral work at the Yale Child Study Center with Dr. James McPartland. Dr. Stavropoulos' doctoral dissertation explored neural correlates of reward anticipation to social versus nonsocial stimuli in children with and without autism spectrum disorders (ASD). She has been a faculty member at the University of California, Riverside in the School of Education since 2016. Her research focuses on translational studies to explore the reward system in ASD, as well as how anxiety contributes to social challenges in ASD. She also investigates how behavioral interventions affect neural activity, behavior, and school performance in children with ASD. She is also involved in the diagnosis of children with ASD and is a licensed clinical psychologist in California. She is the Assistant Director of the SEARCH Center at UCR and is a faculty member in the Graduate Program in Neuroscience.

Meet the Topic Editor



Delfín Ortega-Sánchez holds a Ph.D. in Didactics of History and Social Sciences from the Autonomous University of Barcelona, a Ph.D. in Education from the University of Burgos and a Ph.D. in History from the University of Extremadura. His research interests focus on the processes of construction of cultural, social and gender identities from the educational, anthropological and ethnohistorical fields, and education for a democratic, inclusive and committed citizenship with social problems and controversial issues. These lines of interest articulate the activity of the Recognized Research Group DHISO, directed by Dr. Ortega-Sánchez. His research career has been acknowledged through his nomination as one of the Top 10 best social science researchers globally under the age of 40 in the seventh edition of the Universal Scientific Education and Research Network (US-ERN) Prize 2022. His nomination was put forward by an international jury consisting of several Nobel laureates and the top 1% of scientists in their respective fields. He currently serves as the Vice-Rector for Social Responsibility, Culture, and Sport at the University of Burgos. In this role, he oversees activities promoting equality, diversity, social inclusion, and non-discrimination, as well as initiatives addressing the needs of individuals with disabilities. Additionally, he holds the position of Director of the Chair of Human Rights and Democratic Culture at the Auschwitz Birkenau Institute, which is the first of its kind globally. This initiative is a collaboration with the Auschwitz-Birkenau State Museum in Poland and is supported by the Ministry of Universities of the Government of Spain.

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Preface

We can define teaching innovation as the set of approaches, processes, and strategies aimed at instigating constructive, reflective, planned, and systematic changes in educational and formative practices. The operational application of innovation involves adaptation to specific contexts, and its models are not universally transferable to other educational spaces. They are neither purely replicable nor offered as standardized prescriptions. Nevertheless, the primary goal of innovation is to generate improvements in teaching and learning processes. This is achieved through a synergistic and holistic integration of both applied methodologies (methodological innovation) and the educational program itself (curricular innovation).

The concepts of change and improvement serve as fundamental elements in understanding teaching innovation. While innovation implies making changes, not every change in one or more educational aspects necessarily leads to innovation. It is not solely about implementing appealing methodologies and technological resources; these actions must contribute to improving the teaching-learning process and address the reflective treatment of potential issues.

Innovation is an ongoing process that involves definition, reflection, evaluation, and relational feedback among the participants. It requires intentionality and careful planning; it is not an improvised occurrence but a deliberate intervention. Consequently, it must undergo evaluation to verify its effectiveness, impact, and operability.

Despite its evolving nature, proposals for teaching innovation, rooted in reflective practice, should aim for a meaningful transformation of the teaching reality and, more broadly, the field of education.

From a critical perspective, teaching innovation should originate from a recognized problem within one's teaching practice. The approach to this issue, rather than seeking immediate resolution, should encompass horizontal, cooperative, and interpersonal relationships among all involved agents in the innovation process. This relational aspect, delineated in action plans, is proposed as a source of ongoing evaluation and open dialogue, characterized by constant construction and reformulation.

The empirical and theoretical research presented in this monographic book examines contemporary educational challenges. Topics range from the significance of teacher training and ethical behavior to cognitive strategies, fundamental conceptual frameworks for teacher training, curriculum performance assessment, gamification, multimedia strategies, implementation and evaluation of creative approaches, and the promotion of student participation and social engagement. These studies not only identify specific problems but also guide teaching and educational innovation.

They offer a robust foundation that nourishes and supports innovative practices and informed decision-making. This comprehensive approach aims to propel education towards greater effectiveness, equity, and adaptability, addressing the most pressing educational challenges of our time.

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Section 1

New Contributions
to Educational Research
and Innovation

Chapter 1

An Investigation into the Determinants of Underperformance in Mathematics among Grade 12 Learners in a High School in the Eastern Cape

Pretty Thandiswa Mpiti and Zanele Yonela Wambu

Abstract

Learners in the Eastern Cape Province have over the years performed poorly in the National Senior Certificate Mathematics examinations. This study sought to investigate the determinants of under-performance of Grade 12 learners in Mathematics. The study adopted a qualitative case study in which data were gathered through interviews with teachers and learners. The purposely selected sample comprised three teachers and nine learners from the same school. The findings showed factors that have a direct influence on teaching strategies such as the inadequacy of resources and under-qualified teachers. The other factors associated with learners were learners' attitudes and general under-statement of the subject contributing to undesirable results. Recommendations, as well as suggestions for further research aimed at addressing the factors identified, are advanced.

Keywords: determinants, Mathematics, under-performance, Grade 12 learners, Mathematics teaching strategies

1. Introduction

The National Development Program 2030 of the National Planning Commission aims at addressing the injustices of the past in South Africa. This policy shifts towards the promotion of science, technology, and mathematics-oriented education from basic education levels. This is motivated by the assertion that tertiary education institutions need to produce more STEM-oriented graduates successfully. The attainment of the set targets in the long term all hinge on the capacity of the country to improve technology and scientific research. These are ultimately expected to be a product of improvements in pass rates and uptake of Mathematics education from basic and pre-tertiary education stages. As directly noted and presented, Mathematics provides society with a rigorous foundation and grasp of scientific thought and theory capacitating individuals for robust economic growth [1]. Lemaire [2] states that mathematical thought and concepts would eventually become the drivers of world development and management.

Maliki, Ngban and Ibu [3] postulate that favourable and desired economic development are direct outcomes from elevated uptake and success in sciences and in particular, mathematics. The rapid development of the global ecosystem across all sectors has fostered an environment where not only economic development but also global and national security are hinged on the deepening and extensive uptake of mathematics-oriented subjects. These views, therefore, mean that there is a need to not only advance the Mathematics school curriculum but also to encourage uptake and throughput of the subject. However, the academic performance in mathematics has varied across national frontiers. In an international study, it emerged that the number of students in the USA and Australia taking up advanced Mathematics courses declined significantly as students' progress in high school [4]. Ysseldyke et al. [5] revealed that more than 66% of learners from low-income urban households failed to demonstrate a grasp of even the most mundane mathematical concepts. These studies present worrisome scenarios where the world's most advanced economy which has abundant resources also suffers the scourge of problematic Mathematics grasp among its learners.

These undesired standards and lack of target achievement are not unique to the developed world alone. In Tanzania, the majority of learners consistently fail to match the required pass results, for four national examination results for the years 2004, 2005 and 2006 Mathematics had failure rates of 70%, 77% and 76% respectively [6]. Bahri and Corebima, [7], in a Nigerian study, states that learners' attitudes and fears towards the subject, under-qualified educators and insufficient classroom teaching and learning material grossly affected performance. In the South African context, learners have consistently performed badly in Mathematics examinations. The table below shows the overall performance of the Mathematics candidates in the National Senior Certificate from 2016 to 2020 (**Table 1**).

The table above shows a steady decline in the number of learners taking up Mathematics at the Grade 12 level since 2016. This is the same trend as that reported by Freeman, et al. [4].

According to Reddy [9], poor performance is highest among black Africans. The subject itself is believed to be difficult even to parents [9]. Consequently, many schools in the country, along with their learners, have opted for mathematical literacy, which is viewed as a less complicated subject. While this may be so, the concepts taught and learnt through mathematical literacy are considered inadequate for advanced study

Year	No. wrote	No. achieved at 30% and above	% achieved at 30% and above	No. achieved at 40% and above	% achieved at 40% and above
2016	265 810	135 958	51,1	89 084	33,5
2017	245 103	127 197	51,9	86 096	35,1
2018	233 858	135 638	58,0	86 874	37,1
2019	222 034	121 179	54,6	77 751	35,0
2020	233 315	125 526	53,8	82 964	35,6

(Adapted from [8])

Table 1.
The overall performance of candidates in National Senior Certificate Examinations 2016–2020.

in STEM-related subjects at university level. A typically notable scenario is that of the Bohlbelo cluster in Sekhukhune of Limpopo province in South Africa comprising of four circuits, with 47 secondary schools: Mathematics in Grade 12 has been declared “a killer subject” and as such, learners begin to fear Mathematics. This view is largely ubiquitous in the country’s secondary education sector including the Eastern Cape Province. Therefore, this primary purpose of this study is to determine the causes of poor performance among Grade 12 learners in an attempt to mitigate the low levels of performance. At secondary level, along with other related studies, the study will form a base of literature upon which future studies and references may be based.

2. Literature review

2.1 Mathematics teaching strategies

Teaching strategies encompass all actions in and out of the classroom such as organising and planning of lessons, arrangement of learners, delivery of lessons based on learners’ experiences, effective communication using appropriate language and material, as well as lesson assessment based on the outcomes of the lesson [10]. In a Chinese study that compared the effectiveness of constructivist teaching approaches to the traditional transmission style teaching, it emerged that the constructivist approach resulted in significantly higher learning gains [11]. Ifamuyiwa and Akinsola [12] state that cooperative learning strategies are useful strategies when conducting and delivering lessons on complex principles in Mathematics. In addition, Kodisang [13] advises that to foster a productive learning environment, educators must allocate duties and roles to learners in highly functional groups to encourage debate and ultimately higher-order responses from learners. Muradya [14] indicates that during active learning of Mathematics, the selection and application of inappropriate teaching strategies often results in poor performance by learners. The study revealed that students were performing poorly because of how the subject was taught [14]. In support of this notion, Wabwoba, [15] observes that poorly motivated teachers utilising inappropriate and incorrect teaching methods often resulted in learners performing badly.

2.2 School/teacher-related factors

Hanushek and Rivkin [16] investigated the teacher-related factors that affect learning achievement in Mathematics. Among those factors is the motivation to teach and mediate the construction of mathematical concepts by the learner. The author contends that a positively motivated teacher can help learners minimize mathematical anxiety referred to in the previous section and go an extra mile to help learners address their difficulties in learning the subject and demystify the concepts.

According to Pereira [17], the language of instruction often influenced the performance of learners in all subjects during schooling. Performance was poor, particularly among rural learners or those who have been subjected for long periods to tuition using a different language. There is, therefore, a strong correlation between the language proficiency of learners with their performance in other subjects. However, the implementation in schools has not been sufficiently conducted [18]. In many cases, educators rely on inapplicable teaching practices which affect the learners’ grasp

and outcomes. There is a risk of a high failure rate in Mathematics as core concepts may not be understood, or are lost. Learners need not have advanced proficiency in the language of tuition, but rather should have a deep grasp of the language to grasp concepts in Mathematics and related subjects. Rammala [19] also indicated the importance of language in the performance of learners in Mathematics. Most Grade 12 learners in South African schools struggled and performed poorly in the language of tuition, therefore, likewise most learners failed to grasp key concepts in the subject and barely understood what was required of them [19].

A compounding factor is the lack of resources in some schools in South Africa. There are cases of schools in the country which are poorly resourced but manage to perform well regardless of the obvious shortcoming. Conversely, in the long term and on a day-to-day basis, lack of adequate funding can have a disastrous effect on achievement [20]. While qualified Mathematics teachers may be able to teach and deliver classes with limited resources like textbooks, problems emanate from the limited examples and practice work that an individual teacher may develop [21]. Additionally, the lack of resources only compounds the workload of the already burdened teaching staff. Educational institutions that lack textbooks fail to achieve the independent enquiry level and higher-order thinking attained through self-learning [22]. In the study conducted by Van der Linde [23], lack of resources features very strongly as the cause of the poor performance in Grade 12 Mathematics.

2.3 Learner personal factors

Various learner-specific factors were discovered to be significant in influencing the performance of learners in Mathematics. These included gender, economic status and attitudes of learners [21]. A study conducted in Nepal by Acharya [24] revealed some of the factors affecting learner performance in Mathematics. Learner related factors will be discussed in this section while school/teacher-related factors will be discussed in the section that follows. According to Acharya [24], Mathematics anxiety is one of the key factors affecting students' ability to successfully learn Mathematics. Mathematics anxiety is a general negative feeling towards the process of the learning of the subject and it affects the students' learning negatively. This finding adds weight to findings by Mensah et al. [21] who indicated that the attitude presented by learners towards attaining knowledge in Mathematics was vital in determining the learners' outcomes in the subject. Additionally, Beilock and Willingham [25] state that many students struggle with Mathematics at some point. It is not uncommon to hear them complain that they hate Mathematics: "it's hard," they are quick to give up when they do not understand something. A negative mindset like this can quickly turn into cycles of low confidence, reduced motivation and poor performance [25].

The second factor reported by Acharya [24] is the level of relevant prior knowledge from earlier grades. Mathematical concepts are cumulative and lack of mastery in lower grades makes it very difficult for a learner to construct concepts in higher grades. The third factor affecting performance in Mathematics identified by Acharya [24] is the 'lack of students labour' (p. 11). This refers to a lack of enough effort on the part of the learner when they study Mathematics which leads to a lack of practice in the application of concepts in different scenarios.

In a South African study involving Grade 3 learners, it emerged that only 16% of the learners involved in the study performed at the appropriate standard for Grade 3 level. The rest of the learners performed below the expected level in Mathematics [26]. The same study also revealed that the poorest 60% of the Grade 3 learners are

three Grade levels behind the wealthiest 20% of learners in Grade 3. Furthermore, the study showed that by Grade 9, the gap between the poor and wealthy learners grows to four grade levels. The Eastern Cape Province in which this present study was conducted is one of the poorest provinces in South Africa. Spaul and Kotze [26] concluded that this learning deficit is difficult and costly to rectify later in life (for example in Grade 12 which was the focus of this study).

In another South African study of township schools like the one in the present study, Mkhize [27] explores the reasons that learners in high school did not do well in Mathematics Grade 12 examinations. According to teachers in the study, the reasons for the poor performance was due to the following reasons:

- Learners are not motivated, this may be because of the families and societies they are being raised in where no one probably would have achieved anything related to Mathematics so no one will push them to do better.
- Learners are generally lazy and this may be attributed to poor learner management from a tender age.
- Learners have illiterate parents who cannot assist them with their school work and often leave the teacher to deal with their child's shortcomings in Mathematics
- Learners do not know how and what to study which could have been attributed to how they were taught from elementary stages of Mathematics and school in general.
- Learners believe Mathematics is difficult because they would be discouraged by the amount of energy and effort required to master the general concepts.
- Learners have a negative attitude towards Mathematics since in most social circles, it is regarded as difficult by many.

When asked about the reasons they failed Mathematics, the learners in the study indicated that the reason they appeared lazy and demotivated was because of the constant failure in solving problems when they studied on their own. Mkhize [27] further reports that according to the learners, teachers always *tell them* that Mathematics is easy but they *do not show them* how it is easy.

2.4 Theoretical framework

This study is based on the theory of constructivism. Constructivists contend that learning is a process of constructing meaning from personal experiences [28]. In addition, Taber [29] posits that learning is a 'process of constructing internal mental representations of the world' (p. 45). The constructivist's view emphasizes the need for the learner to be present and to experience events for them to be able to acquire knowledge and learning [28]. This view entails that Mathematics learners will learn more from problem-solving as this will afford them chances to experience the subject as opposed to being told or shown how to do it on the board only. Riegler [30] states that the term constructivism is probably derived from Piaget's "constructivist" views. Mvududu and Thiel-Burgess [31] state that constructivism is an approach to probe

learners' understanding and elevate them from lower levels of learning to much higher levels of learning through the application and synthesis of experienced events.

Jean Claude Piaget is considered the father of the constructivist movement, particularly cognitive constructivism [28]. According to Amine and Asl [28], 'as learners encounter an experience or a situation that challenges the way we think, a state of disequilibrium or imbalance is created' (p. 10). The mental imbalance necessitates that there be a rearrangement of mental structures to accommodate the new experiences. In Mathematics, this is the problem-solving process, which will build new mental structures. Constructivism is, therefore, a practice-based model of learning [32]. Piaget's constructivist approach is based on radical constructivism which focuses on individual cognitive processes combined with social interaction [33]. From a Piagetian point of view, knowledge construction occurs at a personal level. The environment and others serve as a source of the disequilibrium that triggers the construction of new knowledge.

3. Methodology

3.1 Research design and justification

The researcher adopted a qualitative case study approach. Stake [34] asserts that in a case study, the researchers use multiple data gathering techniques to get a deeper understanding and a rich description of the case. The advantages of using qualitative research are that the researcher has the first-hand experience of the participant during observation, the information can be recorded as it occurs during observation, and the researcher can control the line of questioning in an interview. Qualitative research is value-laden.

3.2 Population and sampling

The population consisted of three Mathematics teachers and nine Grade 12 learners. The study utilised non-probability sampling techniques. The purposive sampling was used to select participants who contributed to the qualitative data because of their relevant knowledge. To attain quality and reliable information, the most experienced Mathematics teachers, both general and specific to Grade 12, were selected as the appropriate sample units. The first participant, TR-1 was a female educator holding a Bachelor of Education in Mathematics teaching qualification with 23 years of experience and 16 years teaching Grade 12. TR-2, also a female educator held a Bachelor of Education Honours qualification and 17 years total teaching experience with 12 of those in Grade 12 classes. The third participant, a male TR-3, held a Bachelor of Education qualification and had 31 years of experience and 27 of them in teaching Grade 12 Mathematics.

The learners included as participants in the study were randomly selected from within the purposively selected Grade 12 group. No particular trait or demographic characteristic among the Grade 12 participants was considered as critical above the others to warrant specialized grouping. The learners were randomly selected regardless of age, gender and social status as it was deemed to be generally consistent among the likely participants and little chance of exclusion was possible given the sampling technique. For the presentation of narratives, teachers were coded using prefixes as follows: TR-1, TR-2 and TR-3 while the learners were LN-A to LN-I.

3.3 Ethical approval statement

The participants in the study were informed about the purpose and nature of the study in writing and it was stated that they had the right to choose not to take part in the study without facing any negative consequences. Guarantees were given that all information would be private and confidential. Participants gave their consent in writing.

3.4 Data collection procedures

Data were collected using one-on-one interviews and focus group discussions. According to Mentz and Wolhuter [35], an interview is a goal-directed attempt by an interviewer to obtain reliable valid measures in the form of verbal responses from one or more interviewees. The interviews were semi-structured, allowing the researcher to probe respondents' answers for clarity and more detail. The researcher conducted focus group discussions with the learners on the contributing factors that underpin under-performance in Mathematics.

3.5 Data analysis

According to Kothari [36], data analysis is a process of generating useful information from the data through tabulation, screening and coding. The process involves operations that are performed to summarise and organise the data collected from the field. Since the study involves qualitative data, the data analysis process was done through transcription and recording of participants' assertions and responses during interviews. The data analysis was inductive as there were no predetermined themes. Therefore, themes emerged from the data sets. Analysis of the qualitative data obtained was undertaken through the development of thematic focus areas which jointly provide answers to the research questions. This helped the researcher to make a description of the data collected from the field based on research objectives and to derive conclusions on what to take regarding its usefulness.

4. Results

The following section provides the determinants of underperformance in Mathematics among Grade 12 learners through interviews conducted with the participants and data gathered through observations. In analysing the data, the researchers read and independently categorised responses from both the learners and their teachers. In categorising the responses, statements projecting similar ideas were grouped. Four major themes that emerged in the data analysis are used as headings to present data.

4.1 School related factors

The findings indicated that limited access to textbooks and practical learning resources was the cause of poor performance. TR-1 indicated that *"There are many reasons why learners would not perform the way that the teachers, schools and department want them to perform when it comes to Mathematics. The schools are often lacking adequately qualified and experienced teachers, textbooks, teacher resources among many*

other things”. Along the same sentiments, TR-2 said “*in our school, the learners and teachers do not have adequate time and material to sufficiently undertake a subject, which is as complex as Mathematics. Similarly, TR-3 stated that “many learners have a little or weak foundation in Mathematics. That, mixed with the limited resources and encouragement at the schools automatically means that learners will fail. There are no activities done to encourage an improved grasp of the subject.* The participants’ responses to the primary question are indicative of institutional inadequacies, which have fostered environments that are non-conducive for effective teaching and learning of Mathematics and as such result in undesired outcomes. The prominent causal issues identified relate to mostly lack of resources, particularly learner textbooks and LTSM. Ultimately, the extent to which resources are availed and utilized in the schools is a determining factor in Mathematics outcomes.

Regarding inadequate resources, learners indicated their frustration of sharing textbooks. They expressed similar views as articulated, for example, LN-A indicated that “*it would be much easier to read more on the topics instead of photocopies of the homework only*”. LN-C pointed out that “*having more books which are not shared, or which can be taken home to study will give us more time to practise more and more examples*”. Related to this view, LN-D said “*it can be very frustrating trying your best but not doing well or not being able to do well because of shortages of books. Having all the resources I need motivates me to do better than at present*”. LN-F shared the same sentiments “*some of the items needed to study Mathematics are easily available for everyone. A lot of the time during the period, especially in Grade 12, we are required to have mathematical sets with compasses, protractors and set squares. Not everyone has these and, therefore, practising at school or after school is not easy*”. Notably, both from educators and learners, the data indicated that resource constraints were identified as inducing serious challenges during teaching and learning. Particularly, the unavailability of adequate textbooks, reference sources and practice material severely prejudices learners.

4.2 Teacher related factors

Data from interviewing teachers indicated under-qualified teachers, and the reluctance to accept responsibility and accountability by the appropriate teachers have largely compromised results in Mathematics. Concerning the effect on the composition of educators for Grade 12 Mathematics on learner performance, TR-1 said “*from my view, many teachers are not willing to take the responsibility which comes with teaching Grade 12 Mathematics. Here TR-2 pointed out “many teachers are satisfied with the qualifications which they have. Few teachers want to go for skills or content improvement. So, many teachers are using what they learnt a long time ago to teach in modern times. I do not think it works well.* Interestingly, TR-3 expressed a similar view: “*we have many young teachers in the schools taking Grade 12 classes. Many struggle to control the classes. Many of them also even struggle with content and methods because they are young and new.* The data from interviews of teachers indicated that the quality of teachers especially regarding teaching experience at Grade 12 and the reluctance towards continued skills development was noted as having negative impacts on the quality of content and relevance of teaching methods applied in classes.

4.3 Learner personal factors

The findings illustrated a picture of both teachers and learners agreeing that learners have little interest in learning in general. This further worsened their performance

in Mathematics. The learner attitudes and the values which they placed upon learning were identified as being below those desired for adequate and satisfactory performance in the Mathematics curriculum. In responding to the question asked on the factors which contribute to poor performance in Mathematics TR-1 said “*most of the learners show no interest at all in learning; this makes it worse for Mathematics results. Peer pressure, lack of guidance, poor socio-economic backgrounds, child or elder-headed households affect our learners a lot*”. Similarly, TR-3 pointed out “*poor attitude towards studying is serious among learners. Many of them do not understand the value of learning especially a critical subject like Mathematics in this modern age*. In another pertinent instance, learners insisted “I do not see how I can be motivated, there are few textbooks at school ... nobody cares.”

Concerning lack of interest in learning Mathematics, learners did not seem to identify shortcomings from their side. Blame was for example apportioned to the content being difficult. Here LN-A pointed out: “*Mathematics requires more thinking, knowledge and understanding than what is required in other subjects*”. About this LN-C said, “*Mathematics is very difficult and most of the time you might think that you have grasped the concepts, but they are easy to forget*”. LN-H corroborated this “*the subject is a lot more difficult than most people realize. So, it's not easy to pass it even if you try*”.

4.4 School related factors

The findings indicated that limited access to textbooks and practical learning resources were the causes of poor performance. Inasmuch as most textbooks are in appalling shape and have endured years of damage. Some have a few blank pages and sometimes teachers are compelled to make copies. Data further indicated that in some instances, many learners are grouped to share textbooks. The availability of resources appears to play a pivotal role in student performance. This view is shared by Munda, Tanui and Kaberia [37] who observe that the availability of and quality of textbooks in a secondary school is strongly related to achievement among children from lower-income families especially those in rural boarding schools. According to Mbugua et al. [18], textbooks are a major input for performance in examinations. This view is shared by Kariuki, Kibet, Muthaa and Reche, [18] who observe that the availability of and quality of textbooks in a secondary school is strongly related to achievement among children from lower income families, especially those in rural boarding schools. The availability of textbooks in schools, however, is ultimately what determines students' outcomes in mathematics. Brown et al. [32], from a theoretical perspective, argues that adopting constructivist approaches to teaching and learning requires practice-based models, which demand adequate resources.

4.5 Teacher related factors

Data from interviews indicated that poor performance than intended was generally due to insufficient guidance, mathematics difficulty, and the subject's expectations. On the other hand, data showed that learners' performance was impacted by teachers' reluctance to assume responsibility for teaching Mathematics in Grade 12. Hence Bed [38] states that a positively motivated teacher can assist students in reducing their Mathematics anxiety and go above and beyond to assist learners in getting past their learning challenges. In the same vein Pereira [17], affirms that the language of instruction often influenced the performance of learners in all subjects during schooling. Particularly among rural learners or those who have been subjected

for long periods to tuition using a different language, performance was poor. Poor teaching and inappropriate strategies from teachers affected learning [14]. In lay terms, there is consensus that more experienced or better-qualified employees and particularly a combination of both tend to perform better than their peers do. As identified, allocation of Grade 12 Mathematics classes to under-qualified teachers, student teachers and the reluctance to accept responsibility and accountability by the appropriate teachers have largely compromised results in Mathematics. This was further argued by Mensah et al. [21] that, even in the presence of adequate physical resources, poorly equipped teachers could affect learners negatively.

4.6 Learner personal factors

Data showed a variety of learner-factors that are important in influencing how well learners perform in Mathematics. These included gender, anxiety, economic status and attitudes of learners. According to Bed [38], Mathematics anxiety is one of the key factors affecting students' ability to successfully learn Mathematics. Mathematics anxiety is a general negative feeling towards the process of learning the subject and affects the students learning negatively. This finding adds weight to Mensah et al. [21] who showed that the attitude presented by learners towards attaining knowledge in Mathematics was vital in determining the learners' outcomes in the subject. Additionally, Mkhize [27] states that many students struggle with Mathematics at some point. They frequently lament that Mathematics is hard and that they hate it. They also readily quit when they do not understand anything. A negative mindset like this can quickly turn into cycles of low confidence, less motivation, and poor performance [27].

5. Conclusion

The outcomes from the study provided a clear picture of the nature of the major problems driving poor academic performances among learners studying Grade 12 Mathematics in the Chris Hani District. The consistent and perennial underperformance of learners is a creation of the combination of the various issues discussed above.

6. Recommendations

It is recommended that capacity development techniques targeted at enhancing and upgrading teachers' subject-matter expertise and all-around skills be a requirement in the contemporary educational system. Regular and consistent workshops, frequent reorientation, and seminars addressing the various skill shortages and upgrades should be conducted.


Regarding the points made here, it is suggested that perhaps future research should take into account not only the voices of educators and learners but also the opinions of parents in an effort to improve the poor performance of learners.

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Chapter 2

Cognitive Learning Theory and Development: Higher Education Case Study

Zaheer Ahmed Khan, Javarria Adnan and Syed Adnan Raza

Abstract

Cognitive skills facilitate thinking, reading, and learning, as well as retaining information, reasoning, and responding. Theories of cognitive development attempt to explain how humans develop and change from infancy to old age. Cognitive control suppresses inappropriate habitual actions simultaneously by choosing thoughts, emotions, and behaviors to meet task demands. This chapter is a compilation of major theories on cognitive development, both earlier and contemporary. A longitudinal study was conducted at Mazoon College, Sultanate of Oman. Six different sections of the authors' own classes were chosen as subjects of study to include 176 students (mixed ability learners) who were taking preparatory English language courses for bachelor's degrees. Over three semesters, 14 months of data were collected. During reading and writing exercises, learners were required to abstract, think, hypothesize, and draw conclusions. Experimental and control groups were compared in this study. The results of the research found that it is beneficial for learners to take courses that link to their cognitive abilities, as this will help them to develop more positively. Study results confirm that studying provides opportunities to develop new skills and broaden one's knowledge base. Student thoughts on learning and achievement are evoked by English as a second language.

Keywords: control functions, cognitive development, longitudinal study, cognitive development in higher education, cognitive learning

1. Introduction

1.1 Cognitive control functions

Cognitive skills facilitate thinking, reading, learning, retaining information, reasoning, and paying attention as core functions of the brain. Collectively, they work to take incoming information and add it to the bank of knowledge that they use every day at school, work, and in everyday life. Cognitive skills are used in problem-solving, remembering information, and making decisions. In cognitive control, thoughts, emotions, and behaviors are intentionally chosen based on task demands,

circumstances, and social context to suppress inappropriate habitual actions simultaneously [1]. Three key areas have been identified in the study of cognitive control functions: working memory, inhibitory control, and cognitive flexibility to accomplish certain tasks.

Working memory is the ability to retain information, and one must be able to recall information from working memory to complete academic tasks. As an example, consider a student who is reading a narrative text. If that student is unable to grasp the gist of the story as it unfolds, they will not be able to read it successfully, and they will not enjoy the reading experience. There is a possibility that they might end up losing the thread of the story altogether. This is because they have to return to the beginning of a sentence, paragraph, or page quite frequently. They must develop reading fluency to become effective readers, and in order to achieve this goal, they must have a well-functioning working memory. Conversations should be conducted in the same manner. Learners are likely to experience confusion or even a breakdown in communication if a question is asked, and then the answer is not remembered. This is because of the effort necessary to understand the response.

According to Tiego et al. [2], inhibitory control involves the suppression of stimuli and behaviors that are irrelevant to the goal's attainment. Attention, especially in the face of distractions, and control over one's emotional and behavioral responses to diverse stimuli are very important to accomplishing a task or achieving a goal. Consider a situation in which a student is engaged in a writing task when he or she is interrupted in their work by another student, noise, or some other disturbance from around them. Inhibitory control skills are important to deal with the irritation successfully and continue with their work by ignoring the interruptions rather than losing track of their work. Developing inhibitory control skills is essential for dealing with irritation effectively. To be able to continue working quickly, they need to be able to ignore interruptions rather than lose track of their task.

The third aspect of the cognitive control function is cognitive flexibility, which refers to the ability to solve problems effectively. This is a multifaceted approach that enables students to think outside the box, think creatively, and adapt to changing environments. To think creatively without cognitive flexibility is impossible. To effectively communicate, students must be able to use language in accordance with the circumstances of the environment instead of exchanging prefabricated phrases. They will have to create sentences that they have never heard or seen before. In responding to the conversation of another person, they will need to react flexibly, creatively, and spontaneously. Therefore, they need to use repair strategies to support the process of communication to eliminate any misunderstanding, especially if they or their converser have difficulties comprehending. They need to be able to ask their interlocutor to repeat in order to paraphrase what has been said. Therefore, one must be able to change the course of the dialog flexibly to avoid being stuck.

According to Dawson and Guare [3], cognitive control is a function developed in the brain of the learner. Under the influence of others and the environment, cognitive and linguistic skills develop over time. Therefore, the learning environment and teaching play a crucial role in the development of these skills. Unlike motor control functions, cognitive control functions appear to be interrelated rather than used in isolation. There is often a correlation between working memory and inhibitory control (teachers usually notice that students who are proficient at concentrating and do not easily get distracted tend to also have better working memory).

Best and Miller [4] argue that working memory skills and the ability to control inhibitions are significant skills in cognitive flexibility.

2. Development of cognitive control

It is only through thinking, exploring, and solving problems that learners can acquire knowledge. By thinking about and understanding their surroundings, students develop knowledge, skills, problem-solving abilities, and dispositions. From a neurological perspective, brain development is part of cognitive development. Learning novel concepts and making connections between them is facilitated by building upon previous knowledge and ideas. Students can approach coursework with enthusiasm and confidence when they have a thorough understanding of topics and strong learning skills. Learning in college requires students to be able to read, understand, remember, write, think, analyze, and solve problems. To function effectively, these cognitive skills must be combined. Cognitive skills contribute to the enhancement of academic performance. Through three transactions, students gain an increasing ability to overcome habits. At first, they develop cognitive control in response to environmental stimuli. Later, cognitive control is applied both reactively and proactively. Lastly, learners become more self-directed rather than dependent on environmental cues to engage in cognitive control. The following factors, however, influence the development of cognitive control.

3. Influence of language learning

A study by Morales et al. [5] compared the performance of monolingual children and bilingual children on working memory tests. The results indicated that bilingual children performed better than monolingual children in these tasks. Bilingual children are more likely to perform these tasks successfully due to their ability to deal with “other executive function demands.” It appears that bilingual children outperformed monolingual children on these tasks. Bilingual children are more likely to perform these tasks successfully due to their ability to deal with “other executive function demands.” In the development of bilingualism, cognitive control may play a role in proficiency outcomes. It is because what we think becomes what we communicate, and what we communicate can lead to creative ideas. An immersive approach appears to improve functions, such as attention and mental alertness, in individuals who are learning a new language.

4. The influence of stress and anxiety

Stress makes students more likely to fail, make mistakes, and perform poorly on tests, especially if they fear failure and mistakes. Students may find stress to be one of the most powerful deterrents to learning, regardless of the source of the stress. Students’ self-talk while performing a task is often dominated by worries, which leads to less achievement. This is because students are involved in a process that reduces their working memory capacity and their ability to solve problems [6]. It is like what happens when students have unrealistically high expectations of themselves and strive to achieve perfection—their working memory is occupied with self-worry, limiting their ability to process information. The working memory of students in both situations is occupied either with negative self-talk or worries about possibly not being able to meet their high standards.

5. The influence of emotional engagement

Whether training in cognitive control functions will or will not be successful depends on the degree of emotional engagement. A learner's strong belief in their own engagement, their feelings of excitement, their sense of challenge, and their sense of achievement, as well as their sense that a particular activity is meaningful to them, are essential aspects of essentials. Emotional investment is essential to ensuring that a learner feels committed to an activity. They devote a significant amount of time and effort to this endeavor. Learning activities in the classroom are exciting and fulfilling, which contribute to the development of cognitive control. An activity's method of execution is crucial to this critical act. Therefore, the attitude of teachers is essential in making activities meaningful and engaging while allowing their students to make progress.

6. Theoretical perspective of cognitive learning

Thinking and reasoning abilities are developed through cognitive development. An understanding of human learning, socialization, and behavior is based on cognitive theory, which examines the internal workings of the brain. Information processing is an incredibly relevant topic for cognitive theorists. As children develop cognitively, they become capable of thinking about the world around them. Cognitive development can be influenced by everyday experiences. Cognitive development is initially considered through Piaget's stages, which correspond to certain ages. The Vygotsky theory is another significant contribution. His focus was on factors affecting cognitive development. This theory emphasizes that the social environment contributes significantly to cognitive development.

7. Jean Piaget's theory

Learning processes throughout the world has been profoundly impacted by Jean Piaget's theory of cognitive development. According to Jean Piaget's theory (1919), as cited by Miller [7], *"children's intelligence undergoes changes as they grow."* and *"Cognitive development in children is not only related to acquiring knowledge; children also need to build or develop a mental model of their surrounding world."* Hence, cognitive abilities are continually developed, with later abilities building on earlier ones. Children engage in different types of thinking in their formative years. According to Piaget, learning occurs because of the integration of new experiences with prior knowledge and newly acquired knowledge with previous experiences. Consequently, these two processes combine to create not only short-term learning but long-term developmental changes as well. Piaget's cognitive theory focuses primarily on long-term developments. From the time of birth through the end of adolescence, cognition develops according to distinct stages. The four key features of his "stages" are:

1. There is always a set order for the stages.
2. There is never a skip in a stage.

3. At each stage, the stage before it undergoes a significant transformation.

It is the later stages that incorporate the earlier stages.

8. The road map of cognitive development

Learning about the world requires children to be able to anticipate how objects and people will interact with one another. Human perception and comprehension of the environment are influenced by social interaction patterns. Iterative perception leads to an increase in one's world knowledge. A development link is the assimilation process, followed by the accommodation process. Based on Piaget's (1936) argument, learning is related to "equilibration objects and people will interact with one another". Human perception and comprehension of the environment are influenced by social interaction patterns. Iterative perception leads to an increase in one's world knowledge. A development link is the assimilation process, followed by the accommodation process.

Assimilation: Children familiarize themselves with new experiences by connecting them to previous ones (i.e., schemes). They may incorporate rattles into their grasping strategy because of previous interactions with sticks or rattles. In accordance with this, when they interpret objects, they have expectations based on their past experiences with sticks.

Accommodation: Both children and adults are subject to this process of accommodation. Because every first-time experience varies, youngsters will be able to adapt to these differences and expand their knowledge. The acquisition of updated information and experiences will alter one's existing views of the world (schemas).

9. A cognitive development model based on Piaget's four stages

The development process follows a "staircase" pattern. According to Piaget, there are four major stages of cognitive development: (1) sensorimotor intelligence, (2) preoperational thinking, (3) concrete operational thinking, and (4) formal operational thinking. Childhood aging periods and stages are generally correlated with each stage. During these stages, ideas are generated.

9.1 The sensorimotor stage

Object permanence is visible at this stage (from birth to age 2). Based on Piaget's theory, infants begin to "think" by using their senses and motor actions during the sensorimotor stage. Infants are constantly touching, manipulating, looking, listening, and even biting and chewing objects, as every new parent can attest. According to Piaget, the infant's actions represent objects and events and children acquire knowledge about the world through these actions.

9.2 The preoperational stage

This is a period (from ages 2 to 7) of symbolic thoughts. As children progress through this stage, they make use of their newly acquired ability to represent objects. It is important to note that, at the present time, they do not do so in an organized or

logical manner. Preschoolers, for example, engage in dramatic play or improvised pretend play as a form of cognition. Children engaged in imaginative play are thinking on two levels simultaneously: fantasy and reality. Dramatic play exemplifies metacognition, or reflecting on and monitoring the process of thinking, due to this dual processing of experience.

9.3 The concrete operational stage

This is a period (from ages 7 to 11) of logical thoughts. At this stage, children become more logical and flexible in presenting ideas and events at the elementary school level. They still act and operate unconsciously. A systematic approach to problem-solving improves children's academic performance. The child may be following a rule unconsciously. As well as performing certain arithmetic tasks and science experiments in class, they also perform certain scientific experiments. The mind of a child focuses on concrete events. He or she tries to use logic, but objects and events cannot yet be thought of or presented systematically.

9.4 The formal operational stage

This is a stage (age 11 and beyond) of scientific reasoning. At this stage, reasoning about abstract or hypothetical objects becomes possible for the children. As they represent ideas and events in elementary school, they become logical and flexible. Still, they operate and act unconsciously. Students succeed academically when they solve problems systematically. Additionally, they perform certain arithmetic tasks and science experiments in class. Children focus on concrete events. Although they try to use logic, they are unable to describe objects or events systematically.

10. Vygotsky theory

Based on this theory, scaffolding was introduced, which is defined as "social collaboration conducive to cognitive development." According to Vygotsky, four "elementary mental functions" are with us from birth: attention, sensation, perception, and memory. Utilization of these elementary skills enables us to acquire higher mental functions within our social and cultural environment. According to this theory, social conciliation is a process of knowledge construction, and infants are said to learn new interpersonal and cognitive skills through interactions with older people. Therefore, cognitive functions are developed because of the interaction between humans. Through collaborative dialogs with more knowledgeable members of society, children acquire their cultural values, beliefs, and problem-solving strategies.

In terms of child development, Vygotsky's approach is a form of social constructivism. Consequently, this theory has led to the development of more interactive and collaborative instructional and learning organizations. In these organizations, students and teachers are encouraged to interact socially. As Vygotsky believed, higher-order functions of the brain are shaped by parents, caregivers, peers, and the individual's culture. According to Vygotsky, there can be differences in human development between cultures. Vygotsky's theory discusses concepts, such as the zone of proximal development, culture-specific tools, and private speech. In the process of creating meaning, the community plays an essential role.

According to Vygotsky, social interaction plays a crucial role in cognitive development. Learning is a necessary, universal aspect of culturally organized psychological function. Unlike Piaget's view, social learning generally precedes development, according to Vygotsky [8]. Therefore, according to this theory, constructed cognitive abilities are argued to be socially guided. Learning, memory, attention, and problem-solving abilities are formed through cultural mediation. By means of Vygotsky's theory, teaching and learning have become interactive and collaborative. This type of organization encourages students to learn by interacting with peers and teachers.

11. Contemporary theoretical perspective

The Piaget theory has been criticized for using a small sample with rigid stage limits. Vygotsky's work demonstrates the development of Neo-Piagetian thinking, which integrates context (family, culture, history, language, and play). Piaget's descriptions of accommodation processes are complemented by Vygotsky's emphasis on environmental factors. According to modern theory, children's cognitive development follows specific principles. These principles shift and shift as a child interacts with the environment.

Many cognitive abilities are developed among children at a very early stage. Children have natural information outwardly world, and their learning is fast. Piaget was off-base about knowledge. As far as article lastingness, it was noticed that newborn children look for objects sooner than Piaget proposed. Besides, newborn children younger than one have the mental capacity to comprehend that secret items are not stowed away from sight.

Piaget and strategic issues as far as the standards of formative science, Piaget's hypothesis has a few issues. Right off the bat, with respect to the determination of members, Piaget did not choose an extraordinary assortment of members to give a dependable outcome; for the most part, he just inspected his own youngsters. Moreover, one of the main parts of the exploration strategy is diminishing the impact of testing predisposition by choosing members cautiously. Consequently, summing up his plans for kids from various societies or nations all over the planet is absurd.

Besides, Piaget frequently used the clinical technique to gather information. This technique is more adaptable, so members are probably going to pose various inquiries. Notwithstanding, uniform materials, questions, bearings, and procedures to assess mental factors are the spine of exploratory brain research. Current analysts have been disappointed by Piaget's reports of his investigation. Piaget did not make sense of the social-financial foundation of the kids, the quantity of members, or the member's race or nationality, and he did not give more than adequate insight concerning his testing measures.

It is challenging to tell whether Piaget is depicting kids speculatively or testing them. Besides, as per Piaget, "clinicians over-summed up their techniques and showed up at magnificent details, especially when a multitude of researchers made an interpretation of their outcomes into numerical terms." Besides, "intense perception, especially when made by [a great observer], beats all insights" (1936/1952, p. 72, referred to in Mill operator, 2012, 85-86). This implies that Piaget did not give factual outlines of his revelations, and he gave extensive example conventions deciphered by Piaget, from which peruses regularly do not figure out the topics.

Though Piaget has informed us about the four mental developmental stage but late examination has shown that not all teenagers arrive at the formal functional stage. Since the instructive cycle in certain social orders does not stress decisive reasoning, which is basic for arriving at the formal functional stage. Because of an absence of instructive foundation, concentrates on show that the main portion of people in certain social orders arrives at the formal functional stage. Moreover, people can show formal functional expertise in only one field; for instance, a generally excellent designer can ponder this particular region but is probably going to experience issues contemplating verse.

Modern cognitive development theory evolves as evidence is gathered and suggestions are made. Currently, researchers are studying factors affecting cognitive development. According to Taylor [9], these factors include both internal (such as sexual orientation) and external (such as the community). Kellermann et al. [10] discuss epilepsy's effects on cognitive development.

Dadvand et al. [11] demonstrate that exposure to green and open spaces benefits cognition. A similar study by Barac et al. [12] demonstrated various effects of bilingualism on cognitive development as an internal factor conditioned by the environment. Sun & Esposito [13] indicate the specificity principle plays a role in children's language development. As a result of extensive research, more specific factors are now being examined to provide more details and enhance our understanding of human cognitive development. Future views of this theory may result in a comprehensive understanding of human development due to the diversity of modern views. However, more research and more evidence are required before that can be achieved.

12. Cognitive development and educators as pedagogical leaders

Theories related to early development, sociocultural context, and contemporary context provide educators with theoretical scaffolding. By utilizing contemporary theories, such as Piaget's cognitive theory for observing children's play stages, Vygotsky's concept of cultural tools, and ZPD in early childhood education, educators scaffold children's play and learning. Zones of proximal development (ZPD) are key in scaffolding, allowing children to accomplish as much on their own as possible while tutoring fills in what they are unable to accomplish. Contemporary theorists point out other influences and realities educators need to be aware of. Therefore, they develop a self-understanding of how much they must be open to change and take into account children's perspectives when employing their pedagogical approach to enhance the learning of students in the total scheme of teaching and learning.

Education as a profession requires educators to have a strong reliance on verbal cues, such as providing suggestions and instructions for children to construct their own understandings of the world. A pedagogical leader builds students' social, academic, and intellectual capital, as well as teachers' intellectual and professional capital. The notion of "pedagogical leadership" refers to bringing a pedagogical framework to all aspects of teaching and focusing on dialog with the learners. Children learn more when they are in an environment in which the family is engaged, the organization's curricular philosophy is followed, data are used to measure program effectiveness, and standards are established to maximize learning. An understanding of pedagogy is rooted in a solid theoretical and practical foundation. Therefore, cultural and social values influence learning, teaching, and development.

With the modern educational system's national priorities, teachers must develop students with the skills and knowledge necessary not only for lifelong learning but also for the knowledge economy. In the knowledge-based economy, individuals and institutions actively interact with each other to learn from one another. As a result, teachers play a crucial role in promoting student learning in a pedagogical context. Organizing lessons, facilitating interaction, and solving classroom challenges require a teacher who is capable of handling content and student learning.

To be effective in the context of the modern era, developmental theories work well when combined with contemporary approaches, such as sociocultural theory and post-structural theory. Those theories really help to question universal norms; they help to think about what it is we see in terms of children's holistic development and not just whether they can do this or that by themselves. Sociocultural theories emphasize "the central role that families and cultural groups play in children's learning and the importance of respectful relationships" and "provide insights into the social and cultural contexts of learning and development." It emphasizes that cognitive development is essentially a social process. This is of great importance to educators who have to plan how to teach children with diverse social and cultural backgrounds. Post-structural theory inspires educators to "challenge traditional ways of seeing children, teaching, and learning." It offers insights into issues of power, equity, and social justice in early childhood settings.

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Considering theoretical understandings, educators may consider how different theories can assist them in looking holistically at children's capacities to participate at different ages. Because it is impossible to separate children from their interactions with others around them, educators must use more than one theory to observe learning. To establish a framework of what is acceptable and fair for students, educators should consider contemporary theories along with earlier theories of cognitive development. Learning takes place within the context of a learner's cognitive processes. To promote social, emotional, and cognitive development in children, educators should provide them with interesting and stimulating materials to use in their environments. Five types of educational approaches (constructivist, collaborative, integrative, reflective, and inquiry-based) are incorporated into a cognitive development theory. Classroom environmental, mental, and cultural realities are integrated into these pedagogical and cognitive approaches.

Thus, theoretical and pedagogical orientations support the distinction of cognitive strategies from metacognitive strategies (learning organization) and social/affective strategies (interaction base). In language teaching, educators utilize strategies, such as repetition, organizing new language, summarizing meaning, guessing meaning based

on context, and using imagery for memorization. The purpose of these strategies is to improve learning by deliberately manipulating language.

13. Criticism on cognitive psychology

Cognitive psychology focuses on interior data cycles, such as discernment, consideration, language, and memory. The psychology profession is concerned with these interior cycles and their impact on our behavior and feelings. As a result of cognitive psychology research, new speculations have been developed, and more insight into how the mind works has been gained. Researchers have found that cognitive development is difficult to identify. According to another interpretation of this methodology, it ignores other factors besides cognitive ones that can influence behavior. The social and cognitive environments are two factors that may influence a person's behavior. There are some limitations to this approach.

Psychology researchers usually carry out their studies in false environments or ignore the current situation. For instance, participants in a memory study could feel pressure to perform well in a study hall setting, resulting in worse memory performance than if they were evaluated at home. Since the focus lacks natural legitimacy, its effects are less applicable to daily life and may even be irrelevant outside the review environment. In many cases, students feel confident and well-prepared before an exam, but when they enter the exam hall, everything vanishes. A lack of cognitive development can be caused by nervousness or hypertension.

In most instances, Piaget's four stages of cognitive development respond to misconceptions or insignificant details that do not contradict the central principles of his theory. Some people have complained that his tests were too difficult for children. A variety of skills can be tested by altering the process so that younger students can pass the tests. In other studies, the ages associated with the stages have been examined, and the diversity of children has been highlighted. Rather than focusing on the age at which a child reaches a particular milestone, Piaget emphasized succession.

When it comes to specific errands, children use various types of reasoning and are conflictual at every stage. In another study, it was found that children use specific types of reasoning when solving specific errands and that they are conflictual throughout the process, indicating that they will use functional reasoning. That is, "level decal age" refers to the fact that a child may not always use concrete functional reasoning on such errands. Although it was acknowledged that this went against Piaget's hypothesis, it does so assuming that children are believed to be in a phase. Piaget predicted this outcome based on a thorough understanding of his hypothesis.

Looking closer at his hypothesis, it appears that children develop different types of reasoning based on their experiences. The degree to which a child is involved with the project materials will determine how well they use concrete and functional reasoning.

Furthermore, Piaget's conception of cognitive progression has been criticized for misinterpreting social factors. In some instances, he departs from Vygotsky's belief that social connections are so important. Anyhow, it surprised Vygotsky when he reviewed Piaget's original work and found it to be too dependent on friendly variables! According to Piaget, social elements are clearly significant and important, but they do not fully explain progress on their own. According to him, equilibrium is also a constant, ever-changing interaction. A key foundation for current research on the formative brain remains Piaget's hypothesis of cognitive development. The primary point of his argument is affirmed rather than challenged by subsequent revelations.

On the other hand, “reductionism” is a term only used to describe theories that alter how people behave. Many brain science research approaches fail to take into account all of the different factors that affect the human psyche and how we behave. Instead, they focus on just one aspect of understanding how the brain works. Individual differences are typically ignored in cognitive psychology, where it is assumed that all inner processing is consistent across individuals. This is reductionist because it ignores the influences of nature, the environment, or genetics on cognitive capacity.

Cognitive psychology studies cognitive cycles with a restricted focus. Because of the PC analogy, data handling specialists tend to focus primarily on the coherent components of information handling. They also tend to focus less on the deeper, innovative, and social facets that can also influence thinking. The field of cognitive psychology has often relied on correlations between the functioning of computers and the functioning of the human mind. Does the cerebrum function in this manner? In comparison to the most advanced computer, the human mind is infinitely more remarkable and adaptable.

Criticizing the cognitive approach, Burrhus Frederic Skinner [14] argues that only external stimulus-response behavior can be measured scientifically. Due to their inability to be observed and measured, mediation processes between stimulus and response cannot be observed. The mediation processes between stimulus and response cannot be observed or measured because they do not exist. He continues to explore problems with cognitive exploration techniques, especially thoughtfulness, due to its abstract and informal nature.

Behaviorists believe that children’s brains are like a blank slate (*tabula rasa*) and are born without cognitive functions, such as schemas, memories, or perceptions. In determining behavior, the cognitive approach often overlooks physical (biological psychology) and environmental (behaviorism) factors. In addition to cognitive psychology, cognitive neuroscience and artificial intelligence (AI) have been influenced by and integrated with cognitive psychology.

14. Cognitive development of students in higher education

In higher education institutions (HEIs), stakeholders perceive cognitive development in relation to intellectual capital (IC) and sustainable development (SD). In HEIs, two constructs (IC and SD) are related, especially through relational capital and structural capital [15]. Therefore, intellectual growth is influenced by the study environment, which is conducive to the development of intellectual ability.

Cognitive development is correlated with student learning approaches, but learners may develop cognitively differently in different environments. According to Zhang & Watkins [16], there was a reported difference in cognitive development among American and Chinese students. The study also demonstrated that extracurricular activities were positively related to cognitive development for both American and Chinese students. A stimulating learning environment and a focus on cognitive abilities result in improved academic performance. Among other factors, academic achievement is influenced by a student’s ability to process information quickly, function in a visual-spatial environment, and calculate.

A key goal of education is to engage students with educational plans and encourage them to work intellectually. Engagement in cognitive activities involves working beyond the minimum requirements by putting thoughtful energy into the comprehension of complex ideas. In it, psychological investment is focused on

learning, understanding, and mastering knowledge. An engaged student is capable of exceeding expectations and prefers challenges over requirements. Through this, students can expand their knowledge frontiers and develop meaningful and enduring academic commitments. Students' social and cognitive development is enhanced by engagement in the classroom. A student's engagement in higher education requires consideration of their potential to grow and motivation for development as distinctive characteristics. The development process is driven by the potential of an individual as a motivating value. To achieve creativity, a learner must develop, grow continuously, and engage in motivational-creative activities [17]. According to the five-dimensional model [18], five areas must be considered: (1) academic engagement, (2) cognitive engagement, (3) social engagement with peers, (4) social engagement with teachers, and (5) effective engagement. All these dimensions have high consistency. An undergraduate degree in pedagogical education has three components: (1) a value-based motivation component, (2) a cognitive component, and (3) a practical component. Therefore, by working on cognitive development through these engagements, a sufficient level of knowledge and skills can be developed in students of higher education institutions. A bachelor's degree is generally associated with competitiveness. This belief holds that knowledge (cognition) is the only competitive advantage that remains over time. For cognitive learning to take place, students' creativity must be developed. The perception of difficulty increases with the level of subjective memory dysfunction [19]. Further, speed and perceived difficulty correlate when a task is perceived as difficult. An individual's task and metacognition must be considered to examine the integrity of their information processing speed.

Besides other factors, students' cognitive development is also affected by dimensions of teaching effectiveness in higher education institutions [20]. There are two fundamental perceptions of students regarding instructors: clarity and organization. A combination of both aspects of learning is associated with enhanced outcomes. These outcomes include students' critical thinking skills, their propensity for lifelong learning, their academic motivation, their likelihood of completing their bachelor's degree, and their use of deep learning techniques [21]. From a pedagogical perspective, student-directed learning [22, 23] involves students in the processes of collaboration, testing, creation, and directing their own learning. Students engage in active learning by writing, reading, discussing, evaluating, and creating. Therefore, students develop skills in cooperation and communication with peers in addition to participating in content development and knowledge building. The most efficient way to provide students with opportunities for cognitive development is through a student-directed learning strategy. Student-centered learning refers to the efforts of teachers to facilitate and design the learning process to engage students in their learning. Student-centered education focuses on developing problem-solving skills using complex and open-ended problems. Unlike traditional learning, problem-based learning involves students presenting their knowledge based on their understanding of course content and class participation.

15. Glossary

15.1 Assimilation

Assimilation is the process by which a learner relates newly acquired information to older cognitive structures. Thus, assimilation occurs when a learner encounters a novel idea and must "fit" it into what they already know.

15.2 Accommodation

Accommodation is a substantial process that requires the learner to reshape existing knowledge due to the acquisition of recent information. An adaptation occurs when preexisting knowledge is altered to accommodate newly learned information. Thus, accommodation involves creating new schemas.

15.3 Cognitive learning

Cognitive learning emphasizes helping learners learn how to use their brains to their full potential, where experience leads to changes in knowledge. The formation of insights and latent learning are both components of cognitive learning. The cognitive theory asserts that emotions and behavior are largely influenced by thoughts. Several factors influence learning, such as problem-solving skills, memory retention, thinking skills, and the perception of what is learned.

15.4 Cognitive development

An individual's cognitive development is the development of his or her ability to reason and think. Cognitive information development includes four stages: reasoning, intelligence, language, and memory. Through cognitive development, children learn to think critically about the world around them. The cognitive development of a child is influenced by everyday experiences.

15.5 Cognitive skills

Cognitive skills are brain-based skills necessary for acquiring knowledge, manipulating information, and reasoning. Cognitive skills refer to cognitive capacities. These skills include thinking, reading, learning, remembering, reasoning, and paying attention. Learners organize newly acquired information into the repository of knowledge they use every day in class, at work, and in their personal lives.

15.6 Jean Piaget's theory

According to Jean Piaget, children's intelligence changes throughout their growth. Children need to develop a mental model of the world around them as part of their cognitive development. Children pass through stages in their development of intelligence in terms of their formal thought processes.

15.7 Problem-solving strategies

Learners can find the most appropriate solution to their problems by looking beyond the obvious answers and using problem-solving strategies. Learners develop problem-solving skills by identifying problems, analyzing them, generating alternative solutions, and evaluating them. Common problem-solving techniques used in education are computing, simplifying, illustrating, and summarizing information and ideas.

15.8 Vygotsky's theory

Social interactions can guide and mediate a person's learning ability. The theory suggests that socialization contributes significantly to learning. Essentially, this

theory outlines three core concepts related to cognitive development: (1) culture plays an influential role in learning, (2) language is the root of culture, and (3) individuals learn and develop within their communities.

15.9 Zone of proximal development (ZPD)

A learner is traveling between two terminals: the known and the unknown. Guidance and encouragement from a knowledgeable person can help a learner who is having difficulty mastering certain skills. A skilled partner can guide and encourage a learner to achieve greater results than he or she could on their own. In other words, those skills the learner is “close” to acquiring are considered.

16. Case in point

The teaching environment in Oman involves three main factors: learners, teachers, and obstacles. Therefore, the comparison of students’ results after certain methodical interventions with a control group reflected the difference in achievement. Omani colleges’ English classes, for example, provide students with both basic language skills and a foundation for advanced language abilities that will be crucial to completing their degrees. The process of learning a second language requires more than just language skills. For our learners to be successful at learning a new language, they must be in control of their own learning and self-management.

A longitudinal study was conducted at Mazoon College, Sultanate of Oman. A total of 176 students (mixed ability learners) taking preparatory English language courses for a bachelor’s degree were chosen as the subject of study from six different sections of the authors’ own classes. The data were collected over a period of 14 months (three semesters). Learners were given reading and writing exercises that focused on abstraction, thinking, hypothesizing, and drawing conclusions. The study was conducted on an experimental group of 93 students and compared with a control group of 83 students.

16.1 Theoretical perspective

Guided by the theory of cognitive development to understand the interplay between teaching strategy and cognition in education, students use a certain amount of working memory, which is explained by cognitive load theory. Observing and recording the assessments that how stress and emotion alter the cognitive processes that support performance our study concluded from findings in the preview of cognitive psychology and education point of view.

16.2 Methodology

The study was descriptive in nature and used both quantitative data on samples selected at convenience. The intervention strategy was based on the premise that cognition mediates learning and behavior. Cognitive-behavioral instructional strategies (CBIS) were designed to promote learning and behavior change. Students were taught to examine their feelings and thoughts in their lessons. Interventions included single-task training, integrated training, meditation, group work, and transcranial

stimulation to improve cognitive control. The strategies were based on cognitive restructuring, exposure, and response prevention to develop the following targeted skills:

- Verbal and written English language skills
- Thinking skills
- Developing knowledge
- Memory development
- Perceptual skills
- Emotional control

Outcomes (**Table 1**) are based on the assessment of students' data on given tasks. A tendency investigation of summative assessments and behavioral outcomes assessment measured the following: verbal comprehension, perceptual reasoning, response to challenging situations, processing speed, number of mistakes, and willingness to accept a challenge (**Figure 1**).

	N	Mean	Std. Deviation	Range	Minimum	Maximum
Control Group Average	83	73.132	5.773	24.00	62.00	86.00
Experimental Group Average	93	81.096	4.745	16.00	74.00	90.00
Valid N (listwise)	176					

Table 1.
 Descriptive.

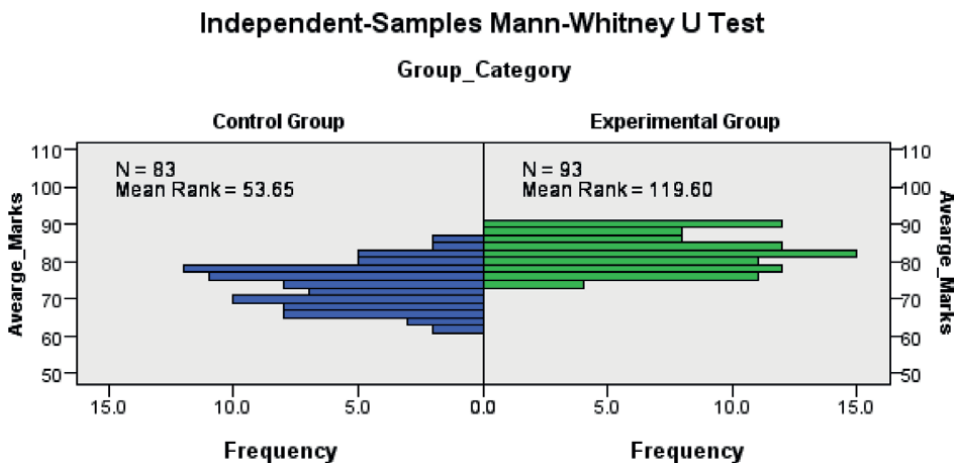


Figure 1.
 Marks average.

Null hypothesis	Test	Sign.	Decision
The distribution of average marks (samples) is the same between categories of groups	Independent-Samples Mann-Whitney U Test	0.000*	Reject the null hypothesis

*Asymptotic significances are displayed. *The significance level is 0.05.*

Table 2.
Hypothesis test summary.

There was a significant difference in variance (**Table 2**) between the control group and the experimental group.

17. Conclusion

Based on research on cognitive development among students of English as a second language in higher education, this chapter examines cognitive development’s theoretical grounds and criticisms, as well as its value and contribution. Additionally, the chapter illustrates how pedagogical approaches are guided by the dimensions of student learning. The outcomes of the study highlight the study process as a chance to develop new skills in students through cognitive engagement. Attending English as a second language class evokes thoughts of learning and achievement in students. Examination of given situations revealed that study engagements may lead to feelings of tension, apprehension, or fear about performing up to the expectations set for learners by teachers and curriculum. Therefore, learners of English as a second language feel under pressure from anxiety and stress. The acquisition and demonstration of knowledge cannot simply sum up what students learn in class. Memory, attention, cognitive control, motivation, and emotions all play a role in academic performance. Providing students with close supervision, assistance, and interaction opportunities enhanced the performance outcomes of the experimental group. Pedagogical interventions integrated with cognitive development perspectives applied to the experimental group resulted in improvements in learning and a reduction of anxiety and stress compared to the control group. The following categories of activities and strategies are presented based on assessments (e.g., formative and summative) aimed at developing cognitive control functions in the language classroom (ages 18–25) or combinations of those activities.

17.1 Determine the level of the learners and assign appropriate activities

Based on the description above, it is evident that these activities provide a dual benefit by developing language skills and improving cognitive control functions simultaneously. Taking part in these activities enhances one’s ability to control cognitive processes. Stress and positive emotional engagement play an influential role in the development of cognitive control.

It is likely that the activities will be repeated over time and that the challenges will become increasingly challenging.

17.2 Learning from mistakes

Ensure that your learners understand that making mistakes is natural and that you do not grade them according to how they perform these tasks. Remind them that these

activities will be performed on a regular basis. If they spend more time focusing on and enjoying the activities, their performance will improve.

17.3 Teaching English as a second language: methods of improving cognitive control


- The use of self-talk to improve cognitive control skills improves a student's ability to set and achieve goals, and plan and carry out plans.
- It is imperative to monitor and analyze a process when it is taught to people rather than expecting that they are already familiar with it.
- A script can be used to support this process, which includes model questions, templates, and checklists. It is critical that students repeat these language routines over time in order to gradually internalize them and use them in their own self-talk.
- This process can also facilitate the acquisition of a high level of proficiency in the target language. It can be taught to students individually or in groups.
- The development of self-control strategies in the classroom is intended to create a culture of can-do in the classroom.
- It is critical to encourage students to develop further by replacing negative beliefs about their abilities. This phase can be challenging in terms of establishing a positive classroom culture. Furthermore, negative beliefs about students' abilities may adversely affect teachers' attitudes toward their students.
- Develop metacognition and study strategies for young adults. The importance of recognizing that any concerns teachers may have regarding cognitive control functions may not be about the core skills themselves cannot be overstated. They may choose to combine these skills in a more sophisticated manner.

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Chapter 3

Conflict and the Quality of Teachers' Work

Beata Pitula and Monika Morgala

Abstract

The text presents research on the conflicts revealed by teams of kindergarten teachers and their effects on the professional functioning of teachers and the quality of work of the preschool institution. Their results confirmed the prevalence of conflicts, their mainly hidden and emotional nature and negative consequences in the form of lowering the quality of the care, educational and didactic functions performed by the kindergarten teacher.

Keywords: conflict, teacher's work quality, teacher, conflict in kindergarten, conflict in teaching teams

1. Introduction

Education is one of the most important ingredients of human existence, and education *has long been recognized as an area of social life that largely determines the fate of individual people, various groups, nations and countries* [1]. Undertaking research and reflection embedded in the perspective of educational everyday life is important from the perspective of perceiving schools and kindergartens in the category of institutions that are *the basic tool of the State for the organization of universal education* [2] and understood in terms of a social institution, which is part of a more complex structure, it is characterized by a relatively constant *system of values, norms, statuses, role regulations, social groups and organizations (...)* related to the need to provide members of society with *basic intellectual and cognitive skills* [3]. The education of children and young people becomes a determinant of the development of every human being, and the teacher and the quality of his work will be of key importance here.

To implement the social functions imposed on education (socialization, social integration, establishing a social position, cultural innovation and other hidden functions) [4], the specificity of the school environment, and in particular the interpersonal conditions of social coexistence, including communication competences and conflict resolution styles, taking into account the roles played in this particular community [5–7] should be examined. The main processes of team interaction are therefore: communication, conflict and coherence [8]. Interpersonal communication in an environment diverse in terms of characters, attitudes, worldview and psychosocial competences is not easy, but it is the only method of effectively communicating information, emotions and own opinions in a team, including the teaching team.

Disruptions in the communication process cause misunderstandings and tensions, the consequences of which are conflicts within the teams. The effects of these conflicts may be destructive for an individual teacher, the teaching team and the entire institution, or on the contrary - positive, implying beneficial changes. *The key (...) is the belief that this conflict is a natural and inevitable part of life, and the realization that it is our reaction or responses to the conflicts that make the conflict situation constructive or destructive* [9]. However, no matter what happens to teachers in this work, both in a positive and negative sense, *if the work negatively affects the teacher's well-being, health and functioning, the negative consequences will secondarily translate into the quality of their work and the activities of the entire educational institution* [10].

Combining the scientific interest in the work of teachers and the factors determining their professional functioning and personal connections with the management of preschool education institutions, we made an attempt to diagnose the effects of conflicts on the effectiveness of the work of preschool teachers and the entire preschool institution.

2. The nature of the conflict

All activities in educational institutions are aimed at cooperation and cooperation in a team. Bearing in mind that the concepts of developing these competences are based on the norms and principles of social life, the need to create a safe atmosphere based on mutual trust and a sense of interdependence, then it becomes important to recognize conflicts, their sources, their course and the effects that they may entail [11].

The concept of "conflict" is a complex term, which is reflected in various attempts to define the concept. Most of them treat a conflict as *a clash resulting from different attitudes, priorities, methods of proceeding in the face of the actual object or situation* [12] or *a dispute between two or more members or groups resulting from the necessity to share limited resources or work or taking a different position, different goals, values or perceptions* [13].

On the other hand, with regard to interpersonal relations, the conflict may appear as *a declared fight between at least two mutually dependent parties who perceive the incompatibility of goals, the lack of mutual benefits and recognize that the other party creates obstacles in achieving the goal* [14].

In the context of human resource management, conflict is perceived both as an impulse contributing to increased creativity and the cause of many *unfavorable phenomena* [15].

On the basis of the quoted, selected by the authors, definitions of the phenomenon, one can notice the characteristics of conflict situations, such as the presence of at least two mutually dependent parties, and its disclosure takes place when one of the parties notices that its goals, tasks and values are in opposition to the attitudes and behavior of the opposing party. Moreover, it is noticeable that actions are taken to hinder or block the achievement of the goals and tasks of the opposing party. In the nature of conflicts, it is important that they can arise for non-objective reasons and are accompanied by strong emotions [16].

In the context of our research on conflicts and the quality of teacher's work, important are the functions assigned to conflicts - positive (functional, constructive) and negative (dysfunctional, destructive) functions and their etiology.

The positive function of conflicts is reflected in favorable changes, resulting in increased initiative and creativity in the work of teachers, or changes and modifications within the entire organizational structure.

Then, the negative function of conflict situations ultimately leads to a reduction in the effectiveness of the professional work of individual teachers, has a demotivating effect on undertaking innovative activities and, consequently, reduces the quality of work of the entire educational institution.

The etiology of conflicts is conditioned by various factors related to the nature of a man and the place where he performs his professional functions (Więcek-Janka, 2006, p. 116). Ross A. Webber expressed the view that the determinants of conflicts are three factors: incompatibility of goals, community of resources and interdependence of actions [17]. One of the best-known classifications of the sources of conflicts (and at the same time the typology of conflicts) is Christopher Moore's conflict wheel. He divided the sources (and types of conflicts) into the following conflict: data, relations, values, structural and interests. Of these five, the conflict of values is considered to be the most serious, as it arises as a result of world views, hierarchy of values, values of one's "self" (identity), as well as habits and conventions.

3. Professional functions of the teacher and the quality of his work

In pedagogy, there is a known (...) thesis that working conditions determine the quality of the effects of action S. Brzozowski [18].

In the education system, it is the teacher who plays a key role, because education is to a large extent what the state-led educational policy wants, but at the same time it is really the same as everyday teaching activity (Suchodolski, quoted in [19]). The teaching profession is assigned functions - covering specific, specific tasks. There are many classifications of teaching functions in the literature, but the best known is the division into the teaching, educational, caring, environmental, research and life orientation of young people [20].

The age of preschool children (2.5–6 years old) is associated with intensified activities related to the care and educational and didactic functions of teachers. They focus on tasks related to:

- creating a safe, friendly atmosphere for children, taking into account their developmental needs (caring function);
- planning and organizing educational activities, developing children's social competences and cooperation in the peer group and with adults (educational function);
- coordinating cognitive processes that develop the competences of preschoolers in terms of knowledge and practical skills, primarily preparing them to start learning at school.

All activities related to the implementation of tasks resulting from the performed professional functions are based on properly selected and adapted to the psychophysical abilities of children, educational interactions [21]. Hence, it is imperative that their implementation by teachers meets the highest standards defined by the provisions of the educational law and the code of teaching pragmatics. It is equally important to ensure appropriate conditions for their professional functioning.

Therefore, an important aspect of the implemented educational reforms is the general tendency to improve the quality of education. This quality relates to the work of the teacher and, consequently, to the quality/effectiveness of the work of the entire kindergarten. It seems obvious, because quality becomes an equal challenge, measure and requirement of contemporary pedagogical theory and practice [22].

Factors determining the quality of a teacher's work can be divided into:

- conditions of psychological nature - related to functional motivational mechanisms for the implementation of goals and tasks resulting from professional functions and general personality competences such as: ambition, creativity, openness or understanding the need for continuous development;
- pedagogical conditions, resulting from clearly defined goals and educational tasks as well as appropriate preparation for the profession;
- praxeological conditions related to efficient operation conditioning effective pedagogical activities as well as monitoring the quality of one's own work;
- conditions of social nature, relating to interpersonal relations in the institution, organizational climate, the social prestige of the teacher's profession and the social and professional roles it performs, as well as the appropriate material and organizational prosperity of the workplace [23].

As can be seen, the quality/efficiency of the teacher's work in the performance of the assigned professional functions is determined by many different factors that are referenced in specific and diverse interpersonal relations occurring in educational institutions. The planes of these relations include not only the teacher and the student, but also the teacher - parents /legal guardians, teacher - student's /child's assistant, teacher - specialists/therapists; teacher - headmaster; teacher - teacher/group of teachers or teacher - other staff of the institution. As a result, it can be assumed that interpersonal relationships and all related processes and phenomena constitute a special place in the work of teachers, and conflicts are one of them. Since the very beginning of teaching and educating children and youth, a discussion has been held on the teacher and his professional functioning.

Empirical investigations in the field of pedeutology relate to a large extent to such areas as: predispositions and competences, teacher's autonomy, professional satisfaction and well-being of educators, professional burnout and its implications for the professional functioning of teachers, stress in teachers' work and coping strategies.

Meanwhile, various external factors (including permanent reforms of the education system; increasing requirements and expectations on the part of state and local authorities, parents and students; excessive bureaucratization or insufficient financing of education) as well as internal (e.g. organizational culture of an educational institution; the level of psychosocial and professional competences of teachers; occurrence/intensification of salutogenic and stressogenic factors, etc.) (see [10, 24–26]) may be determinants of conflicts between members of teaching teams.

It should be emphasized at this point that although the topic of many works is the correlation between disharmony in personal and professional life, without any specific indication of teachers, the scheme of implication of conflicts for various areas of life is the same (see [27–31]).

The current literature on conflicts in educational institutions focuses mainly on conflict situations and ways of resolving them among students (see [31–36]).

However, the perception of educational institutions such as schools or kindergartens in the category of organization, allowed for the diagnosis of conflict and the ways of using it as a potential tool for managing the institution. This, in turn, shows the potential for conflict in the management and guidance of an educational institution with the use of human capital (teachers and other staff) and other assets (tangible and intangible).

In the literature, more and more space is devoted to the topics of leadership of principals and teachers, and conflict management in schools (see [37–41]). One important fact should be noted - how little attention in the literature is paid to conflicts and their implications on the work of kindergarten teachers. And yet, pre-school education, as clearly emphasized in the 1972 report on the state of education in the world under the patronage of UNESCO¹, is a key stage in the *effectiveness of the state's educational and cultural policy* [42].

4. Methodology of own research

4.1 Research objectives and research focus

The aim of the research was to diagnose the most common causes of conflicts in teaching teams and the relationship between them and the professional functioning of the teacher and the effectiveness of the kindergarten's work, while internal conflicts in the teaching teams of kindergartens were the subject of the research.²

In order to obtain reliable results, the research problems were formulated in the form of questions:

1. Whether and what kinds of internal conflicts occur in the teaching teams of kindergartens?
2. Are internal conflicts in teaching teams related to the professional functioning of preschool teachers and to what extent?
3. Do internal conflicts occurring in teaching teams affect the effectiveness of the school/preschool institutions and to what extent?

4.2 Methods and techniques used in the research

Taking into account the nature and complexity of the research topic, we decided to triangulate research techniques within a diagnostic survey and an individual case study. The use of the survey method made it possible to diagnose conflicts among teachers, while exploring the quality of their professional functions and the

¹ The project "Learn to be" was chaired by E. Faura and included 81 expert opinions of many eminent scientists, including I. Illich, J. Piaget, E. Reimer, W. Okoń and B. Suchodolski. The report was a critical assessment of the current state of world education and the prospects for its development (cf. [2], pp. 6–7).

² The presented analyzes are a selected part of the research on the problem of conflicts in teaching teams carried out as part of the doctoral dissertation of Monika Morgala MA, prepared under the scientific supervision of Beata Pitula PhD Associate Professor of Silesian University of Technology.

effectiveness of the entire preschool education institution. The individual case studies allowed to identify and understand deeper mechanisms of the emergence of conflicts in teaching teams, as well as their impact on the teacher's professional functioning, and the comparison with the results of the survey method showed regularities related to the mental state, self-esteem and effectiveness of professional activities.

The techniques that were used in our empirical investigations were questionnaires addressed to teachers, an interview with principals and selected teachers, a psychosocial competence test and observation.

The analysis of the obtained research material was carried out with the use of statistical methods. Measurements were performed using IBM SPSS Statistics version 25. It was used to analyze basic descriptive statistics, Pearson's and Spearman's r correlation analysis, Student's t -tests for independent samples, as well as Mann Whitney's U tests and one-way ANOVA. The classic threshold $\alpha = 0.05$ was adopted as the level of statistical significance.

5. Conflicts and the quality of teachers' work

5.1 Socio-demographic profile of the study group

The research was carried out in public and private pre-school education institutions (kindergartens, pre-school units in schools and other forms of pre-school education - kindergarten points) in the Rybnik commune, operating at least since September 1, 2020. The survey was conducted in the period from 09.2020 to 09.2022 with 305 kindergarten teachers and 37 principals as participants.

All respondents turned out to be women, so our analyzes did not take into account the gender determinant of the studied population. Feminization of the kindergarten teacher profession in terms of identifying and managing conflicts is crucial, as shown by global research. Women treat conflict situations more emotionally than men [43]. Moreover, they have greater abilities in interpreting non-verbal messages, and their reactions in conflict situations are more intense than in the case of men (i.e., in [44–48], cf. [49]), as in the case of commitment and striving to resolve a conflict situation.

In men, on the other hand, there is a noticeable tendency to present an attitude of withdrawal and denying the existence of a conflict (see [46, 50]). Bearing this in mind, in the case of respondents of both sexes, one should. Take into account a different approach to the problem of conflicts, as in the case of different styles of their resolution [51].

The professional structure of the survey respondents is presented in the **Table 1** below.

Based on the above chart, it can be concluded that in the case of teaching experience in the group of surveyed teachers, the largest percentage is 26.9% are educators with 11–15 years of experience, and the lowest are teachers with more than 26 years of experience (5.2%). and over 30 years of work in the profession (5.2%). It is interesting that in the group of teachers from non-public institutions there are no teachers with more than 25 years of experience. In the case of the group of principals, the largest group are people with work experience between 21 and 25 years (45.9%), of which as much as 88.2% of the total number of respondents in this period of service were principals from public kindergartens.

On the other hand, the data on the structure of the degrees of professional promotion obtained indicate that among teachers the most numerous group are chartered

	Teachers N = 305						Principals N = 37					
	P	%	NP	%	Total	%	P	%	NP	%	Total	%
Pedagogical work experience (in years)												
0–5	21	6,9	44	14,4	65	21,3	0	0	0	0	0	0
6–10	36	11,8	25	8,2	61	20,1	1	2,7	1	2,7	2	5,4
11–15	51	16,7	31	10,2	82	26,9	2	5,4	2	5,4	4	10,8
16–20	22	7,2	3	1,1	25	8,2	4	10,8	2	5,4	6	16,2
21–25	35	11,5	5	1,6	40	13,1	15	40,5	2	5,4	17	45,9
26–30	16	5,2	0	0	16	5,2	3	8,2	0	0	3	8,2
over 30 years	16	5,2	0	0	16	5,2	4	10,8	1	2,7	5	13,5
Total all	197	64,5	108	35,5	305	100	29	78,4	8	21,6	37	100
Professional promotion degree ¹												
no degree	0	0	27	8,9	27	8,9	0	0	3	8,1	3	8,1
trainee teacher	5	1,6	9	3,0	14	4,6	0	0	0	0	0	0
contract teacher	26	8,5	53	17,4	79	25,9	0	0	1	2,7	1	2,7
appointed teacher	51	16,7	14	4,6	65	21,3	0	0	4	10,8	4	10,8
chartered teacher	115	37,7	5	1,6	120	39,3	29	78,4	0	0	29	78,4
Total all	197	64,6	108	35,4	305	100	29	78,4	8	21,6	37	100

Source: own study based on the collected material. N - total number of the study group population; P - public kindergartens; NP - non-public kindergartens.

¹Teachers career degrees, obtained in accordance with the educational law, in force until August 31, 2022.

Table 1.
The professional structure of the respondents in the research.

teachers (39.3%) and the least numerous are trainee teachers - 4.6%. In the case of principals, 77.1% are people who are chartered teachers, and thus constitute 100% of managers of public institutions.³ It can be assumed that the polarization of the professional experience of the headmaster of the kindergarten, resulting both from the seniority and the degree of a certified teacher, gives a greater guarantee of knowledge of the functioning of the kindergarten, the specificity of the work of kindergarten teachers as well as their needs and expectations. On the other hand, the change of perspective from teachers to principals allows for introducing innovative changes in the organizational structure of the institution, beneficial for the entire kindergarten community.

5.2 Analysis of the research material collected

The main goal of our exploration was to obtain information about the occurrence of conflicts, their causes, type and consequences for the quality of the teacher's work.

³ According to educational law regulations, principals managing non-public kindergartens and kindergarten points are not required to have any degree of professional advancement, although the headteachers of such educational institutions have the opportunity to take advantage of this path of professional development.

Therefore, our respondents were asked whether there were conflicts in their teaching teams in the analyzed period. Their presence was indicated by 236 of the surveyed teachers (76.87%) and 100% of the surveyed principals. The obtained results confirm the general thesis about the universality and inevitability of conflicts in the work environment. Confirmation of the occurrence of conflicts generated a question about their type. The results of the obtained responses are presented in **Table 2**.

Based on the above chart, it is visible that hidden conflicts, both in the opinion of teachers (27%) and principals (39%), appear most often, while open conflicts constitute only 12 and 8% of indications. Hiding one's attitudes and the inability to express them in the long run may consequently reduce the quality of the professional work of the teacher and the entire teaching team. It also entails potentially negative consequences in the area of interpersonal relations between all kindergarten employees [52].

The second type of conflict most frequently indicated by the respondents in the group of teachers (17%) and principals (27%) are those of an emotional nature. The essence of this type of dispute are emotions and attitudes towards other teachers or employees who play different roles. The autogeneity of emotional conflicts determines the difficulties or the inability to solve them. It is closely correlated with human factors, which causes difficulties in determining the real cause of the conflict, as they may result from fatigue, malaise, anger, jealousy, aversion, poor reading of other people's intentions or problems outside of work. The high percentage of responses shows that emotional conflicts put a heavy burden on teachers and teams. Additionally, in combination with hidden conflicts, they lead to the compilation of difficult situations with negative consequences for individuals, the teaching staff and the entire organization. Apart from emotional conflicts, in both groups of respondents material conflicts were indicated as situations occurring in their teaching teams (teachers - 16%, principals - 9%). This type of conflicts is related to specific issues, hence it is possible to use it constructively to introduce changes within the organization of teachers' work and the entire preschool education institution. The disorganized nature of all the conflict situations indicated by the respondents indicates the spontaneity of their emergence as a result of immediate resonance. Irrational conflicts (teachers - 5% and principals - 1% of responses) were the least frequently indicated in both groups of

Conflict types	Teachers' responses	Principals' responses
	%	%
hidden	27	39
public	12	8
emotional	17	27
factual	16	9
irracjonalne	5	1
rational	0	11
organized	0	0
disorganized	9	5
lack of conflicts	11	0

Source: own study based on the collected empirical material.

Table 2.
Types of conflicts occurring in the workplace according to the surveyed teachers.

teaching staff of kindergartens, which indicates that fictitious and false motives resulting from stereotypes, prejudices, envy and a tendency to suspect [53], constitute a small percentage of conflict situations.

The types of internal conflicts most often revealed by the respondents of the research, most often revealed in their preschool institutions, encourage them to obtain answers regarding the potential causes of their occurrence. Due to the coexistence of various conflicts and the multidimensional nature of their sources, the respondents had the opportunity to indicate more than one answer. The results of the opinions of the respondents are presented in **Table 3**.

The above data justify the statement that teachers see the greatest correlation between the disclosure of a conflict and bad interpersonal communication (11.5%), misinterpretation of the information provided (10.2%) and a complete lack of information (8.5%). In the opinion of the surveyed teachers, the overabundance of tasks and responsibilities (8.2%), the lack of teamwork skills (5.6%) and the lack of respect from other members of the teaching team (5.5%) are also conflicting factors. The least frequent sources of conflict were religious beliefs (0.1%) and non-compliance (or "bending") of the education law and regulations by the principal (0.8%).

In the group of preschool principals, the dominant etiological factors of conflicts were the misinterpretation of information (12.4%), the multitude of tasks and responsibilities (10.6%) and the inaccurate allocation of work tasks, responsibilities, powers and responsibilities among teachers (10.6%). Principals also identified as an impulse for conflict situations: poor interpersonal communication (8.3%), a low level of teachers' resistance to negative behavior of colleagues (8.3%), lack of mutual respect by members of the teaching team (7.3%) and teachers' inability to accept criticism (6.9%).

However, kindergarten principals do not see the sources of conflicts in their institutions in terms of different political or religious beliefs, an unfair reward system, insufficient infrastructure or bullying by teachers (0%). Contrary to teachers, they also do not see potential causes of conflicts in actions resulting from their own behavior, such as: favoring selected teachers, non-compliance or "bending" regulations or (0%) or bullying their subordinate teachers.

Worrying is that the respondents stated the existence of mobbing, both on the part of the principal (1%) and in the group of teachers (2.3%). This means that in the years covered by the empirical analysis, such a phenomenon must have occurred, and the principals did not notice it or do not want to admit.

The literature on the subject contains only a few studies devoted to conflicts in kindergarten, while many of them deal with potential sources of conflict in the organization. Recognizing that a preschool institution is a specific organization, we assumed that the comparison of our results with the empirical results of other researchers is legitimate and allows us to conclude that communication disruptions/disturbances are the most common cause of misunderstandings and conflict situations. Below in this classification the following are listed: favoritism, nepotism, disruptions in the organization of work, inadequate remuneration or stressful situations, including mobbing (see [30, 49, 54–63] and others).

The research has already confirmed that pre-school education establishments are institutions involved in various conflicts within teaching teams. Therefore, the question arose whether their appearance and duration in a certain period of time conditions, and if so, how is the implementation of the didactic, educational and caring function by the teacher.

In order to obtain reliable knowledge on this subject, the respondents were asked about the possible consequences of the conflict on the functions and tasks performed

Potential sources of conflicts in kindergarten	Teachers' responses		Principal's responses	
	Indications in the group N = 1700	%	Indications in the group N = 218	%
poor interpersonal communication	195	11,5	18	8,3
misinterpretation of information	173	10,2	27	12,4
lack of information	145	8,5	14	6,4
stereotypical thinking	95	5,6	14	6,4
differences in political beliefs	26	1,5	0	0
differences in religious beliefs	2	0,1	0	0
overabundance of work tasks and responsibilities	140	8,2	23	10,6
lack of sense of security	25	1,5	7	3,2
no sense of respect from other members of the teaching team	93	5,5	16	7,3
changes and ambiguities in the education law	34	2,0	9	4,1
improper allocation of work tasks, responsibilities, powers and responsibilities among teachers	79	4,6	23	10,6
inaccurate selection of members for task teams	59	3,5	6	2,8
unfair reward system	69	4,1	0	0
improper allocation of material goods	21	1,2	2	0,9
infrastructure deficiencies	33	1,9	0	0
favoring selected teachers by the management	75	4,4	0	0
mistrust between teachers	40	2,4	12	5,5
lack of trust in the principal	39	2,3	2	0,9
substantial non-compliance with the education law by teachers	26	1,5	2	0,9
substantial non-compliance with the education law by the principal	13	0,8	0	0
low level of resistance to negative behavior of colleagues	55	3,2	18	8,3
inappropriate behavior of the principal towards teachers (rudeness, harshness, verbal aggression, anger, etc.)	22	1,3	0	0
principal bullying teachers	17	1,0	0	0
bullying by other teachers	39	2,3	0	0
teachers' inability to accept criticism	96	5,6	15	6,9
principal' inability to accept criticism	29	1,7	0	0
lack of teamwork skills	60	3,5	10	4,6

Source: own study based on the collected empirical material.

Table 3.
Sources of conflicts in a preschool education facility.

by them. The distribution of responses is illustrated for positive consequences in **Table 4** and negative consequences in **Table 5**.

Consequences	Indications in the group of teachers N = 305						Indications in the group of principals N = 37									
	scale of occurrence						scale of occurrence									
	Never	%	Seldom	%	Sometimes	%	Often	%	Always	%	Seldom	%	Sometimes	%	Often	%
has a positive effect on the didactic function performed by the teacher	61	21,6	98	34,8	44	15,6	53	15,2	36	12,8	14	37,8	17	45,9	6	16,3
positively influences the upbringing function performed by the teacher	61	20	104	34,1	36	11,8	55	18	49	16,1	13	35,2	18	48,6	6	16,2
positively influences the teacher's caring function	61	20	93	30,5	47	15,4	55	18	49	16,1	13	35,2	18	48,6	6	16,2

Source: own study based on the collected empirical material.

Table 4.
 Positive effects of conflicts for the teacher's professional functions.

Consequences	Indications in the group of teachers N = 305						Indications in the group of principals N = 37									
	scale of occurrence						scale of occurrence									
	Never	%	Seldom	%	Sometimes	%	Often	%	Always	%	Seldom	%	Sometimes	%	Often	%
has a negative effect on the didactic function performed by the teacher	71	23,3	87	28,5	65	21,3	69	22,6	13	4,3	16	43,2	15	40,5	6	16,2
negatively influences the upbringing function performed by the teacher	64	21,0	66	21,6	87	28,5	68	22,3	20	6,6	24	64,9	11	29,7	2	5,4
negatively influences the teacher's caring function	58	19,0	56	18,4	103	33,8	61	20,0	27	8,9	24	64,9	11	29,7	2	5,4

Source: own study based on the collected empirical material.

Table 5.
Negative effects of conflicts for the teacher's professional functions.

The information gathered in **Table 4** leads to the conclusion that, in the opinion of 1/3 of the teachers, internal conflicts occurring in the teaching teams they create rarely have a positive impact on their didactic (34.8%), educational (34.10%) and caring (30.5%). Especially interesting is that in this group of respondents, about 20% of respondents answered that conflicts never had a positive impact on the performance of professional functions, although there were also voices pointing to the favorable impact of conflicts on their activities (didactic function - 12.8%; educational function - 16.1% and the caring function - 16.1%). The principals of pre-school institutions, however, have a slightly different opinion, because sometimes internal conflicts generate positive effects within the functions performed by teachers: didactic (45.9%), upbringing (48.6%) and care (48.6%). Nevertheless, about 35.5% of the surveyed principals rarely notice the positive effects of conflicts for the performance of professional functions, and only 16% that they often see the positive effects of conflicts for the performed tasks of kindergarten teachers. It seems that the positive effects of conflict, conditioning the professional functioning of teachers, should be associated with usually favorable arrangements ending a misunderstanding/dispute in the team. Certain organizational changes or clarifications between the parties to the conflicts are conducive to increasing teachers' motivation and commitment to the work they do. Based on the listed effects of conflict (**Table 4**), we can conclude that teachers rarely perceive its positive impact, contrary to principals. Perhaps this difference results from a different perspective on the perception of the problem.

When analyzing the distribution of indications of the scale of the occurrence of negative consequences of conflicts in relation to the individual professional functions of teachers (**Table 5**), principals rarely (43.2; 64.9; 64.9%) or sometimes (40.5; 29.7; 29.7%) see a negative impact on the direct work teachers perform with children. Teachers' responses indicate that they rarely see a negative impact on their teaching function (28.5%), but 21.3% of them claim that the conflict clearly has a negative impact on their teaching work with a child. In the case of the educational function, 28.5% of teachers indicated that sometimes conflicts have a negative impact on the implementation of the tasks assigned to them; as in the case of caring interactions, where as many as 33.8% indicated the negative effects of conflict in this area of work. We emphasize that while in the group of principals the extreme items of the scale (never and always) were not included in their ratings, in the group of teachers, for each of the discussed functions, there were such indications. The analysis of the distribution of the assessment of the impact of conflicts on the professional functions performed, resulting from the presence or absence of conflicts in the team, was also interesting. For this purpose, a comparative analysis of the respondents' assessments regarding the occurrence of conflicts (in the group of teachers) and their number (in the group of principals) was used, which differentiate the assessment of the impact of conflicts on the teacher's professional functions. In the group of female teachers, the analysis covered answers where the variable was the presence of internal conflict or its absence and the noticeable effects (negative and positive) on the professional functions performed by teachers.⁴ The results of the Student's parametric *t* test are presented in **Table 6**.

The analysis proved that the surveyed teachers did not differ in the assessment of the positive impact of conflict on the performance of the didactic ($p = 0.657$),

⁴ due to the unequal groups, for the analysis, Student's *t*-tests were performed for independent samples, while at the same time Mann-Whitney U tests were carried out to confirm the results.

	Occurrence of conflicts (n = 236)		Lack of conflicts (n = 69)		t	p	95% CI		d Cohen's
	M	SD	M	SD			LL	UL	
Conflict has a positive impact									
Didactic function	2,75	1,21	2,86	1,85	-0,45	0,657	-0,57	0,36	0,08
Upbringing function	2,73	1,22	2,86	1,85	-0,52	0,607	-0,59	0,35	0,09
Caring function	2,78	1,21	2,86	1,85	-0,32	0,750	-0,54	0,39	0,05
Conflict has a negative impact									
Didactic function	2,82	1,12	1,68	1,01	7,58	<0,001	0,84	1,43	1,04
Upbringing function	2,89	1,07	2,13	1,47	3,98	<0,001	0,38	1,14	0,65
Caring function	2,96	1,09	2,30	1,45	3,49	0,001	0,28	1,03	0,56

Source: own study based on the collected empirical material. n - number of people in the subgroup; M - average (medium); Me - median; SD - standard deviation; Standardized value of the Mann-Whitney test; t - Student's t test statistics; p - statistical significance, where the significance threshold is <0.05; 95% CI - confidence interval; UL - upper bound of the confidence interval; LL - lower bound of the confidence interval; effect strength - a value specifying the amplitude of differences between averages (Cohen's d).

Table 6. Assessment of conflict consequences for the performance of teachers' professional functions and the occurrence of a conflict.

upbringing (p = 0.607) and caring (p = 0.750) functions by the teacher. Significant differences were noted for the assessment of the negative impact of conflict on the performance of these functions (p < 0.001 for the didactic and upbringing function and p = 0.001 for the caring function). In the case of the didactic function, this effect is strong (d = 1.04), and for the remaining functions - upbringing and caring - the effects are moderate (d = 0.65 and d = 0.56). The obtained results therefore suggest that teachers with conflicts in teams experienced a more negative impact on their teaching (d = 1.04), upbringing (d = 0.65) and caring (d = 0.56) functions. Than teachers, who did not declare the occurrence of conflicts (the strength of the effect was: 0.08, 0.09 and 0.05).

In the course of further research, it was checked how the characteristics of an internal conflict in the group of principals is related to the assessment of the impact of this conflict on the performance of professional functions by a teacher⁵ Table 7 shows the results of the tests performed.

The differences between teaching teams with a large number of conflicts and teams with a small number of internal conflicts were analyzed in terms of the impact of these situations on the teacher's professional functions.⁶ The results of these tests turned out to be statistically insignificant. Therefore, it can be assumed that the number of conflicts revealed in teaching teams differentiates the assessment of the effects of conflicts on the didactic, upbringing and caring function performed by the teacher. At a later stage of the research, it became important to check the correlation between the diversity of conflicts and the strength of their course. These analyzes

⁵ U Mann Whitney tests and Spearman's rho correlation analyzes were performed.

⁶ U Mann Whitney tests were conducted.

	1-5 (n = 30)		There were so many of them that I cannot define (n = 7)				
	average rank	Me	average rank	Me	U	p	η^2
Positively influences performed functions							
Didactic function	18,85	3,00	19,64	3,00	100,50	0,849	<0,01
Upbringing function	18,93	3,00	19,29	3,00	103,00	0,932	<0,01
Caring function	18,93	3,00	19,29	3,00	103,00	0,932	<0,01
Negatively influences functions performed by teachers:							
Didactic function	18,68	3,00	20,36	3,00	95,50	0,689	<0,01
Upbringing function	17,97	2,00	23,43	3,00	74,00	0,151	0,06
Caring function	17,97	2,00	23,43	3,00	74,00	0,151	0,06

Source: own research. n - number of people in the subgroup; M - average (medium); SD - standard deviation; p - significance at the level < 0.05; η^2 - value determining the strength of the effect.

Table 7.
 Differences in the assessment of the impact of internal conflicts on the performance of a teacher's function depending on the number of conflicts.

		Diversity of conflicts	Strength of conflicts
Positively influences performed functions	Didactic function	<i>rho</i> Spearmana	0,64
		relevance	<0,001
	Upbringing function	<i>rho</i> Spearmana	0,63
		relevance	<0,001
	Caring function	<i>rho</i> Spearmana	0,63
		relevance	<0,001
Negatively influences functions performed	Didactic function	<i>rho</i> Spearmana	-0,13
		relevance	0,460
	Upbringing function	<i>rho</i> Spearmana	-0,17
		relevance	0,328
	Caring function	<i>rho</i> Spearmana	-0,17
		relevance	0,328

Source: own research.

Table 8.
 The impact of conflict on the teacher's functions in the opinion of principals.

were complemented by the assessment of the impact of internal conflict on the teacher's teaching, upbringing and care functions.⁷ The results obtained are illustrated in **Table 8**.

The summary presented in **Table 8** gives the basis for the conclusion that in the group of principals, the diversity of conflicts is positively and strongly related to the

⁷ Analyses of Spearman's rho correlation were performed.

assessment of a positive impact on the functions performed by the teacher - didactic, upbringing and caring ($p < 0.001$). It follows that the more diverse conflicts are experienced in the teaching team, the more often principals notice their positive impact on the performance of professional functions by teachers. Additionally, the strength of the course of the conflict is negative and moderate (Spearman's $\rho = -0.37$) and the significance is above the threshold and equals $p = 0.023$) with a positive impact of the conflict on the teacher's performance of the didactic function. Along with the stronger course of the conflict, its positive impact on the teacher's performance of the didactic function decreases, which was clearly indicated by the surveyed principals. On the other hand, for the educational and care function, the results were significant at the level of the statistical trend. These relations are negative and weak (Spearman's $\rho = -0.29$), with the significance above the assumed threshold and amounts to $p = 0.076$ for both functions). Therefore, it can be cautiously assumed that the more turbulent the course of the conflict, the less frequently the principals notice the positive impact of conflicts on the performance of the upbringing and caring function by the teacher. There were no statistically significant correlations between the diversity of conflicts and the strength of their course with the assessment of the negative impact of the conflict on teachers' professional functions ($p = 0.460$ for the didactic function, $p = 0.328$ for the upbringing function and $p = 0.328$ for the caring function).

The positive result for the professional functions performed by teachers can be explained using the interactive theory of conflict, assuming that the occurrence of conflicts, understood in terms of universality and inevitability, does not always have to have negative consequences.

The empirical research was supplemented by a comparison of information obtained as a result of participant observation carried out during the implementation of the core curriculum by teachers and data obtained during individual interviews with teachers, which indicated participation in a conflict that took place in their teaching teams.

Observations of the care-upbringing-didactic activities conducted within the core curriculum allowed for an examination of the quality of the professional functions performed in a situation where a team of teachers assigned to one kindergarten group works under the pressure of visible tension between them. This study confirmed not only the existence of a conflict between teachers but also its destructive impact on the course of classes (showing dislike openly in public, disturbed communication, lack of cooperation or lack of respect towards the other teacher).

Interviews conducted as part of individual case studies presented a picture of personal experiences and consequences that became the result of participating in a conflict. Individual conversations with teachers allowed for a closer look at the mechanisms of the course of conflict situations on three different levels of interpersonal relations, where the conflict involved the following entities: teacher - teacher, teacher - group of teachers and teacher - teaching assistant.

The conclusion resulting from the conducted individual interviews may be the statement expressed by all respondents that the involvement of kindergarten teachers in the conflict diverts their attention from the common goals and tasks. Over time it is responsible for the noticeable deterioration of the quality of their professional work, and in the long term also the quality/efficiency of the work of the entire pre-school institution. In the opinion of the surveyed teachers, it is these short- and long-term consequences of conflicts that require systematic improvement and replenishment of communication competences that help in coping with stress, emotional tension,

establishing and maintaining relationships with other people, resolving conflicts, building and maintaining the team spirit (in Ref. [64]).

6. Discussion and conclusions

Conflict situations are a reality in every organization, including school and kindergarten. The need to identify and diagnose them is an important area of empirical interest, mainly due to their implications for the functioning of an individual teacher and the entire institution. Even if the problem of conflicts in an educational institution is downplayed or "hidden" by both teachers and principals, they affect the quality of teaching and the effectiveness of the teacher's work [61].

Our research oscillated around the verification of hypotheses assuming the existence of various conflicts (of different etiology and type) within teaching teams, as well as the identification of the correlation between conflicts and factors determining the professional functioning of teachers (i.e., the didactic, upbringing and caring function), i.e., the quality of work teacher's. The results of our research confirmed the common occurrence of various internal conflicts of various etiology. The results of empirical investigations have also confirmed the dependence between the occurrence of internal conflicts and factors conditioning the professional functioning of kindergarten teachers. The analysis of the collected empirical material leads to the conclusion that there is a statistically significant correlation between the conflict in the teaching team and the quality of the implementation of the didactic, upbringing and caring functions performed by the teacher who participates in it. The demonstrated dependence in relation to the quality of the teacher's professional tasks may result in reduced level of motivation to work, may also be burdened with a higher risk of errors, raise real concerns about the quality of his work and the functioning of the entire institution. The research confirmed that they are fully justified, as the consequences of the conflict lower the quality of work of an individual teacher, the team in which he operates and the entire preschool institution. They are consistent with the research results, according to which the quality of teachers' work is largely determined by the atmosphere in the workplace and interpersonal relations (see [65, 66]). Teachers who experience conflict, have negative feelings such as disappointment, insensitivity, stress, sadness, anxiety, etc., may not like their profession, have low morale and motivation, form groups with like-minded people, and have weaker results, which finds confirmation in the surveys conducted by other researchers (see [31, 62, 67]). Teamwork is extremely effective for the entire preschool community, becoming a tool conducive to open discussion from the level of various perspectives and integrating them into real solutions [68]. This is due to the fact that *contacts between two or more people will sooner or later come to a point where some differences in their desires, values, views and habits will appear. What is good for one person becomes unacceptable for the other.*

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Chapter 4

Perspective Chapter: Enhancing Student Teachers' Professional Development through Active Learning

Thor-André Skrefsrud

Abstract

As a contrast to traditional approaches to learning, this chapter explores two examples of active learning conducted with student teachers in Norway. In the first example, the chapter reports from a case study on student teachers' engagement with the Scandinavian Romani exhibit at a local museum. For this example, the chapter discusses student teachers' possibilities for developing a critical consciousness through immersive experiences. In the second example, the chapter presents and discusses a project using virtual reality (VR) technology designed to build student teachers' capacity for their future professional role in schools. For this example, the chapter addresses the development of student teachers' awareness of their own professionalism and their active role in home-school cooperation. In both examples, the chapter draws attention to the leading role of the teacher educator, who actively facilitates a collaborative, interactive, and participatory learning environment. Theoretically, the chapter elaborates on student-centered learning from the perspectives of John Dewey and Paulo Freire, underlining the significance of active engagement and critical reflections.

Keywords: student active learning, professional development, innovate methods in teacher education, John Dewey, Paulo Freire

1. Introduction

The purpose of this chapter is to shed light on the relation between student teachers' professional development and student-active learning methods in teacher education. By introducing and discussing two examples of active learning conducted with student teachers in Norwegian teacher education, the chapter will draw attention to the teacher's role when incorporating collaborative, interactive, and participatory approaches in teacher education. In the first example, I will report from a case study on student teachers' engagement with the Scandinavian Romani exhibit at a local museum in inland Norway. In the second example, I will introduce a project using virtual reality (VR) technology designed to build student teachers' capacity for their future professional role in schools.

In the two examples, I will illustrate how the teacher educator plays a crucial role in student-centered learning by acting as “a more competent peer” [1]. This role includes modeling behavior for student teachers and providing a space in which they can imitate the role of a professional teacher. Moreover, it includes the responsibility to nurture and challenge reflections, skills, and understanding by asking questions and providing critical instruction, guidance, and scaffolding [2]. As such, this chapter will challenge the view that student-active learning methodologies reduce the role of the teachers to passive facilitators who leave the learners to grow and advance on their own.

As noted by Bergmann and Sams [3], a common misconception regarding student-active methodologies is that they turn the teacher-student relationship upside-down compared to traditional teaching approaches. Within this misunderstanding, the teacher, who played the active part in the traditional classroom, is replaced with the active student, leaving the students to discover, interpret, and develop knowledge and skills on their own. I argue that utilizing the potential for positive outcomes of student involvement very much depends on the teacher educator’s ability to plan, structure, and lead the process of learning. Applying student active learning methodologies in teacher education implies rethinking the role of the teacher educator. The positive outcomes of student success and development are more likely to happen when teachers engage with their students, take their responsibility seriously regarding creating a positive learning environment, and provide guidance and support for their active student learners.

This chapter is structured as follows: first, I will provide an argument for why student-centered learning should be considered an imperative not only in school but also in teacher education. Second, as a background for presenting and discussing the two pedagogical examples, I will elaborate on the concept of student-oriented learning, tracing its roots back to the works of classical education thinkers, such as Freire [4, 5] and Dewey [6, 7]. Third, I will refer to two examples of student-active learning methodologies in teacher education, discussing how the two examples can contribute to enhancing student teachers’ professional development, focusing on critical consciousness and self-reflection. In particular, I will draw attention to the leading role of the teacher educator, discussing what we can learn from these examples regarding a collaborative, interactive, and participatory involvement from both student teachers and teacher educators.

2. Why study student-active learning in teacher education?

An important aspect of teachers’ professionalism is the ability to promote instructional strategies that encourage students to take an active role in their own learning. Examples of such strategies include project-based learning, group discussions, and hands-on activities, all designed to help students develop critical thinking skills, problem-solving abilities, and a deeper understanding of the subject matter. By engaging students actively in the learning process, teachers can help students retain information and knowledge more effectively. In addition, by creating a learning environment in which students participate as active learners, teachers play a critical role in helping students feel more connected to their school and community and feel more invested in their own learning. In turn, a learning environment where all students feel valued, respected, and supported can lead to improved academic outcomes and greater social-emotional well-being.

As noted by Darling-Hammond [8], the kind of teaching that supports twenty-first-century skills in education, such as that incorporating creativity, collaboration, and critical thinking, “is very different from what was required when the goal was merely to ‘cover the curriculum’ and ‘get through the book’”:

Students entering school today will leave to work in jobs that do not yet exist, using knowledge that has not yet been discovered and technologies that have not yet been invented, facing complex problems our generation has been unable to solve [8].

Meanwhile, the complex processes of globalization, internationalization, and immigration continue to alter the landscape of education [9]. As cultural and linguistic plurality become integral aspects of the educational experience, different perspectives are introduced into the dialog. Such intercultural exchange may not only stimulate new ideas and innovations but also transform traditional notions and values [10]. The central in-demand skills that employers demand within such a context will be to understand, communicate with, and effectively interact with people across different cultural backgrounds. More than to follow directions or “simply to recall a canon of received knowledge” [8], students need to incorporate the abilities to assess and evaluate different solutions to problems, to make sense of complex information, and to develop a lifelong-learning mind-set. As such, the traditional teacher-oriented methods used to impart information, what Darling-Hammond [8] framed as “chalk and talk-methods,” need to be replaced by teaching methods that allow students to take an active role in their own learning.

All of these expectations surrounding contemporary schooling have implications for teacher training. In recent years, teacher educators have increasingly recognized the value of student teachers' engagement in their own learning. New preparation programs typically allow student teachers to discuss and review research to actively develop a basis for systematic and critical reflection regarding professional practice. These programs also allow student teachers to develop their professional experiences by conducting their own inquiries using methods such as action-based research to strengthen the quality of their own teaching. Likewise, by incorporating teaching methods that utilize collaboration, interaction, and participation in teacher education, prospective teachers are given opportunities to engage in reflexive and critical thinking that may help them prepare for future work in a complex school environment and in society [11–13].

Nevertheless, a growing body of teacher education research has called for radical improvements in traditional teacher training [14, 15]. The repeated critiques of traditional teacher education programs include the divide between the field of practice and the university, the fragmentation of content and pedagogical knowledge, and the absence of innovative teaching strategies and inquiry-based learning in the programs. Over the past decades significant improvements have been made in many countries, for example, by developing undergraduate teacher education programs into five-year practitioner research-based master's models or initiating one- or two-year graduate programs to support newly qualified teachers [8]. Still, prior research has indicated that many teacher programs require improvement, not least by challenging, developing, and transforming the well-established and dominant role of lecture-based teaching practices [14, 15].

From the perspective of such a critique, prospective teachers need to actively engage with knowledge rather than passively reproducing it. A continually changing society requires professional teachers who can help students to engage in their

learning to develop critical thinking, the skills for problem-solving, and the ability to address the emerging challenges and problems that do not have existing answers [16]. Thus, it is imperative that teacher educators not only lecture about the necessity of student-active learning, but also find ways of facilitating and promoting real student teacher engagement. With this background, there is reason to discuss how contemporary teacher education programs can apply methods that more actively involve prospective teachers in the learning process.

3. Student-centered learning in contrast to conventional academic instruction

In prior decades, student engagement in school and higher education has attracted considerable attention not only in research literature, but also in the general educational discourse, headlining educational conferences, meetings, and seminars across the globe [17–20]. As noted by Trowler [18], “a sound body of literature has established robust correlations between student involvement in a subset of educationally purposive activities and positive outcomes.” According to Trowler [18], such positive results include enhanced “satisfaction, persistence, academic achievement and social engagement,” making student-centered learning an essential aspect of a wide range of pedagogical debates.

Central to the concept of student-centered learning is the view that learners’ engagement is a key contributor to students’ success [20]. As such, student-centered learning can be described as the pedagogical approaches that prioritize the learner as the focal point of the educational experience. Where the learner is seen as an active contributor to the process of learning, the teacher assumes the role of a facilitator guiding the learner through a process of inquiry and discovery. Consequently, students are not reduced to the role of passive recipients of knowledge provided by the teacher; rather, they are empowered to take ownership of their own education, developing a deeper understanding of the subject matter, and sharpening their critical thinking, communication, and problem-solving skills [17, 18].

Characterized by its attention toward activity, interaction, and experience, the concept of student-centered learning has a lengthy historical background, including inspiration from behaviorism, organizational learning, and motivational theory. However, by acknowledging that engagement “is not just behavioral, but includes emotional and cognitive dimensions” [20], the socio-cultural perspective on teaching and learning has played a specific and important role in developing student-centered methodologies. As such, the approach to knowledge production in student-centered learning resonates notably with the works of classical education thinkers, such as Dewey [6, 7], and Freire [4, 5]. Although the problems that these theorists addressed in their writings were very different and the contexts for their writing varied substantially, their ways of framing education have inspired student-centered learning initiatives for decades.

In *Experience and Education*, originally published in 1938, Dewey [7] outlined a theory of learning based on a deep and practical appreciation of students’ personal experiences. For Dewey, learning takes place when human beings interact with their surroundings. According to Dewey, education is essentially a social process in which students take an active part in the process of learning. This participation is seen as constitutive for gaining new knowledge and involves continuity and interaction between the learner and what is learned, formulated in the following question:

“How shall the young become acquainted with the past in such a way that the acquaintance is a potent agent in appreciation of the living present?” [7].

The answer that Dewey gives to this rhetorical question is that schools should create a relationship between the students' histories and everyday lives and the school's curriculum [21]. Having their own histories and life-worlds mirrored in the school's teaching, in textbooks, and in the knowledge and skills that schools provide, motivates students to seek new understandings [7]. For Dewey, it is imperative that teachers “become intimately acquainted with the conditions of the local community, physical, historical, economic, occupational, etc., in order to utilize them as educational resources” [7].

Half a century later, Freire [4, 5], formulated a corresponding approach to teaching and learning. Sharing Dewey's idea that curriculum should correspond to students' previous knowledge and experiences, Freire emphasized that the turn from a teacher-oriented education to the inclusion of the students' experiences “must also include a global, critical dimension” [5]. Acknowledging the significance of students' experiences and active participation in the process of learning is more than a technique “simply to confirm the status quo or motivate students” [5]. Instead, taking students' life-worlds into account when teaching should also affect and perhaps even alter the students' experiences [4]. In this way, Freire laid the foundation for Young's [22] influential thinking regarding “powerful knowledge” and his argument that “the main purpose of school is to enable all students to acquire knowledge that takes them beyond their experiences” [22]. Thus, while Dewey emphasized the significance of context, Freire found that the contextual starting point also may create a space for action, intervention, and even transformation [21, 23].

Both Dewey and Freire developed their thinking in contrast to traditional education, where the role of the school is to pass a pre-defined and controlled body of knowledge to the learners. In Dewey's critique, traditional education has failed, as it overlooks the significance that real-life experiences have in the acquisition of knowledge. In a similar vein, from Freire's perspective, traditional education represents what he called a banking model of education [24], stating that teaching is the transfer of knowledge from someone who knows to someone who does not, thus isolating knowledge from practice and personal experiences. Dewey and Freire would agree that, within a traditional model of education, the roles of both the teachers and students are reduced. While teachers are seen as providers of a static body of knowledge, transferring what the curriculum prescribes as relevant information, students are pictured as “blank slates,” or passive recipients, waiting to be filled with new knowledge. In Dewey's and Freire's view, traditional education created a sharp distinction between school and other arenas, for example, children's leisure time, largely ignoring the significance that students' own experiences have in motivation and transformative learning.

A common concern for Dewey and Freire is that teachers continue to play an active role within a learner-centered education [4–7, 24]. In both Dewey's and Freire's alternative, the teacher is responsible for selecting the content and building the curriculum that incorporates diverse perspectives. For learning to take place, it is the teacher's task to plan, organize, and facilitate spaces for interaction and collaboration. Engaged teachers take responsibility for relating their teaching to the lives of the students, responding to students' natural curiosity by providing adapted learning activities and integrating assessments that measure real accomplishments, and giving students a direction in which to proceed to raise their academic level. Hence, in Dewey's and Freire's student-centered models, the teacher activates the power of the

co-construction of knowledge and strategies that may occur when students' experiences are used as a starting point for teaching.

4. Student teachers' professional development: using the museum as a site of learning

As part of my teaching in a two-year master's program at INN University in Norway, my team and I collaborated with a local museum to use it as a site of learning for student teachers. More specifically, we let our student teachers engage with the exhibit *Latjo Drom—The Romani/Travelers' Culture and History*, which displays the life and history of the Romani people in Norway. The exhibit is located at the Glomdal Museum in Elverum, which has been a pioneering institution in including ethnic minority cultures in their exhibits [25]. In bringing student teachers to the museum, we have been interested in how the exhibit can create a space for student teachers to develop a nuanced and in-depth understanding of the traditions and current situation for one of Norway's national minorities [26].

In the exhibit, the student teachers become familiar with the diversity of the Romani people's history and culture in Norway. The exhibit is comprised of a wide range of Romani artifacts, such as tools, clothing, decorative knives, and other handicrafts, all presenting the Romani's traveling way of life and the advanced skills and knowledge their communities have developed for centuries. In addition, the exhibit includes larger items, such as a life-size horse model, a car, a caravan, and a fully equipped 40 ft. boat, to portray how the culture of traveling has evolved and been adapted through generations.

The student teachers also encounter a multimodality of pictures, films, texts, and examples of Romani music, both older folk music and presentations from newer artists that actively incorporate their Romani background when composing and performing. In a separate part of the exhibit, the student teachers learn about the racism and social exclusion the Romani people have suffered in Norway, including cases of lobotomy, forced relocation into labor colonies, and forced sterilization. These dramatic experiences of discrimination, stigma, and violence are documented through the use of pictures, films, and personal narratives telling the story of how Norwegian authorities in the 1950s, 1960s, and 1970s worked systematically to erase the Romani culture and to assimilate the Romani communities into the dominant culture. The exhibit, titled *Latjo Drom*, meaning to wish someone a safe and pleasant journey in the Romani language, thus gains a deeper meaning. Not only does the title emphasize the distinctive Romani way of life, it also bears a message of hope and reconciliation, reminding the visitors about the past and the power of transformative change.

The cooperation and interaction between schools and museums has a long history and has been mutually beneficial in many ways and on many levels [27, 28]. Frequently, the museum is seen as an extension of the classroom, facilitating inquiry-based and experiential learning in ways that engage the students and support the curriculum goals. However, as noted by van der Kooij [27], schools' collaboration with museums can also very often take a form in which the museum acts largely as a provider of services and the school as a consumer. The teachers adopt a passive and observatory role, leaving the instruction to the curators. In this way, the teachers give the impression to the students that a field trip to a museum is more equivalent to leisure time than to school-based learning. Hence, in such a case, the collaboration with the museum has little significance beyond the isolated visits.

In visiting the Latjo Drom exhibit with student teachers, the concept of student-centered learning is introduced to them as part of the master's courses at the university, which includes reflections on the teacher's role when providing collaborative, interactive, and participatory approaches to teaching and learning. At the venue, the student teachers are first given a guided tour through the different sections by one of the curators, before they explore the exhibit by themselves or in groups. In this way, they are offered the opportunity to engage with the emotions that the exhibit evokes through the artifacts, imagery, texts, and sounds. Later, we allow the student teachers to discuss in groups, posing questions such as: "What did you learn from the exhibit?"; "How did you respond to the exhibit?"; and "How does your encounter with the exhibit relate to those of your peers?" As part of the group work, the student teachers are also asked to revisit one part of the exhibit by free choice and prepare a presentation for the others on the opportunities and challenges they could face if they were to allow their students to engage with this content as future teachers. The group work ends with a plenary discussion led by my colleagues and me in which we ask questions to emphasize reflection upon concepts from the course, such as diversity, discrimination, and minoritization and how they correspond and intersect with the exhibit. One example of these questions is: "To what extent may the Latjo Drom exhibit elaborate or even challenge the concepts presented in the course?" Moreover, we ask the student teachers to reflect upon how an exhibit like Latjo Drom can be utilized with students in school and what role the teacher should have in this regard. An important part of this discussion is how the teacher may help the students see the direct, indirect, and even subtle forms of historical and contemporary discrimination against the Romani communities. Drawing on Freire's [4, 5] transformative approach to education, such knowledge also includes becoming aware of the structures that have allowed systematic discrimination to occur.

In this way, the integration of the Latjo Drom exhibit in the master's courses offers opportunities for engaging emotionally with the exhibit. Following Dewey's [7] idea that experiences are not only a phenomenon of the intellect, but also have to do with bodily involvement, the student teachers encounter a form of learning that involves the senses and emotions. Moreover, as emphasized within the framework of student-centered learning, the student teachers involve themselves in group work activities and self-directed learning [17, 20]. Instead of regarding the teacher educator as the primary source of knowledge, the student teachers take an active role in their own learning [18].

Meanwhile, through the group discussions, the teacher's role in education is highlighted, emphasizing the empowering and transformative function teachers can have as implementers of education [4, 5]. Thus, learning is seen "as an intentional and active event that requires critical examination between all actors, teachers, and students" [29]. Hence, based on theory and my own experiences with the integration of the museum into teaching and learning, I believe that an experiential engagement with the Latjo Drom exhibit creates opportunities for enhancing the student teachers' role as professional teachers.

5. Pursuing professional development for student teachers using virtual reality (VR) technology

At INN University, I have also been involved in a project in which student teachers in the five-year master's program engage with virtual reality (VR) technology. Virtual

reality (VR) is a simulated experience that employs a computer-generated environment to stimulate the physical presence in an imaginary world—in our case, a classroom. The project was developed by a team of teacher educators at INN University in collaboration with in-service teachers at one of the schools in the area and a local company working with different types of VR style technology [2]. The purpose of the project is to advance the professional growth of prospective teachers, developing skills and knowledge with regard to home-school cooperation.

In the project, the student teachers use VR headsets to simulate their role as a professional in-service teacher, leading a conversation on social and academic learning with a student and her parent. In the Norwegian context, such a developmental talk is a central part of the school's communication with the students' homes. In Norwegian schools, in-service teachers are obliged to conduct planned and structured conversations with parents and students at least two times a year [30]. These conversations are initiated by the school and provide an opportunity for addressing the students' academic progress and social development. However, for student teachers, there are few opportunities to rehearse such a developmental talk as part of their education. Instead, in teacher education, issues within the field of home-school cooperation are most often introduced on a theoretical level, meaning that the student teachers read relevant research literature on their own and attend lectures on home-school cooperation, regulations, laws, and practices.

In order to activate the student teachers' engagement in their own process of learning, the VR project is designed as a "flipped classroom" practice [2, 3]. As noted by Burnett and Merchant [14], the introduction in recent years of digital tools has contributed to a radical change in teacher education pedagogy, for example, through the emergence of flipped classroom methodologies. Typically, a flipped classroom approach involves an initial stage, during which concepts, perspectives, and literature are introduced by the teachers, a middle stage, during which the students work independently, and a final stage, during which the students reflect upon the work they have conducted using the experiences and perspectives from the two first stages. As such, a flipped classroom practice stands in contrast to teacher-oriented education by allowing the students to work more independently, with their teachers acting merely as guides, mentors, or facilitators [3, 7]. In this way, the flipped classroom resonates with the principles of student-centered learning, emphasizing students' engagement and active participation through technology-based learning activities.

In the VR project, the student teachers are placed in a work-related situation using VR headsets to encounter two virtual characters: Emilie, a student in the lower secondary school, and her father. Emilie is portrayed as a rather quiet and shy student who works hard in school but still performs on an average level, academically. She has several friends in school. As such, Emilie represents a type of student that many prospective teachers will meet in their future work.

In the simulation, Emilie and her father sit at a table in a classroom, while the student teacher is located behind a desk in front of the two, much as in a real-life scenario. The characters move and talk as they would in an advanced videogame; for example, Emilie may show signs of being embarrassed when the student teachers ask her questions, and the father may get upset when holding the school responsible for his daughter's education. The conversations are limited to pre-produced statements and answers designed as responses to the kinds of questions asked by the student teachers. Based on the strategy the student teacher selects, a facilitator (often a teacher educator or a trained peer) chooses the type of response Emilie or the father will give. In all the different manuscript scenarios, the simulation is programmed so

that the father sometimes interrupts the conversation, asking questions or posing comments directed either to the teacher or to his daughter. The simulation ends with either an accepted solution or with a situation in which the father is dissatisfied with the school.

After the simulation, which can last from three to five minutes, the student teachers gather for a group discussion, sharing their experiences in both leading the conversation and watching their peers perform the VR simulation. Here, they are also given the opportunity to draw on the theories and perspectives to which they were introduced before entering the simulation, including theories on home-school cooperation, communication theory, and perspectives on teacher professionalism.

As a parallel to both Dewey's [6, 7] and Freire's [4, 5] work, the project was carefully designed so that the student teachers' process of learning and professional development is guided by the team of teacher educators. Burnett and Merchant [14] argued that, by itself, the integration of digital devices and technologies in education makes very little difference with regard to enhancing student-active learning; rather, it is what teachers do with technologies that matter. On this basis, in both the first phase (where theoretical concepts are introduced) and the third phase (where experiences are discussed), the team of teacher educators takes a leading role.

In the first phase, the prospective teachers work individually and in groups with the concepts introduced in a traditional in-class lecture on home-school cooperation, an online lecture on communication, and in a podcast on relevant scientific models, including an experiential and student-centered model of learning. In this part of the project, we emphasize an active connection to the learning material with the student teachers' previous knowledge and experiences about home-school cooperation [6, 7]. In this phase, the team of teacher educators constantly assesses the extent to which the student teachers are able to utilize and apply their knowledge independently [2]. In the second phase, which involves the actual VR simulation, the student teachers test their newly acquired skills and knowledge, and, in the third and final phase, they come together and discuss and analyze their experiences with the team of teacher educators. In this final phase, our team of teacher educators draws on Freire's [4, 24] transformative perspective on education. Aiming to enhance the professional development of the prospective teachers, the teacher educators attempt to discern the connections between the student teachers' prior knowledge and their interpretations of the VR simulation in a way that may advance and even alter their understanding of their professional role.

6. Conclusions

In this chapter, I have discussed the use of student-centered approaches in teacher education, drawing on two examples from my own practice as a teacher educator. In both examples, student teachers are provided hands-on practice opportunities to build the skills and knowledge important for their future work as teachers. Hence, the examples illustrate the teaching approaches designed to increase student engagement and enhance reflections on the professional role of teachers.

In analyzing the two examples in light of Dewey's [6, 7] and Freire's [4, 5] work on student engagement, I have attempted to demonstrate how these examples may hold the potential for altering the roles of the student teacher and the teacher educator compared to their roles in traditional teacher-oriented education. While conventional teacher-oriented approaches to teaching and learning often position the learners

as passive interpreters of the knowledge that is selected and presented to them by the teacher, student-active learning methods aim to increase the engagement of the student without reducing the significance of the teacher. In the two examples, student teachers are seen as active co-constructors of knowledge, not as objects to be equipped with pre-determined knowledge. In a similar vein, the role of the teacher educator is neither to provide the learners with information, nor to be a passive facilitator who leaves the students to discover and develop skills and knowledge on their own [2]. Rather, by leading the process of learning in a planned and structured way, teacher educators may take an active role in constructing and developing knowledge in collaboration with the student teachers.

The study of student-centered approaches in teacher education should not overlook the risk of student-centered learning becoming a buzz-phrase that draws attention away from important educational discussions regarding the purpose of education. As noted by Biesta [31], Hultberg and Heiret [32], and others, a progressive, student-centered approach to teaching and learning fits well with the skills-oriented and neoliberal policy encouraging competitive individualism in education. As such, a student-centered approach in school and teacher education “risks neglecting knowledge about the social conditions that students act within” [32]. For example, to take real action on climate change, students need to know the underlying causes of the climate crisis and not simply to develop the practical skills to act.

Against this background, it is important to emphasize that incorporating collaborative, interactive, and participatory approaches in teacher education should give prospective teachers opportunities to engage in reflexive and critical thinking. Future research should further investigate how student-centered approaches in teacher education can empower student teachers “with greater understanding of complex situations rather than to control them with simplistic formulas or cookie-cutter routines for teaching” [33]. Thus, for student teachers, being prepared for work in a complex school environment includes developing an understanding of the underlying properties of a problem and a critical awareness of one’s social reality through reflection and action. As I have demonstrated in this chapter, a combination of Dewey’s practical and experience-based approach and Freire’s transformative perspective may be helpful in this regard. Enhancing student teachers’ professional development through active learning means advancing their participation and engaging them in their own learning. Likewise, it also implies the fostering of a critical consciousness with which student teachers can apply their knowledge and skills in pursuit of social justice. As highlighted in this chapter, the teacher educator’s guidance is crucial for developing this professionalism in the active learning classroom.

Conflict of interest


The author declares no conflict of interest.

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Gamification as a Multimedia Methodology Strategy in the English Language Teaching Process for EFL Learners

Inés Amaya Díaz and Johnny Bajaña Zaja

Abstract

In the twenty-first century, traditional educational methods work less than before because they are designed to make students fundamentally passive. Within this research work, it has been proposed to develop gamification as a multimedia methodology strategy in the English language teaching process for EFL learners, thus developing techniques that help improve and develop the skills of English as a foreign language in the UTB-EQ students'. The introduction point concerning this research work starts from the best-known and most common methods used in the English language teaching process, thus pointing out the appropriate way they have been helpful at the time to help students acquire EFL. Within the methodology, the methods used to obtain relevant information about the current investigation, the field methods were used: inductive-deductive, analytical-synthetic, and scientific methods served as primary drivers for getting the results of the application of the gamification as a multimedia methodology strategy. The results show this teaching strategy's contribution to the EFL. Finally, the discussion provides significant answers on how this strategy is unique and effective in developing EFL students' skill development.

Keywords: EFL students, gamification, language teaching, multimedia methodology, strategy

1. Introduction

Does it ever feel that learners are stultified, bored, and unmotivated? Maybe it is not the subject but the way is taught. Competing for the divided attention of learners has never been perplexing. It has become a chronic situation familiar to all teachers struggling to motivate learners. Currently exist a generation of children who have never known a world without video games, mobiles, and the Internet. Demographics of the workforce mean that those retiring are being replaced by people who grew up with these things (aged 18–40). We now routinely divide our attention between many things simultaneously.

Traditional educational methods no longer work because they are designed to make learners fundamentally passive. They focus on instructing learners in specific and limited processes before testing what learners can remember from what they have been told. Often, tests do not consider the variable factors that can affect the trial's outcome: learning styles, ages, and abilities, learners' performance on a particular day, whether they have had enough sleep the night before, or whether they have eaten before taking the test. Moreover, when teachers are on their feet and teaching for 6 or 7 hours, all day, every day, it is all too easy for them to reteach literally by the book to achieve school goals.

Sticking rigidly to the textbook, delivering teacher-centred lessons without considering students' learning styles and experiences, and assessing students based on what they can remember all result in inferior education. Students do not need textbooks. No number of books and no amount of class time will do any good. There is no engagement. Essentially, there is no learning.

Learners need hands-on, interactive experiences that stimulate their understanding and aptitudes to help them deal with real-world concerns. As a matter of fact, learners should be actively involved in the education process. It is where play-based wisdom comes in. Gamification, game-based learning, or game-based learning refers to a game with clear and defined learning outcomes. It means using well-designed digital and non-digital games to stimulate learners' language, critical thinking, and problem-solving skills. Include game elements in the learning environment to drive engagement and participation. A group of people sits while the teacher gives them a game. Not all games are the same. Teachers need to reconsider the structure of the play experience: are the learning outcomes clear, and could it leave learners frustrated or bored? Ultimately, all learning environments should encourage active and critical learning, not passive. Game-based instruction furnishes this flawless background. The best matches are those that actively immerse learners in experiencing the pleasure of exploring and apprehending a new system.

Well-designed games, played in diverse ways, using mixed media and platforms, can mainly cut through distractions and engross learners in a way few other ways can. Games can include word, language, narrative, and role-playing games and digital platforms. Multimedia can be used at almost all ages and language levels, from acquiring literacy skills and practising listening and speaking to improving critical thinking and problem-solving skills and developing digital literacy skills (collectively known as twenty-first-century skills). The beauty of gamification as a multimedia methodology strategy in the learning environment is that learners quickly develop autonomy and can easily self-correct with minimal emotional stress. There is a clear progression path, and learners can learn at their own pace.

2. The evolution of the methods used in English language teaching

2.1 Early beginnings (The Latin and Greek Heritage until the nineteenth/ twentieth century)

Latin was the dominant language of education, commerce, religion, and government in medieval and early modern Europe. Thus, relevant people studied Classical Latin in grammar schools, where teachers focused on the analysis of its grammar and rhetoric in grammar schools. The emphasis is put on the study of declensions and conjugations, translation, and the composition of sample sentences [1].

While Latin was the most dominant language in the Middle Ages in the Western world, in the sixteenth century, we appreciate a change. Such languages gradually replaced Latin as Italian, French, and English. Little by little, Latin fell into disuse as a language of spoken and written communication, and it survived mainly as a subject in the school curriculum [1].

2.2 The grammar-translation method (1840–1940s)

The literature study is essential to support mental discipline and intellectual development in this method. Teachers used to focus on reading and writing, and students elaborated bilingual wordlists to learn vocabulary quickly. The basic unit of teaching was the sentence and the emphasis on accuracy. Grammar was taught deductively instead of inductively. In class, the student's native language was the medium of instruction [2].

2.3 The reform era (mid-nineteenth century)

Scholars started to consider that child language should be the model for language teaching. Thus, they centred on the contextual use of language and language acquisition was developed through a sequence of related actions, for example, "I walk toward the door—I walk". Consequently, they focused on spoken language and phonetic awareness with an inductive approach to grammar teaching. For them, it was relevant to establish associations within the target language rather than between native and target languages. Because of this, it was common to present new words in meaningful contexts. The main leading developers of this method were C. Marcel (1793–1896), T. Prendergast (1806–1886), and F. Guin (1831–1896, [3]).

2.4 The direct method (late nineteenth and early twentieth centuries)

It was also known as the natural method, as observing naturalistic principles became essential. It led to a monolingual teaching approach, emphasising everyday spoken language and supporting direct and spontaneous use of the second language. The grammar was taught inductively, focusing on correct pronunciation and grammar. Teaching was done through demonstration, mimicking, and using pictures, with a gradual progression in difficulty. It was popular in private language schools (Berlitz Method) [4].

2.5 Audiolingual method (middle of the twentieth century)

This method responded to the structural view of linguistics and behaviourism as a learning theory. Language is considered a system of structurally related elements for coding meaning. Their goal was the mastery of all the aspects of the language system (phonological units: e.g., phonemes; grammatical units: e.g., clauses, phrases, sentences; grammatical operations: e.g., adding, shifting, joining, or transforming elements; and lexical items: e.g., function and structure words). The usage of new media (e.g., tapes) was introduced for continuous practice of listening, speaking, reading, and writing (pattern drill). The focus was on spoken language [5].

2.6 Audio-visual method (the 1960s)

This method was not used sparingly, as it required watching films in monolingual classes. The lessons were strictly divided into phases, focusing on dialogues and classroom discourses [6].

2.7 Main methods nowadays

Nowadays, new needs have conveyed a change in language teaching methodology. One of the most relevant aspects of society today is group work, and this trend has also reached education. In this section, we will present the two main methods of group work: cooperative and collaborative learning.

2.8 Cooperative learning

It is an educational approach which aims at turning classroom activities into an academic and social learning experience and has been described as “structuring positive interdependence”.

Students must work in groups to complete tasks collectively. Unlike individual learning, students’ cooperative learning can capitalise on one another’s resources and skills (asking one another for information, evaluating one another’s ideas, and monitoring one another’s work). On the other hand, the teacher’s role changes from giving information to facilitating students’ learning. Cooperative learning has also been linked to increased levels of student satisfaction, as everyone succeeds when the group grows [7].

After the first approach in 1994, Johnson and Johnson [8] posited five variables that mediate the effectiveness of cooperation and become essential elements of cooperative learning:

Positive interdependence: students must fully participate and put forth effort within their group. Each group member has a task/role/responsibility; therefore, they must believe that they are responsible for their learning and that of their group [9].

Face-to-face promotive interaction: members promote each other’s success. Students explain what they have learnt or are learning and assist one another with understanding and completing assignments.

Individual and group accountability: Each student must demonstrate mastery of the content being studied. Each student is accountable for their learning and work, eliminating “social loafing”.

Social skills:

- Social skills must be taught for successful cooperative learning to occur. Item Skills include effective communication and interpersonal and group skills.
- Leadership.
- Decision-making [10].
- Trust-building.
- Friendship development.

- Communication.
- Conflict-management skills.

Group processing:

- Group processing occurs when group members.
- Reflect on which member actions were helpful.
- Decide which steps to continue or change.
- The purpose of group processing is to clarify and improve the effectiveness with which members carry out the processes necessary to achieve the group's goal.

Cooperative learning is developed using tasks that must be intellectually demanding, creative, open-ended, and involve higher-order thinking tasks. Additionally, they must have two features for the students to achieve significant improvement [11]:

Social skills.

- Individual responsibility and accountability must be identified. Individuals must know their responsibilities and that they are accountable to the group to reach their goals.
- All group members must be involved for the group to complete the task. For this to occur, each member must have a job they are responsible for that cannot be met by any other group member.

2.9 English language teaching using ICT in the EFL classroom and their evolution

In the 1980s, some publishers began to include recordings in cassettes or single discs so pupils could practice their listening skills. Later, the tapes evolved into CDs. With the introduction of personal computers in the classroom, teachers started using PowerPoint or Word documents to make learning more enjoyable. Then we saw the introduction of software such as interactive CD-ROMs. Finally, in recent years, the Internet has been a revolution with its introduction into the teaching-learning process through tablets, various tools, and other applications [12].

It is true that with the development of new technologies, some of these tools are no longer used today—think of cassette or video tapes—but some are still useful and can help us in the teaching-learning process, such as CD-ROMs or Word documents. [12]

2.9.1 How can we implement ICT tools in the classroom?

Implementing ICT in the learning process is more than just having a computer in the classroom and using it to watch some videos or listening exercises or to project the units on the blackboard, where we can practice some easy exercises. Nor is it just having an Internet connection in the classroom to quickly access films or activities on the website of the book we are using. The core of this implementation is that the

teacher can develop their exercises and integrate the Internet with tasks that help students to be active in the learning process [13].

Along with the above concepts, it has discussed the history of ICT used in the classroom; for this, we must include two images, CALL and TELL.

CALL: It stands for computer-assisted language learning and refers to the first computer-based language teaching materials, which appeared in the early 1980s. They used to be basic exercises (by today's standards), such as text reconstruction or gap-filling. However, they are still helpful today. For example, publishers still offer such exercises on the CD-ROMs distributed with coursebooks [14].

TELL: In the 1990s, [15] coined another term, TELL (technology-enhanced language learning), by which he referred to the evolution of CALL as the CALL activities or format that adopted Internet and web-based tools. In this way, the range of activities was extended, offering more possibilities for teaching and learning a foreign language.

The concept of gamification takes an additional perspective when the components, perceived as critical elements, become instrumental in developing and applying the idea. For example, the vision will involve game elements, design, and non-game context concepts. Also, gamification is diverse and has different uses [16].

2.10 Gamification as a multimedia methodology strategy

The concept of gamification is new, and according to [17], it is the use of game elements and game design techniques in non-game contexts. It builds on the gaming industry's success, social media, and decades of research in human psychology.

Any task, assignment, process, or theoretical context can be gamified. The main objectives focus on increasing a person's participation, often referred to as a "user", and motivating them by incorporating game elements and techniques, such as leaderboards and immediate feedback. It gives the users a sense of empowerment and engagement in working through the processes and achieving the tasks. In addition, understanding basic gaming concepts is essential when outlining and using gamification as a strategy [18].

ICT can expand how the outside world is brought into the classroom. It can also offer students and teachers the opportunity to communicate with others around the world. English can provide a varied context for many aspects of ICT, which could enhance the teaching and learning process. It can contribute to developing ICT skills among learners and to more comprehensive technological literacy.

Gamification as a multimedia methodology strategy is now a fundamental element of literacy in a modern technological society. All students have the right to communicate effectively using new technologies, which go hand in hand with the English curriculum. Experience shows that ICT is most effective when incorporated into the curriculum, integrated into work programmes, and not seen as an add-on [13].

The Internet is a communication tool that makes collaborative work more exciting and fun for learners. As an information tool, it allows us to use authentic materials, especially ELT materials, and provides educational resources to create their materials [19]. On the other hand, proposes the following ways in which ICT help students of ESL (**Figure 1**).

According to [20], there are five primary benefits for our students of using technology in the classroom:

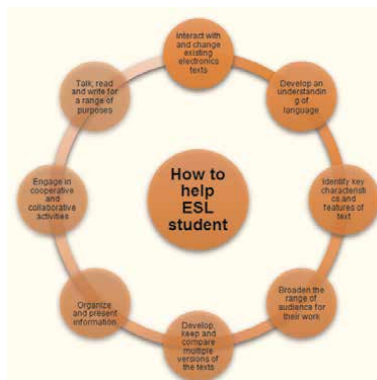


Figure 1.
How ICT helps ESL students. Based on Miles [19].

- Improves engagement: technology provides different opportunities to make learning more fun and enjoyable in terms of teaching the same things in new ways. For example, teaching through gamification or taking students on virtual field trips. In addition, technology can encourage more active participation in the learning process [20].
- Improves knowledge retention: students who are engaged and interested in the things they are studying are expected to have better knowledge retention. As mentioned above, technology can help encourage active classroom participation, which is also a significant factor in increasing knowledge retention [20].
- Encourage individual learning: no one learns similarly due to different learning styles and abilities. Technology offers great opportunities to make learning more effective for each individual and their different needs. For example, students can learn at their own pace, review complex concepts, or skip content if needed. The Internet allows learners to access various resources to research in different ways, increasing engagement [20].
- Encourage collaboration: according to [20] named the “5 Basic Benefits of ICT in EFL” (**Figure 2**), where students can practice their collaboration skills by participating in online activities, for example, working on different projects by collaborating with others in forums or sharing documents through virtual learning environments, both within the same classroom and school and even with other classrooms worldwide (**Figure 2**) [20].

3. Material and Methods

3.1 Type and level of research

The present research corresponds to a quantitative research methodology that explains how gamification as a strategic application of the multimedia methodology in teaching the English language to eighth-semester students of the Technical University



Figure 2.
Benefits of ICT in ESL. Adapted from [19].

of Babahoyo, Quevedo campus (UTB-EQ) assigned as an effective tool in the EFL classroom. The field and applied research was analysed based on the facts and personal experiences of the researcher and the students who served as the experimental and controlled group.

3.2 Place of the research and informants

The research was carried out with a section on the subject of English as a foreign language, in the career of Hospitality and Tourism, in the Faculty of Legal, Social and Educational Sciences of the UTB, Quevedo campus, during the second semester of the academic year, 2021–2022 (October, November, December, January). Fifty students confirmed the control and experimental groups from the eighth semester of the Hospitality and Tourism career. The learners were selected because they were finishing their studies in hospitality and tourism career. After all, it is one of the demanding subjects they need to acquire knowledge. Furthermore, of course, their willingness to collaborate with the researcher.

3.3 Sessions and activities

During the second semester of the academic year 2021–2022 (October, November, December, and January), 50 students confirmed the control and experimental groups (25 each). The participants were from the eighth semester of the Hospitality and Tourism career; the period of the experiment was for 16 weeks, 2 hours per day with a total of 6 hours per week; the activities planned for the experimental group in this research were:

1. The activities for the experimental group's lesson plans were developed around the gamification and multimedia methodological strategy in teaching English to EFL students.
2. The participants for the experimental group partook in observed class lessons applying gamification as a multimedia methodological strategy in teaching English to EFL students.

3. The most relevant activities were using platforms in daily classes; for example, it can name: Kahoot was used at the beginning as prior knowledge and at the end as a formative assessment to measure their academic performance. Educaplay, which through videos, helped to develop and engage the participants' listening skills, Mentimeter was also used to practice writing skills, and small quizzes were used after each meeting; the techniques used in class consisted of developing oral and written skills.

The activities for the control group were the same but only using paper, board, and books.

3.4 General Methods

- Select relevant and corrected sources to elaborate the theoretical framework and analyse the diagnosis results. Throughout this method, it was possible to analyse and systematise the results to generalise the problem.
- Particularised the problem at the Technical University of Babahoyo, Quevedo campus (UTB-EQ). Analyse the information collected in the research. In addition, the partial data were gathered as a whole, allowing the analysis and interpretation of the information obtained in the research process and drawing conclusions and recommendations.
- Establish facts objectively through testing and experimentation. Supposedly, it demonstrates multimedia methodology using Kahoot games and Mentimeter, and Educaplay to assess students in the EFL classroom. It can be crucial to apply gamification as a multimedia methodology strategy in the English teaching process for EFL learners. The essential process involves observing both groups (control and experimental) and creating prediction metre tools. In that case, the process involves conducting an experiment and finally, analysing the results.

4. Analysis tools

The present research was aimed at young adults between 20 and 23 years old studying for a Bachelor's degree in Hospitality and Tourism at the Technical University of Babahoyo, Quevedo campus (UTB-EQ). The research was developed at the Quevedo campus 100 kms from the matrix in Babahoyo, Ecuador. According to their curriculum and the CEFR, they learn English because they need to pass a B2 level and the regulations established by the university to obtain their degree in Hospitality and Tourism.

This experimental research was carried out qualitatively to investigate the factors that improve the development of oral skills of EFL undergraduate students from hospitality and tourism careers. A confidence factor gradually developed over the 10-week 2-hour 3-day-a-week session with 60 hours of regular writing and speaking course. A task-based pedagogical design provided by applying gamification as a multimedia strategy offered learners various opportunities.

Fifty students fitted the control and experimental groups, 25 participants for each group from the eighth semester of the Hospitality and Tourism career. The learners were selected because they were finishing their studies in hospitality and tourism

career. After all, it is one of the demanding subjects they need to acquire knowledge. Furthermore, of course, their willingness to collaborate with the researcher.

To obtain the statistics results from it was used an ICT tool, as was SPSS, to calculate the arithmetic median, standard deviation, and t-value. It is meaningful to mention that this analysis corresponds to a quantitative research methodology because it explains how a new multimedia technology strategy can help develop the EFL classroom effectively. Achieve goals in the student's knowledge, and help them develop their oral and written skills.

In this section, the formulation developed for the control group where the media to the pre and post-test are less significant than the experimental group. This class has yet to apply gamification as a multimedia methodology strategy in the English teaching process for EFL learners. All 25 learners were evaluated at the beginning and the end of the experimental research, and it was not noted that there were any improvements (**Figure 3, Table 1**).

To see a better result of the process, the researcher adjusted the row of the media to get a better understanding of the simple classes in the classroom, with a less oriented focus on developing English language skills for their professional life.

In this section, the formulation developed for the experimental group where the media to the pre and post-test are significantly better after taking the class using gamification as a multimedia methodology strategy in the English teaching process for EFL learners for 16 weeks, 6 hours a week. All 25 learners were evaluated at the beginning of the experimental research. It is noted that if gamification is used as a multimedia methodology strategy in the English teaching process for EFL learners, learners can improve their skills (**Table 2**).

Table 2 shares the information concerning the media analysis where. It starts at six and end at 8. It is noticeably a significant difference in improvement using

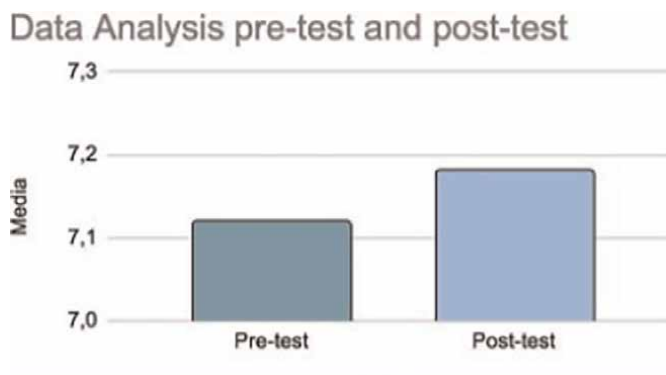


Figure 3.
Control group-data analysis pre-test and post-test.

Group	Test	No	Media	Standard deviation	t-value
Control	Pre-test	25	7.12	2.09	0.93
	Post-test	25	7.18	2.04	

Table 1.
Control group-data analysis pre-test and post-test.

Group	Test	No	Media	Standard deviation	t-value
Experimental	Pre-test	25	7.00	1.44	4.91
	Post-test	25	7.80	1.03	

Table 2.
 Experimental group-data analysis pre-test and post-test.

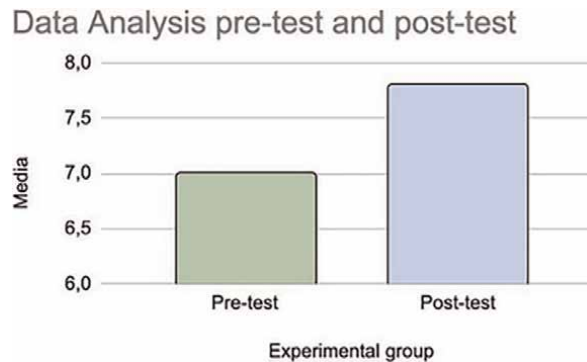


Figure 4.
 Experimental group-data analysis pre-test and post-test.

gamification as a multimedia methodology strategy in the English teaching process for EFL learners to develop English language skills for their professional life (**Figure 4**).

4.1 Control group pre-test and post-test

The pre-test was a tool assessment that helped measure participants' knowledge before undergoing some treatment as part of the research study. The pre-test test for the control group from the hospitality and tourism course consisted of answering 20 random questions on a piece of paper about professional, personal, and goals in their life in a communicative and written form. The researcher wanted to develop this part as quickly as possible.

The post-test was administered to the control group participants through three forms: oral presentations, short, and significant conversations between peers and developing some worksheets using topics from the taught classes. All of these apply in the same way they were taught, corresponding to how control participants were introduced in this long experiment, 16 weeks in total. The classes were developed regularly, as in an EFL classroom, using only paper, audio recordings, some books, and common EFL resources, the techniques used in class consisted of developing oral and written skills.

4.2 Experimental group pre-test and post-test

The pre-test was a tool assessment that helped measure participants' knowledge before undergoing some treatment as part of the research study. The pre-test test for the experimental groups from the hospitality and tourism course was the same for both. The pre-test consisted of answering 20 random questions on a piece of paper

about professional, personal, and goals in their life in a communicative and written form. The researcher wanted to develop this part as quickly as possible.

This part of the post-test was administered to the experimental group participants through three forms: oral presentations, short, and significant conversations between peers and developing some worksheets using topics from the taught classes. All of these apply in the same way they were taught, corresponding to how experimental group participants were introduced in this long experiment, 16 weeks in total. The experimental group participant experimental tones of classes by applying gamification as a multimedia methodological strategy in the English teaching process for EFL learners; the most relevant were the use of platforms in daily lessons, as an example, we can name Educaplay, which through videos, helped to develop and engage the audio part of the participants. In the same way, Kahoot was used at the beginning as prior knowledge and at the end as a formative assessment to measure their academic performance, Mentimeter was also used to practice writing skills, and small quizzes were used after each meeting; the techniques used in class consisted of developing oral and written skills.

5. Results

First, in the control group, all classes were taught as simply as the teachers used to train many years ago. The existence of demand for the type of students that exist nowadays means getting better as teachers and preparing ourselves to hit another level in the daily teaching practice. Concerning the type of learners from this twenty-first century, education has experimented with a low academic program resulting from undermining and disusing multimedia methodology strategy in the EFL classroom as a gamification tool.

Second, using gamification as a multimedia methodology strategy in the EFL classroom requires adequate training for the teachers to employ it commonly in the EFL classroom. The new gamification and the application of a multimedia methodology strategy in the English teaching process for EFL learners is an excellent way to teach speaking and writing skills for their everyday professional life; its goal is to produce understandable communication. It focuses on more than just grammar. The goal is for students to communicate based on context and other aspects of language.

Thus, gamification as a multimedia methodology strategy in the EFL classroom is one of the best ways of teaching English that teachers should use in their daily teaching practice. This research proved that it is an excellent way to teach speaking and writing skills for everyday professional life. Its goal is to produce understandable communication. It focuses on more than just grammar. The goal is for students to communicate based on context and other aspects of language.

The noticeable and variable results from the control and experimental groups showed that in the control group, if teachers do not employ gamification as a multimedia methodological strategy in their daily EFL classrooms, it would not be relevant to help learners develop their English language skills for their professional life. However, it was evident within the experimental group that if teachers used gamification as a multimedia methodological strategy in their daily EFL classes, it would be essential to help students develop their English speaking and writing skills for their everyday professional life [21].

6. Discussion

Language is an essential means of communication; the ultimate goal of language learning is to put it into practice and communicate better with people. People will be limited in real work if they only learn to listen and read without sharing spoken English in everyday life and study. Moreover, it takes work to have a job in today's competitive situation. Therefore, English language teaching aims to improve oral communication by enhancing students' English language skills for their professional life.

The use of gamification as a multimedia methodological strategy in teaching English to learners of English as a foreign language has several advantages in the learning environment. Learners quickly develop autonomy and can easily self-correct with minimal emotional stress. There is a clear progression path, and learners can learn at their own pace.

The reviewed studies reveal and demonstrate through this research that the appropriate implementation of gamification as a multimedia methodology strategy in the language classroom promotes learning and enhances interaction and communication. Boosts autonomous learning, maximises intended outcomes, motivates learners, and helps them improve their EFL classroom performance. Using appropriate pedagogies and methodologies, such as multimedia methodology strategy, can make a difference, bring positive changes in the EFL classroom and turn classrooms into open digital learning environments. However, using ICT without careful planning and well-defined objectives will likely waste time and effort. The use of ICT in English language teaching, particularly in multi-sensory teaching, also has its limitations. The cultural component of teaching materials can be complex and confusing.

As Blake said, it insists that “teachers inexperienced in the use of technology often harbour the belief that simply transforming an activity into a web or CALL format will guarantee its success for learners. Again, any activity without proper pedagogical planning—technologically enhanced or not—will produce unsatisfactory results with learners, even if it is engaging from a multimedia point of view” [22].

7. Conclusion

This study aimed to help students develop and improve their English speaking and writing skills for their everyday professional life. It was proposed to carry out a pre-test and a post-test while in the classes; the formative evaluation was an essential tool for measuring their development. The most relevant need in this research work was to discover the problems teachers and students encounter in the daily EFL class. At the end of the study, the demand to improve English speaking and writing skills in EFL learners became the most discussed topic. Getting students to communicate and express their ideas through a written text takes time and hours of hard work to make them feel confident enough to achieve that goal.

Some suggestions for improving participants' speaking and writing were mainly related to listening skills. These activities included listening to each other, teacher readings, and frequent practice of listening and speaking skills. Multimedia websites such as Kahoot were used at the beginning as background knowledge and at the end as a formative assessment to measure their academic performance. Educaplay, which

through videos, helped to develop and engage participants' listening skills, Mentimeter was also used to practice writing skills, and short quizzes were used after each class. The techniques used in class consisted of developing oral and written skills. In addition, task-based learning design was applied to promote a particular skill or an integrated skills pedagogy in EFL language learning contexts.

It must be said that all learning environments should encourage active and critical learning, not passive. It is why this experiment decided to employ game-based knowledge to learn English as a foreign language using gamification through a multimedia methodology which in this twenty-first century provides this ideal environment for EFL learners.

The participants in this quantitative research work had the opportunity to practice speaking and writing skills in different situations, which helped them improve their vocabulary and broaden their English lexicon from different topics related to their professional life. The creativity of the topics was considered a strength of the speaking. At the same time, pronunciation errors and writing structure were classified as weaknesses to make them feel more confident and comfortable.

Abbreviations

CALL	computer-assisted language learning
CD-ROM	compact disc read-only memory
EFL	English as a Foreign Language
ICT	information and communication technology
TELL	technology-enhanced language learning
UTB-EQ	Technical University of Babahoyo, Quevedo campus

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Chapter 6

Graphics of Ukrainian Children's Publications 2000–2010: Based on the Work of LNAM Graduates

Andriy Maiovets Ivanovuch

Abstract

The article analyzes the experience of some illustrators, graduates of the Lviv National Academy of Arts, whose creative program has developed since the beginning of the XXI century. There is a general approach to solving the system “author–text–vision”, stylistics, metaphorical and plastic imagery, interpretation of elements of ethnic tradition and modern design technologies. The object of research is the graphics of children's publications of Ukrainian publishers that specialize in publishing books for children. For the first time, the creative work of these artists is analyzed: illustration, decoration, created by means of computer graphics. Children's books of the Lviv edition. The subject of the research is figurative and expressive means of illustrators of Ukrainian children's publications of 2000–2010. The methodological basis is the historical and cultural consideration. Scientific methods will be used in the research: descriptive, historical-genetic analysis, comparative and semantic analysis, and others. (1) Descriptive method, thanks to which we classify the artistic and technical execution of children's books. (2) Comparative analysis will allow us to compare historical and literary sources and research. (3) Semantic analysis, according to which we will trace and compare “textual facts” on the basis of descriptive, historical, comparative methods.

Keywords: children's book, illustration, artistic design, stylistics and design, artists, Lviv National Academy of Arts, Lviv Publishing House, Ukraine

1. Introduction

Lviv National Academy of Arts (LNAM) is a Lviv art educational institution for the training of specialists in the applied arts. Tradition and experience of artists of the University's predecessors, it is worth noting illustrators, book designers and periodicals for children: Sofia Karaffa-Korbut, Ivan Ostafiychuk, Zenovia Yuskiv, Lubomyr Medvid, they have become a good artistic basis for the younger generation. In turn, the younger generation is absorbing new trends of the postmodern era, testing various kinds of artistic and technical performance, increasingly taking into account the wishes of society. We can talk about a close relationship—artist—publisher—reader. A new and unpredictable philosophical thought in the expression of their ideas—the

concept of a new children's book. Consider the creative work of contemporary artists: Maryana Kachmar (Flyak), Khrystyna Reynarovykh, Anastasia Stefurak, Andriy Lesiv and Romana Romanyshyn (Creative Tandem "Agrafka").

Illustrative artists who collaborate with modern publishers and offer them bold graphic designs of works by Ukrainian and foreign writers. Author's innovative graphic solutions of covers, covers of the edition. Artists are bold in their vision of the book as a whole, the design of the book can be changed to a non-classical design, or the illustration will be created beyond the usual format of design [1].

The general tendencies in drawings will be traced, when often the image is decorative plane, there is an ornament and a decor. Graphic solution of illustrations found in Easter painting, icon painting, weaving and painting of ceramics, enamels. Artists who imitate the decoration of things and everyday life of decorative and applied use.

There are conceptual approaches of modern illustrators of children's publications, which were formed in the general educational environment—in LNAM. The plurality of authorial approaches in the interpretation of classical literary forms or innovations in different versions of the esthetics of modern book graphics will be considered. Graduates of the Department of Graphic Design and other departments of LNAM, cooperate with various publishers, including: "Kamenyar", "Apriori", "Old Lion Publishing House", "Svichado", "Svit", implement original formal ideas.

2. Review and research topics of modern book design of children's literature in Ukraine in the XX: XXI centuries

The topic of the article is reviews of predecessors, researchers of book work for children in Lviv, Ukraine. "Visual art from avant-garde shifts to the latest trends: Development of visual art of Ukraine in the XX–XXI century" V. Sidorenko [2]. "For the first time in domestic art history, the publication comprehensively considers the path taken by visual art during the XX–early XXI century" [2]. The author M. Slavova researches a children's book, asks a rhetorical question about the development of modern publications for children in socio-cultural status ([3], p. 38–39). Roman Yatsiv in the article "Modern Accident of Artistic Lviv. Fine Arts" traced and analyzed the latest incarnations reflected in the graphics ([4], p. 10–11).

O. Melnyk in the article "Computer graphics in modern book illustration: problems of technique and style" explored modern book illustration and features of its implementation using computer graphics, considered the technical features of working with computer graphics, with emphasis on the current trend of non-photorealistic visualization in the illustration and search for a unique author's language ([5], p. 157–161).

Maryna Tokar in her dissertation "Images of Heroes of Ukrainian Children's Literature in the book illustration of the second half of the XX–early XXI century" [6] explores the features of images of heroes of Ukrainian children's literature created in children's illustrated books by means of fine arts. The work aimed to investigate their representations, which took place under the influence of socio-cultural changes of the second half of the XX—early XXI century and characterize the development of national culture. The author considered the Ukrainian children's book graphics of this period on the visual material of the book: page illustrations, screensavers, letters, endings, in particular, analyzed the covers of children's books. M. Tokar is also the author of the article "Artistic representation of the image of literary heroes of children's books of the 2000s–2010s." [7]. "Evolution of development and current state of publishing literature for children and youth in Ukraine in the period of independence" [8].

L. Burdonos analyzes the formation of book publishing for children and adolescents in Ukraine, in particular: typology, circulation and quality of book publishing for 30 years of independence. In this vein, O. Papush in his research work “Narrative of children’s literature: the specifics of artistic discourse” [9] emphasizes the analysis of the concept of children’s books and proposed his definition of “children’s literature”.

The author touches on issues, namely: artistic taste, esthetics of the word and the publication as a whole. Developing the topic of modern book publishing in Ukraine, T. Galamaga raises the rhetorical question “What is published for children in Ukraine” [10]. The author offers a critical, research consideration of selective illustration, decoration of children’s books.

3. Illustrators (L NAM) and children’s book editions, 2000–2010

At the beginning of the 2000s, the installation of computer graphics and technical and stylistic capabilities of the software continued (it was updated quite quickly, the software itself was changed). Artists have used computer graphics in illustration and book design. A new type of technical and stylistic solution of illustrations, design becomes possible since the development and improvement of material and technical equipment, excellent previous models of graphic solutions of easel and painted methods. With the active introduction of computers and related software, the technical and stylistic way of illustrating, designing and designing a publication is changing.

Computer graphics involves the use of specially designed programs, such as: Corel Draw, Illustrator, Corel Painter, Art Rage, etc. plus the use of a graphics tablet. A characteristic feature of computer graphics is that: the drawing is made in whole or in part by means of software, materialized printed in the circulation of the publication. As a technique, it can “imitate” the above-mentioned, as well as, from the skills and experience of the artist himself—he can create a new figurative-plastic, different from the previous, form of illustration.

Contemporary artists of the younger generation, graduates of L NAM, include: Mariana Kachmar (Flack), Christina Reynarovich, Anastasia Stefurak, Andrew Lesiv and Roman Romanishin (Creative tandem “Agrafka”) Graphic artists and modern naming as designers work with and private, design works by Ukrainian and foreign authors. They equally feel the plastic form of illustration and text on paper, skillfully create a composition of covers, covers. The created decorative-plane drawings are filled with gradient fills, painted ornaments and decor. Until now, such an illustrative, artistic solution has not been used in the design of publications, at the stage of creating a book, for publishing preparation, which became possible only with the spread of computer graphics.

Mariana Kachmar (Flack), a graduate of L NAM, Faculty of Fine Arts and Restoration, Department of Sacred Art (2006). The artist is closely connected with the design of children’s periodicals. Mariana Flack is working on icons—in the style of execution we trace the character present in the illustration. She is the main artist of children’s magazines “Angelyatko”, “Angelyatkova Nauka” and a leading illustrator of the Lviv publishing house “Svichado”, the magazine “Zernyatko”. The artist creates illustrations in vector and raster graphics programs. Designs children’s works by contemporary Ukrainian and foreign authors. The image is addressed to young readers of preschool age. He is working on the design of the magazines “Angel” and “Angel Science”. The artist wrote children’s books by contemporary Ukrainian writers, in particular: Oksana Myronovych “Poems for Girls and Boys” (**Figure 1**), Bohdan Stelmakh’s “Christian Alphabet” (**Figure 2**).



Figure 1. Myronovych Oksana "Poems for girls and boys" (https://svichado.com/vydannya_dlya_molodi_i_ditey/doschkilna/virshiki-dlya-divchatok-i-hlop%CA%BCyat (06.01. 2022)).

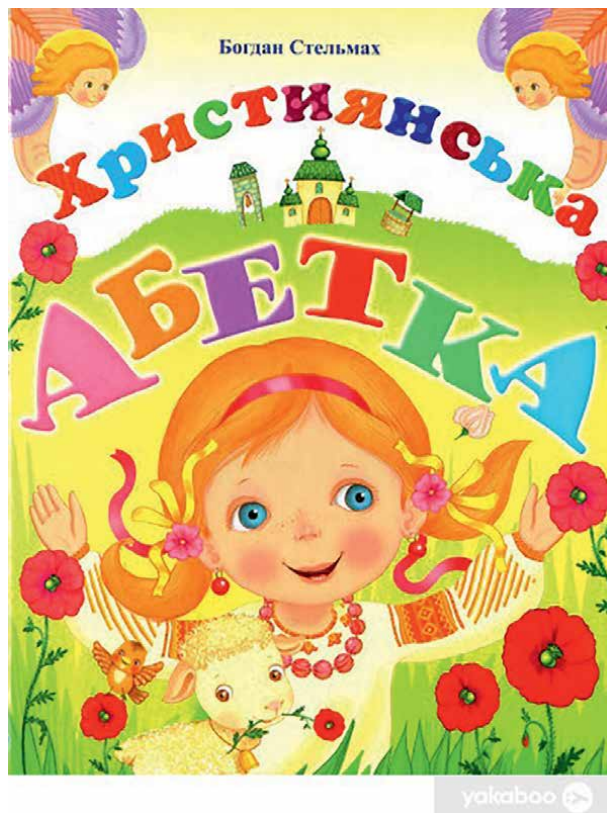


Figure 2. Bohdan Stelmakh "Christian Alphabet" (<https://www.yakaboo.ua/ua/hristijans-ka-abetka.html> (06.01.2022)).

The illustrations are without excessive decorative or ornament. The artist drew attention to the facial features and behavior of the characters. Relative to the basic proportions of the body made large the heads of children and animals. The portraits of the protagonists of stories, poems and fairy tales are clearly interpreted. There is a pastel color scheme and delicately applied calligraphic line in the outline of the drawing. Mariana Flack made good use of computer graphics in creating an illustrative series, clearly taking into account the peculiarities of the readership and children's perception of drawings.

The artist M. Flack created incomparable illustrations that are original and recognizable author's examples. They reflect the trends and needs of the time in search of something new, rethought—something new that can interest children. Regarding her experience of illustration, the artist herself shares:—“Books with luxurious colorful illustrations accompany me since childhood. I do not give them to anyone. Sometimes I come across a book at home that I read as a child, and there are so many memories related to the book, and the texts, and my own fantasies, and travel to the center of Lviv, which was then more fabulous than real for me. city... because I was born here and lived in the center for the first 13 years of my life. Books with gorgeous colorful illustrations have accompanied me since childhood. I do not give them to anyone. Sometimes I come across a book at home that I read as a child, and there are so many memories related to the book, and the texts, and my own fantasies, and travel to the center of Lviv, which was then more fabulous than real for me. city... because I was born here and lived in the center for the first 13 years of my life. Who knows—maybe it's thanks to these books that I now write and openly admire the wonderful illustrations. And who created them? It's a shame that until recently I could not name five modern Ukrainian illustrators. And there are so many of them, talented, hardworking and unique. They are not often written about and not talked about anymore. And they work, live and create next to us. And so—to somehow explore this topic, I went in search of them—on foot and by car, the Internet and trails trodden by friends. She asked those she found personally about life and work, made friends with many, and found information about others on the World Wide Web. I know there are other talented illustrators nearby, but I'm not familiar with them yet. But the time will come and they will also become my friends. If not real, then at least virtual. And I will tell you about them” [11]. And as the artist herself noted:—“Children's illustration is by no means on the margins of art. And although it is not written about, it is not systematized by style, it is not researched, it is and remains one of the brightest types of art” [12].

Another artist, Khrystyna Reynarovych, a graduate of LNAM, fruitfully collaborates with publishing houses: Svichado, Svit, and Kamenyar. He performs his illustrations in raster graphics programs. The artist is meticulous about the details in the artistic style of drawings. Individual segments of the composition are solved by one ornament, decor, and the next - by other variants of drawing. It is worth noting the ornament and decor, the artist developed in raster graphics, software, original author's. Variability in the application of these methods is an intuitive artistic thing. The artist mostly designs children's books of primary school age. Skillful drawing, composition, color and tonal solution, the use of graphic programs - as a result, these means the artist creates perfect reversible, page illustrations. Achieves the desired results - without losing in the details of gently crafted characters. In addition to the illustration itself, the artist also resorted to layout, page design, cover or the whole edition (**Figure 3**). Khrystyna Reynarovych is an artist-technologist, author of original drawings and designer and editor of printed products at the same time.



Figure 3. A clear star above the nativity scene. Christmas crafts (https://svichado.com/vydannya_dlya_molodi_i_ditey/molodschyj_schkilnyj_vik/nad-vertepom-zvizda-yasna--rizdvyani-samorobki (06.01.2022)).

Anastasia Stefurak, from the age of seven she was engaged in art circles, studied at the Ivano-Frankivsk DHS them. O. Sorokhteya, a graduate of LNAM (2013), the diploma project was a series of illustrations to the book “Ukrainian proverbs”. He currently works as a graphic designer in a design studio and collaborates with the “Old Lion Publishing House”. Works in computer graphics and collage techniques. Successfully combining computer capabilities and manual authoring techniques. The artist is impressed by the direction of “magical realism” in literature and fine arts. Among the books of the “Old Lion” by the artist are: “Relentless Katie” (**Figure 4**), “Relentless Katie at school” Susan Coolidge, “Proverbs Ukrainian” [13]. The created illustrations are pastel colors, flat, full of lightness and tenderness in the stylization of the protagonists, without excessive ornamental or decorative ornaments. A certain iconicity of images in the nature of the drawing, in the colors of the drawings. The author’s solution is the most successful in the combination of collage created by means of computer graphics. In general, illustrations evoke positive emotions and ease of perception.

The creative workshop “Agrafka” is Romana Romanyshyn and Andriy Lesiv. Creative tandem of two artists, LNAM graduates who live and work in Lviv. They embody their ideas in the author’s books, in the free execution of illustrations [14]. Romana Romanyshyn, studied at the Lviv State College of Decorative and Applied Arts named after I. Trush, Department of Painting (1999–2003), studied at the Lviv National Academy of Arts, Department of Art Glass (2003–2009). Andriy Lesiv, studied at the Lviv State College of Decorative and Applied Arts named after I. Trush, Department of Restoration of Works of Art (1999–2003); graduate of LNAM, Department of Restoration of Works of Art (2003–2009). Romana Romanyshyn and Andriy Lesiv from the “Agrafka” creative studio immediately perceive the text as a composition of elements. “The first stage of working with the text is acquaintance with large compositional planes: the main characters, geography of actions, historical references, etc. are written out. All subsequent stages involve the search for details, hidden content, interesting fragments, the rhythm of the text is studied. The first thing we do is always print the text and sketch a lot on these sheets, emphasize interesting



Figure 4.
Susan Coolidge "The Restless Katie" (https://www.yakaboo.ua/ua/nevgamovna-keji.html#media_popup_photos (06.01.2022)).

moments, words that can be touched, build associative chains. While illustrating the book, the artist is a co-author of the story. Very interesting are the episodes of departure from the text, his own visions, which the artist reads “between the lines” [14].

A characteristic feature of the graphic embodiment of both artists “Agrafka” is: in their ideological, conceptual solution of illustration, in artistic interpretation, the ideas are not similar to others. An unusual combination of computer graphics and collage techniques using the texture and texture of different materials and planes created with the help of graphics programs and the method of manual execution. Part of the drawing is performed in vector and raster programs, and the other is processed by ink and pen and pre-cut embossing, applications of various improvised materials, mainly fabrics (Figure 5).

The style of pictorial material can be traced in the artistic currents of expressionism or postmodernism. As well as certain analogues of books can be found in modern book publishing in Western Europe. In addition to illustrative material, interesting and dynamically composed decoration. The location of the text column, the choice of typeface typesetting is consonant with the nature of the drawings. Despite the originality and unusualness of the author’s books, there are small shortcomings, if you look strictly at the standards and norms. From the point of view of a book for



Figure 5.
Creative workshop "Agrafka"/The Gauntlet | Art Studio Agrafka. The Mitten (<https://www.youtube.com/watch?v=bbjBB4EtW1w> (06.01.2022)).

a child, in children's publications: individual protagonists are difficult to recognize characters, and the main text present is accidental rather than line type—as modified or stylized, which slows down reading.

In the opinion of Romana and Andriy from the “Agrafka” creative studio, the illustration must convey the meaning, but in an original way, without literal and overly detailed retellings. “Again, referring to the example of “Gloves”: at the beginning and end of the book, the grandfather is not interpreted literally by an old gray-haired man in a sweatshirt, and only his legs are depicted - the reader's imagination paints the figure itself (Figure 5). Every text, no matter how detailed and informative, always leaves the reader with many unanswered questions, and the illustrator should try to answer at least some of them. As a child, reading “Glove”, I always did not understand: how so many animals fit in it? Therefore, we decided to answer this question by drawing the already mentioned “architectural” plan of the glove and its inhabitants. Of course, when you draw such a plan, you come up with associations with ZhEK, redevelopment and house book, the idea of which we used in the illustrations” [14].

“It is common practice for artists to use other literary sources while working, in addition to the work they illustrate. “It broadens the horizons of associations and visions.—Roman and Andriy from the “Agrafka” creative workshop explain.—In this case, the illustrations can be even more figurative than the text itself. But they are also illustrations to tell what is hidden behind the plane of the text” [14].

Participation, awards and exchange of experience in regional, national and international competitions, forums and exhibitions have become significant for Agrafka artists. Good cultural environment of the modern book market of Ukraine and Western Europe. Possibility of creative searches and unusual authorial embodiments of approaches in illustration, design and design of “Agrafka” books. In general, the original author's and recognizable books of the “Agrafka” creative workshop are illustrated. Artists, in addition to printing books, make

versions of the book by hand—the so-called artbooks. Successful creative tandem, workshop, participants of personal and collective exhibitions, awarded many grants and awards.

4. Conclusions

The article analyzes the experience of some modern illustrators, graduates of the Lviv National Academy of Arts, from the beginning of the XXI century. The common features of the professional criteria of artists working on publishing projects for children's audiences are noted: general approaches to solving the system "author—text—vision". Stylistics, metaphorical and plastic imagery, interpretation of elements of ethnic tradition and modern design technologies are traced. For the first time in book design, new features of computer technology have been tested, and the word "book design" is often used. With the active introduction of computers and the spread of appropriate graphics software, the style and methodology of the principle of creation of illustrations, decoration and design of children's publications have changed.

Artists have chosen to use computer graphics as a new type of graphics and logistics. Artists in their search for creative self-expression "destroy" the established norms, rules and regulations, violating them, they offer their options, examples of technical and stylistic performance of the image. The artistic and stylistic language of illustrations is analyzed, we noticed: the expressed author's drawing, individual stylization of the main characters; bright color solution; actively used hyperbolization (exaggeration) of the proportions of the protagonists; vector and raster graphics are pastel tones with soft transitions to ornamental and decorative filling, collage is used in combination of author's graphics with computer graphics.

The result of the study, the artist remains the author or director of the design of children's publications. We can talk about a close relationship—artist—publisher—reader. Illustrative material meets the needs of modern conditions of book publishing and the interests of children of preschool and primary school age. A new and unpredictable philosophical thought in the expression of their ideas—the concept of a new children's book. The modern book market shows a high ratio of various literature and periodicals for children, which in turn creates competition and crystallizes a high culture of design.


The phenomenon of children's book publishing of the given time is represented by new, non-formal graphics, artists, they boldly embodied stylistics and design. This gives impetus to a new vision—modern illustration in children's books and new ideas, ways of implementation on the book market of Ukraine and the world. After all, artists listen to the expectations of the young reader and certain world trends, quality findings in the art of bookmaking. Ukrainian artists, graduates of LNAM, have an affinity for authentic, typical Ukrainian cultural and artistic heritage: Easter eggs, ceramics, icons, etc. they used it successfully in illustrations for children, in the books in question.

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Lecturers' Perception of Technological Pedagogical Content Knowledge in Nigerian Colleges of Education

Aina Jacob Kola and Abdulwasiiu Adebayo Azeez

Abstract

The study investigates lecturers' perception of Technological Pedagogical Content Knowledge (TPACK) in Nigerian Colleges of Education. This is a survey method of research, where a questionnaire was used to obtain data from teachers in three public Colleges of Education in a state. The questionnaire is a five-point Likert scale containing 29 items on technological pedagogical content knowledge (TPACK). The data obtained were analysed using descriptive statistics. Results show that teachers possess the technological knowledge required for their teaching profession and use various teaching pedagogies to teach. Besides, teachers integrate technologies to teach subject content using suitable teaching methods. Finally, teachers employed minimal technologies for their teachings, and only a few lecturers own personal technologies. One of the implications of the outcome of this research is the teacher's challenge to e-learning. This research indicates that Nigerian Colleges of Education teachers have not been adequately engaging students in online teaching during COVID-19.

Keywords: technology, technological knowledge, TPACK, pedagogical content knowledge, teacher self-efficacy

1. Introduction

The critical position of technologies in education in the twenty-first century [1] made it imperative for Nigerian Colleges of Education to play along. However, research studies indicate that teachers at different levels of education have problems integrating technologies into teaching [2]. The poor Nigerian teachers' experience with technology in teaching and learning is similar to Kafyulilo, Fisser, Pieters and Voogt [3] about the teachers in Tanzania.

A research study suggests that teachers are deficient in using technology in teaching [4, 5]. The entire world is in the era of digital teaching and learning. Thus, there is a need for teachers' competencies in all tertiary education in Nigeria, including the Colleges of Education.

The College of Education in Nigeria was born out of the government's passion for training qualified teachers after independence. The College began as a Teacher Training College (T.T.C.) to train Grade II teachers for primary schools. However, with the growing Nigerian economy, there was a hunger to produce human resources for the nation, which requires qualified teachers beyond primary school. In light of this, the T.T.C. metamorphosed into the College of Education [6]. The College was to train pre-service teachers for primary and junior secondary schools with the Nigerian Certificate in Education (N.C.E.) award. The National Commission for Colleges of Education (NCCE) supervised these Colleges. The world is in a digital age where all higher learning institutions, including Colleges of Education, require the knowledge of technologies in schools.

According to Barisic, Divjak and Kirinic [7], it is essential to consider digital competencies in teacher education and professional development. Today's vogue in Nigerian schools is information and communication technologies (I.C.T.). Moreover, with the ubiquitous I.C.T., integrating it into teaching and learning is a problem. Therefore, integrating I.C.T. in classrooms is an essential primary issue in educational institutions around the globe [8], not only in Nigeria.

Teachers are critical in any education system because they transmit the subject contents through pedagogical knowledge [9]. Hence, in this digital age, such is done effectively using I.C.T. Therefore, the concept of technological pedagogical content knowledge (TPACK) was born. The Technological Pedagogical Content Knowledge (TPACK) framework represents teacher knowledge of technology integration in teaching and has seven domains [7], as in **Figure 1**. According to Nordin, Davis and Ariffin [8], TPACK provides a model to guide the effective integration of I.C.T. into teaching. TPACK encompasses three core knowledge bodies: technology, pedagogy and content [11].

The roles of teacher TPACK are enormous and crucial to students learning. The most important of these roles is enhancing authentic learning in schools. Authentic learning is learning by doing. It is active learning, where students are actively involved in teaching and learning.

The TPACK model was conceived in 2006, which authors based on the study of teachers in different grade levels showing their classroom operations. The authors' TPACK Framework leveraged Shulman's 1986 work. Shulman's discussion was on teacher-specific knowledge of the teaching subject (content knowledge) and the specific teaching method (pedagogical knowledge). Shulman argued that any competent teacher should overlap the two knowledge – this is a set of knowledge about teaching their subject matter effectively. This is called pedagogical content knowledge (P.C.K.). The change that happened many years after Shulman was using technology in the classroom.

The technological knowledge was initially treated as knowledge outside the pedagogical content knowledge (P.C.K.). However, according to Mishra and Koehler [12], research that produced a TPACK framework added technology to pedagogical content knowledge, showing teachers' connections, interactions and constraints within all three knowledge areas.

Given this background, the current research is set to assess the lecturers' TPACK in the state's three public Colleges of Education. It is significant because it provides valuable information about these lecturers in domains of TPACK. The information obtained will adequately assist the Nigerian Colleges of Education programme stakeholders in planning this education level. Additionally, it compares the standard of Nigerian teacher education with the educationally advanced countries such as Finland,

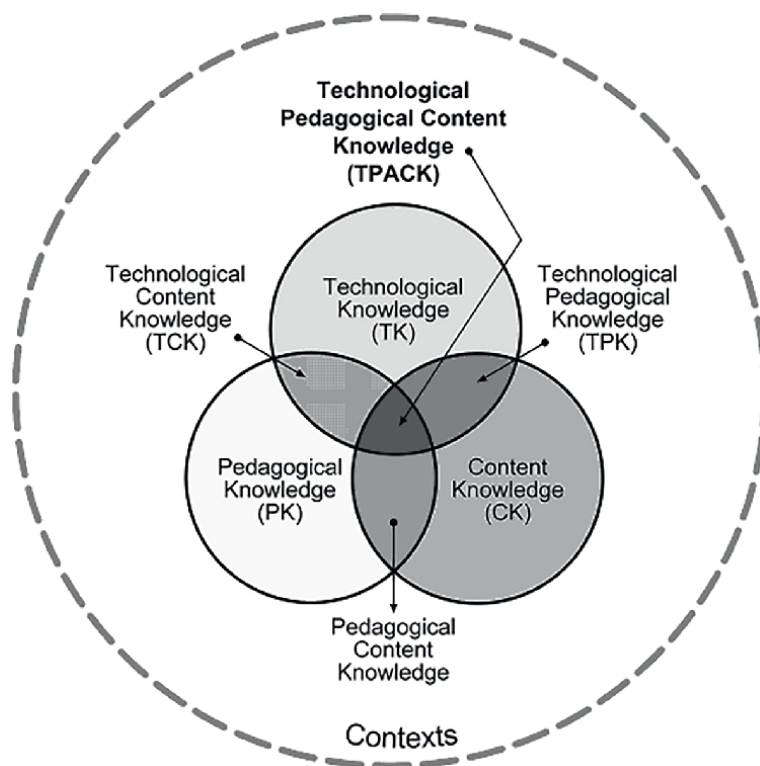


Figure 1.
The TPACK Framework [10].

Singapore, the USA and others. Finally, it would help Nigerian College of Education students to acquire the practical skill to function outside the teaching profession.

Educational systems worldwide are under increasing pressure to use information communication and technologies to teach students and advance their learning skills [13]. Moreover, students of many advanced countries are information technology-savvy and technologically inclined [14]. This implies that the teacher must be competent in using technology to teach any school subject as a critical factor in teaching-learning. However, observation and research studies show that most lecturers in Nigerian schools, including Colleges of Education, are not competent in using technologies to teach. Thus, this research investigates lecturers' perception of technological pedagogical content knowledge (TPACK) in Nigerian Colleges of Education.

1.1 Statement of the problem

Technologies in schools globally make teaching and learning easy and also, in the era of COVID-19, prevent the spread of the virus among students and teachers. Every nation invests heavily in integrating technologies into teaching in its learning institutions. Teacher training institutions globally must prepare pre-service teachers who are sound in integrating technologies into teaching [15]. For lecturers of the tertiary institution to achieve excellence in teaching and learning depend on their use of I.C.T. in the classroom [16]. However, the situation in Nigerian schools is different because most teachers do not have adequate knowledge of integrating technologies into

learning. Research studies show inadequate I.C.T. devices and a low usage level among College of Education lecturers in Nigeria [17]. This challenge has created more problems for teacher training institutions such as colleges of education. Critical among these problems is the inability of the teachers to teach students effectively during the COVID-19 lockdown. In light of this, this study investigates lecturers' perception of Technological Pedagogical Content Knowledge in Nigerian Colleges of Education.

1.2 Purpose of the study

The kernel of this research is to assess lecturers' perceptions of Technological Pedagogical Content Knowledge (TPACK) of lecturers in Nigerian Colleges of Education. The study shall specifically investigate:

- Teachers' knowledge of understanding which technologies are suitable for teaching the specific subject matter
- Teachers' knowledge of effective use of technology suitable for teaching strategies
- Teachers' knowledge of effectively selecting and integrating relevant technologies in teaching content using appropriate pedagogical strategies and technologies teachers frequently use in their classes to teach.

1.3 Research questions

This study generated four research questions to assess lecturers' perceptions of technological pedagogical content knowledge (TPACK). The questions are stated below, and the research shall provide answers to the questions.

- **Q01:** Do lecturers have knowledge of the technology required for their professional assignments?
- **Q02:** Do lecturers have knowledge of using technology that is suitable for teaching pedagogies?
- **Q03:** Do lecturers have the knowledge to select and integrate technologies in teaching content using appropriate teaching methods?
- **Q04:** What are the frequently used technologies by Lecturers in Colleges of Education?

1.4 The scope of the study

The study focused on technology, subject content, pedagogical content, technological content and TPACK domains in three public Colleges of Education. The Colleges of Education programmes in Nigeria comprise courses in art and humanities, science and technology. Therefore, the participants for this study were sampled from all courses in the Colleges of Education programmes.

The College of Education in Nigeria was established to train teachers in the nation's primary and junior secondary schools [18]. The philosophy of this College is to train professional teachers competent to teach with sound content and pedagogical knowledge.

2. Methodology

This section explains in detail the methodology for this research. In addition, the research design, sampling and sampling techniques, instrumentation, data analysis and ethical consideration were discussed.

2.1 Research design

The research employed a survey method where the researchers adapted a validated questionnaire from Schmidt et al. [19]. The study targeted 200 lecturers, but the participants were 184 lecturers from three public Colleges of Education who returned the completed questionnaire. The data obtained from the questionnaire were analysed using descriptive statistics. For ethical consideration, the dignity and integrity of the participants are essential, and the researchers did not violate them. Furthermore, anonymity and confidentiality were respected. Therefore, for anonymity, the sampled Colleges' real names were not mentioned (pseudonyms) throughout the study.

3. Result and discussion

This section is about the results and discussion. **Table 1** presents the responses of the randomly sampled lecturers in the three public Colleges of Education to the TPACK questionnaire. The 29 items in the questionnaire with a five-point Likert scale were analysed and summarised in **Table 1**.

3.1 Results

Table 2 shows technologies frequently used by lecturers in Colleges of Education. However, respondents show that these technologies were not possessed by 62% of the lecturers.

Research question 1: *Do lecturers have knowledge of the technology required for their professional assignments?*

	T.K. (Technology Knowledge)	Mean	S.D
1	I know how to solve my technical problems.	3.9061	.94105
2	I can learn technology quickly.	3.9451	1.05498
3	I keep up with critical new technologies.	3.9891	.88943
4	I frequently play around the technology.	4.0223	1.02198
5	I know about a lot of different technologies.	3.9500	1.06899
6	I have the technical skills I need to use technology.	3.8402	1.08201
7	I have had sufficient opportunities to work with different technologies.	3.6524	1.27551
	CK (Content Knowledge)		
8	I have sufficient knowledge about my subject area.	4.2527	.92352
9	I can use a scientific way of thinking.	3.9887	.92925
10	I have various ways and strategies for developing my understanding of science.	3.9205	.89725

	T.K. (Technology Knowledge)	Mean	S.D
P.K. (Pedagogical Knowledge)			
11	I know how to assess student performance in the classroom.	4.3111	.90491
12	I can adapt my teaching based on what students currently understand or do not understand.	4.1768	.79002
13	I can adapt my teaching style to different learners.	4.2320	.68416
14	I can assess student learning in multiple ways.	4.3056	.90373
15	I can use various teaching approaches in a classroom setting (collaborative learning, direct instruction, inquiry learning, problem/project-based learning, etc.).	4.1848	.79520
16	I am familiar with common student understandings and misconceptions.	4.0659	.92602
17	I know how to organise and maintain classroom management	4.3204	.78675
P.C.K. (Pedagogical Content Knowledge)			
18	I know how to select practical teaching approaches to guide student thinking and learning in my specialised area.	4.1413	.85035
T.P.K. (Technological Pedagogical Knowledge)			
19	I can choose technologies that enhance the teaching approaches for a lesson.	4.2143	.78888
20	I can choose technologies that enhance students' learning for a lesson.	4.1093	.99949
21	My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom	4.1148	.80038
22	I am thinking critically about how to use technology in my classroom.	4.0330	.96857
23	I can adapt the use of the technologies that I learned to different teaching activities.	4.1038	.88027
T.C.K. (Technological Content Knowledge)			
24	I know about technologies that I can use for understanding and doing science.	4.0615	.93714
TPACK (Technology Pedagogy and Content Knowledge)			
25	I can teach lessons that appropriately combine science, technology, and teaching approaches.	4.1038	.92886
26	I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn.	4.2582	.91296
27	I can use strategies that combine content, technologies, and teaching approaches that I learned about in my coursework in my classroom.	4.0335	.96512
28	I can provide leadership in helping others coordinate my school's content, technologies and teaching approaches.	4.1278	.87823
29	I can choose technologies that enhance the content of a lesson.	4.2303	.96713

Table 1.
TPACK domains.

From **Table 1**, items 3–7 show lecturers have knowledge of technology (T.K.) with means above 3.0.

Research question 2: *Do lecturers have knowledge of using technology that is suitable for teaching pedagogies?*

Table 1 shows that lecturers have technological pedagogical knowledge. Items 19–23 offer a means of above 4.0. The table indicates that the lecturers have proper pedagogical knowledge with a mean value above 4.1413.

Research question 3: *Do lecturers have the knowledge to select and integrate technologies in teaching content using appropriate teaching methods?*

Table 1 indicates that Colleges of Education lecturers use appropriate teaching methods to select and integrate technologies in their teaching. From **Table 1**, items 25–29 have a mean above 4.0.

Q04: *What are the frequently used technologies by Lecturers in Colleges of Education?*

Table 2 shows that teachers frequently used laptops, desktops, projectors, mobile phones, auto cards, Smartboards, digital cameras, tablets, whiteboards and calculators. The table also indicates that 38% of the lecturers possessed these technologies, suggesting that 62% may not have technologies for teaching. It shows that the lecturers used hardware technologies only and are indigent with relevant technologies for education.

3.2 Discussion

Technology is critical in any nation's education, making it mandatory for teachers at all levels to have adequate knowledge of it. Scholars advocated for digital literacy of the twenty-first-century teachers, which according to Ortega-Sánchez, Gómez-Trigueros, Trestini and Pérez-González [20], could be achieved if universities' teachers have digital teaching repertoire.

The outcome of this study is not consistence with Ifinedo, Saarela and Hämäläinen [21]. Ifinedo et al., in their study, faulted the weak pre-service teachers'

s/n	Technology
1	Laptop
2	Desktop Computer
3	Auto card
4	Projectors
5	Mobile Phone
6	Smartboard
7	Tablets
8	Digital Camera
9	Whiteboard
10	Calculator
Ownership of the technology devices	
38% owned by Lectures	
62% owned by others (Government, College management, Department/Unit, etc.)	

Table 2.
Frequently used technologies.

understanding of I.C.T. in Nigerian Colleges of Education. The finding of this study regarding adequate knowledge of technologies by the teachers has divergent research perspectives across African schools. Aina and Ogundele [22] opined that Nigerian Colleges of Education lecturers had an inadequate understanding of the technologies required for teaching. Adeoye and Ojo [23] argued that teachers' knowledge of technology is insufficient in Nigerian schools. Umugiraneza, Bansilal and North [24] submitted that teachers' I.C.T. knowledge in Kwazulu-Natal schools in South Africa is based on demographic factors such as experience and gender. Similarly, Makgato [25] once queried that teachers in rural South Africa have challenges with school technology. Hennessy, Harrison and Wamakote [26] have related results with the present finding that teachers in Sub-Saharan Africa are I.C.T. literates. Similarly, Bingimilas [27] submitted that many Saudi Arabian teachers have average knowledge of technology and confidence in its uses. The outcome of this study may not be on the same page as Opoku, Pobee and Okyireh [28] that many West African countries have insufficient knowledge of technologies.

The knowledge of using technologies appropriately in the classroom is critical in this age. The finding of the current study on technological pedagogical knowledge is inspiring. This result is consistent with Harris and Hofer's [29] previous study where teachers' T.P.K. enhances authentic assessment of students' learning. Kurt, Mishra and Kocoglu [30] observed that English teachers have a high level of T.P.K. in a Turkish University. However, the current study is not on the same page as Hosseini and Kamal [4]. The authors observed that the pre-service teacher in a university showed inadequate knowledge of using technology for instructional purposes. In a related perspective, Heitink, Voogt, Fisser and van Braak [31] argued that teachers sparingly use T.P.K. to promote teaching-learning strategies but primarily for classroom management and others.

The present study's finding on the TPACK has some variances with the existing literature and is parallel with many. Tseng [11] shows that teachers in Taiwan have adequate knowledge of content than TPACK. Kafyulilo, Fisser, Pieters and Voogt [3] observed poor teachers' understanding of integrating technology among Tanzania teachers. According to Bingimilas [27], there are differences in teacher TPACK in Saudi Arabian schools based on gender, experience and teaching. Hosseini and Kamal [4] observed that teachers integrating technologies into their teaching is low in a university. Kirikçilar and Yildiz [32] said teachers have difficulty integrating pedagogical knowledge into technologies. Omoso and Odindo [15] found that teachers already know TPACK in a Kenyan public university but show concern for technological knowledge and technological content knowledge. Surahman, Thaaariq, Qolbi and Setiawan's [33] findings showed that teachers in Indonesian schools had adequate TPACK.

The outcome of this study on the frequently used technologies in schools is problematic because the technologies used in Colleges are too small and inadequate. Numerous I.C.T. tools could be employed in classroom teaching [1] far beyond the result of this study. Similarly, Aina and Ogundele [22] listed technologies such as Twitter, virtual interactive classroom, course management software, etc. used for teaching that is missing here. The finding is consistent with Oyediran and Dick [34] that teachers do not possess laptops for teaching in a Nigerian Federal College of Education. In related research, Tella [17] observed the non-availability of I.C.T. tools for teaching at Southwest Colleges of Education in Nigeria. The study's findings revealed that these teachers have a long way to go regarding using technologies in Colleges of Education.

Technologies have occupied a critical position in our global educational system [35]. To succeed in the profession, every institution must have adequate knowledge of technology [8, 36]. A proper understanding of technologies is not enough, but

integrating them into teaching is critical to teachers (Agormedah, Henaku, Ayite, & Ansah [37]. Due to this, Abdalla and Ali [38] opined that teachers should integrate technologies into their teaching because of their numerous benefits. According to Gur and Karamete [39], the integration of technology into education has many advantages, such as creating learning interest for learners [40] and changing the ways teachers think in teaching [39].

The current study's findings suggest that teachers in these Colleges have adequate knowledge of pedagogy, content and technology because, according to Abdalla and Ali [38], these are the three components of the TPACK. The technological pedagogical content knowledge framework is critical because of its various features, as shown in **Figure 1**. According to Koehler [10], the TPACK framework has a focal point where T.K., P.K. and C.K. intercept, suggesting their critical positions in TPACK. The implication is that no teacher can have adequate TPACK when a teacher is deficient in T.K., P.K. or C.K.

Given this, the present study indicates that teachers in the sampled schools are perceived to be adequate in T.K., P.K. and C.K., as **Table 1** reveals. Several studies documented the critical position of technology in teaching and learning in schools globally [41]. Therefore, teachers in all levels of education must possess adequate T.K., as recorded in this study. Technological knowledge makes problem-solving seamlessly accessible, and teachers impart knowledge to students instantly and effectively using appropriate strategies [42]. However, teachers' P.K. and C.K. are essential, but it is more critical to be adequate in P.C.K. [43]. P.C.K. is a unique feature of teaching the subject matter [44]. Aina and Olanipekun [9] argued that P.C.K. is essential for all teachers because content knowledge alone is insufficient, except the teacher has proper strategies for students' understanding. The current study shows that teachers have adequate P.C.K., as shown in **Table 1**.

Teachers in this study employing limited technologies for teaching might be due to their capability of using some I.C.T., which is self-efficacy. Self-efficacy is a belief in an individual ability to perform a particular task [45]. Scholars averred that self-efficacy correlates to the P.C.K. [9]. For instance, Pendergast, [46] argue in linked research that a high self-efficacy teacher would be resilient and be able to handle difficult situations, which is a direct effect of the P.C.K. According to de Oliveira, Ferreira, Souza, Furtado and Ramos [47], teachers with high levels of self-efficacy are more likely to use active teaching techniques that help students become more problem-solving adept. Using or integrating technologies limits teachers' I.C.T. use in classes [48]. The use of technology increases teacher self-efficacy [49]. TPACK strengthens and is a source of teacher I.C.T. self-efficacy [49, 50].

In light of the above, the summary of the findings of this study are as follows:

- Lecturers in Colleges of Education possess knowledge of the technology required for their teaching profession.
- Colleges of education lecturers can use technologies with various teaching pedagogies to teach their courses.
- Colleges of Education Lecturers know about integrating technologies to teach subject content using suitable teaching methods.
- Colleges of Education lecturers employed minimal technologies for their teachings, and only a few lecturers owned personal technologies to teach.

4. The implication of the finding

The finding of the study has some implications for teacher education in Nigeria. Teacher education in Nigeria is critical to the nation's development [51, 52]. However, teacher education in Nigeria is facing many challenges such as curriculum [53, 54], poor pedagogy [55, 56], low enrolment [57], poor teachers' welfare [58], insufficient funding [59], low societal value [6] and recently, COVID-19 [60]. Critical among these challenges is the issue of Information Communication and Technology [61, 62]. This finding implies that these Colleges' lecturers are not engaging in electronics learning because they do not have the required devices. The teaching paradigm has shifted from face-to-face classrooms to mobile electronic learning because of the COVID-19 pandemic [53, 63]. Students were engaged in remote learning at their homes during the international lockdown. Given this, students in many Colleges of Education in Nigeria must have missed a lot because lecturers do not have the technologies for this teaching mode. Technologies have replaced the conventional method of teaching and learning worldwide.

Therefore, this research implies that the Nigerian Colleges of Education stakeholders should inject more funds into mobile and e-learning. The emergence of COVID-19 has brought changes to education globally [64–68]. Teachers and students are adopting online content delivery modes in schools because of COVID-19 [69]. However, teaching and learning during this period may not be possible in Colleges of Education through the online paradigm [53, 70–73].

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Chapter 8

Mental Stress, Socioeconomic Status, and Academic Performance: A Critical Analysis among University Students of Bangladesh

Ahsanul Haque Rifat and Israt Jahan Bithi

Abstract

Socioeconomic status is the totality of an individual's social and economic conditions and may vary from person to person based on various criteria, issues, and distinct factors. A family's socioeconomic status is based on family income, parental education level, parental occupation, and social status in society. This study intends to determine student's socioeconomic status and explain how it affects mental health, academic performance, and personal life among university students. This is a mixed-method study, with both qualitative and quantitative methods. The study data and information were collected from the students of Jatiya Kabi Kazi Nazrul Islam University, Mymensingh, Bangladesh. The study sample size is 180 (n=180; male = 81 and female = 99; including case study= 05) The sample was collected through a convenient sampling method, and a face-to-face interview was conducted. The male (72.7%) and female (66.7%) students are more mentally stressed by socioeconomic status, and above half of the respondents' (55%) academic study is influenced by it. Overall, this analytical study will also progressively contribute to getting the whole idea about the socioeconomic status of the university students in Bangladesh.

Keywords: socioeconomic status, mental health, academic performance, university students, Bangladesh

1. Introduction

Society consists of various types of people across many strata or classes, who have a variety of incomes, earnings, and functions. Different peoples have different income levels and income sources (and other determinant variables) that customize an individual's socioeconomic level in society; moreover, this socioeconomic term formulates or influences one's family, family members, and other related things. Socioeconomic status (SES) deeply influences an individual's life, such as a student's academic life being impacted by the SES (of the family).

Socioeconomic status is a measuring term, including two variables: social condition and economic condition. Social condition is established by the social situation, and financial condition is associated with the money or economy a person has. Socioeconomic status is measured with the same pointers by different sociologists, educationists, and psychologists [1]. Socioeconomic status refers to an individual's position within a classified social structure. It depends on a combination of variables, with occupation, education, income, wealth, and so on. Sociologists ever so often use socioeconomic status as a means of predicting behavior.

Moreover, the university has a large number of students from every social and economic class and even the remote regions of Bangladesh. Understanding the extent of past and present industrialization, urbanization, and socialization of human resources, for example, could help to explain the presence and contemporary value of the process of human development and empowerment and also to know what constraints they still face from various socioeconomic and political burdens that may promote their removal or modification. According to Parson, Stephanie, and Deborah [2], "Socioeconomic Status (SES) is the term used to illustrate people's linked condition in the society in terms of family income, power (political), educational contextual, and working status" [2].

Socioeconomic factors affect the performance of students and influence their personal life and mental health too. It can be projected that this study will help many partners, governments, social researchers, and different expert groups get a sketch-knowledge of the process of the current impact of socioeconomic status. It will be helpful to reformat and update the academic curriculum, action planning, and administrative decisions of the universities of Bangladesh. The study result confirms that students with better grades come from better socioeconomic levels, receive more support from their parents, and have previously attended preschool. So, the socioeconomic level of the student governs their academic performance, mental stress, and health. It is extensively recognized that if learners are to maximize their potential from schooling, they will need the full support of their families. Efforts to improve familial contribution to education occupy governments, administrators, instructors, and family organizations all over the world. The socioeconomic status of a student is the most important factor to improve educational or academic performance, and it helps to support one's mental life too. Moreover, it can be a broad factor for most students to overcome or build a career properly with full support. This analytical study focuses on the basic need for SES on the student's academic performance and mental health and other related things or factors of the student's life. On the other hand, it also reveals that the poor-background students also overcome the fear or condition of SES through their own will and hard work, focusing on their studies and improving their academic studies, not issuing the SES. Socioeconomic status varies from person to person and affects all the spheres of life, such as education, health, socialization, proper psychological development, future progression, and so on. Based on this socioeconomic status, individuals face many difficulties and unequal treatment in getting various opportunities. In this study, a student's socioeconomic status, mental stress (due to SES), academic performance, and other related correlations have been explained.

1.1 The objective of the study

Socioeconomic status is the totality of the individual social, economic, and other overall conditions. It may vary from person to person based on various criteria and

factors. Socioeconomic status is thus a measure of students' access to family resources (financial capital, social capital, cultural capital, and human capital) and the social position of the student's family/household.¹ This study will be conducted with some major objectives as follows:

1. To find out the current socioeconomic status of the students of Jatiya Kabi Kazi Nazrul Islam University (JKKNIU)
2. To explain the impact of socioeconomic status on a student's personal life and academic performance
3. To investigate the influence of socioeconomic status (SES) on the student's mental health

1.2 Research question

This study included some specific research questions, which were served to the respondents, and tried to focus the answers to the analysis and discussion part of the study, to collect accurate results on some demanding areas.

1. What is the current socioeconomic status of the students of Jatiya Kabi Kazi Nazrul Islam University?
2. How does the socioeconomic status impact a student's personal life and academic performance?
3. How does the socioeconomic status influence the student's mental health?

2. Theoretical framework of the study

The theoretical work of this study has highlighted that family SES influences a student's educational outcomes, examined instruments through which family SES is related to their success, and acknowledged probable ways behind this connection, one of which practices three forms of capital: economic, cultural, and social assets [3]. Socioeconomic status (SES) affects an individual's overall life in many ways or their various strata (steps) of life. This analytical research study will correlate these factors with some perspectives/theories. These theories are as follows, as the summary (**Figure 1**).

According to the **functionalist perspectives**, there are several functions of socioeconomic status in the social stratification system. In the structural formation of society, socioeconomic status creates some strata or classes among the group of people, and it is created based on some factors or criteria, such as occupation, economic

¹ https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.oecd-ilibrary.org/sites/f7986824-en/index.html%3FitemId%3D/content/component/f7986824-en&ved=2ahUKEwjR1ou9zv5AhUrS2wGHVU_DQ4QFnoECAYQBQ&usq=AOvVaw19aGM53DhrVU86rPIuQE7a

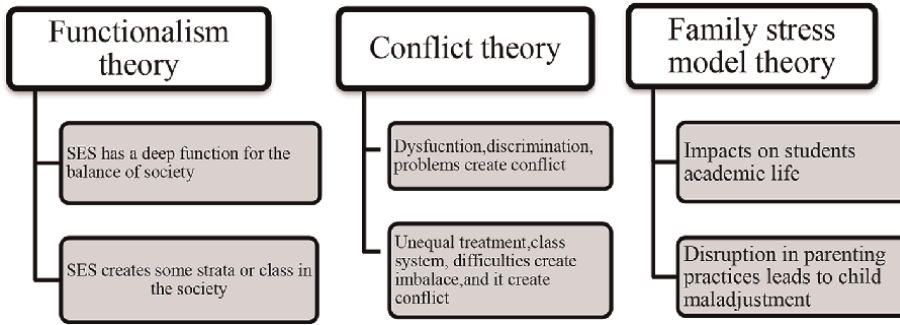


Figure 1.
A summary of the theoretical framework on socioeconomic status and its effects.

condition, high-lower prestige level, power, domination, and so on. This socioeconomic status has a deep function for the balance of society, and to run its organization, it needs many types of persons with different intelligence; this is organized by the formation of the socioeconomic status of an individual. There are some strata or steps of the group and the class created on the basis of the socioeconomic status of a person, and finally, in this way, society is run. Completing the overall functions of society needs the socioeconomic status of individuals and also to run a society smoothly.

Additionally, from the **conflict perspective**, there have been several dysfunctions that occur due to socioeconomic status and its negative effects on a person’s life. For example, classes are created for the SES system in society; people face many problems, discrimination, unequal treatment, and difficulties in their whole life, and these trouble them very much, as a poor-class father’s children are sometimes not allowed in the high-class school, only because of having that poor identity. These types of incidents create discrimination and dysfunction in society. Sometimes, many bad events such as conflict among those classes occur due to dysfunction. Negative perspective like discrimination and dysfunction creates a conflicting nature among the societal classes or strata. These negative things, discrimination, dysfunction, class differences, and so on create a conflict-type mentality among university students also. This perspective is from the conflict theorists, and they talk about class conflict, class distinctiveness, and also class inequality.

Since studies report an association between socioeconomic status and student progress, major theoretical frameworks have been established to clarify this collaboration; it is important to note that both theories highlight family’s economic assets or income [4]. According to an additional perspective—the **family stress model (FSM)**—the connection between parents and students is impacted by the economic difficulties that the family is experiencing [5]. The pressure that comes with the economic situation affects the progress of students since it impacts the excellence of caregiving [6]. Yet socioeconomic status affects educational properties, backgrounds, prospects, and the support that parents offer. Possibly, the care of parents and a home-based atmosphere govern the development of the brain sections involved in decision-making function and intellectual and behavioral development [7]. Conclusively, in explaining the influence of SES differences in development, these perspectives are deeply related to this analytical study [4, 8], and current research develops these theories, explaining the association with the socioeconomic status.

3. Methodology

In this analytical study, the appropriate primary data has been collected from the sample respondents through an organized survey designed in light of the objectives of the study. Due to the scarcity of both time and money, the students studying at Jatiya Kabi Kazi Nazrul Islam University (a public university in Trishal, Mymensingh, Bangladesh) are treated as the population of this analytical study. The data and information have been collected from a total number of 180 students from different faculties of Jatiya Kabi Kazi Nazrul Islam University, including 05 case studies for qualitative data, and the sample was collected by a convenient method of data collection. This is a mixed-method study, with both qualitative and quantitative methods. A questionnaire was served among the students, and an interviewer collected information on socio-economic status from the respondent through a face-to-face interview system (also using a Google survey form). Collected data has been organized and evaluated by various mathematical and statistical methods like averages, frequencies, ratios, percentages, and so on to make the study quantitatively more revealing. In this paper, data is analyzed and processed using the SPSS-25 (*Statistical Package for the Social Sciences*), *Microsoft Excel-2019*, *Google Forms*, and other related software. The study used closed- and open-ended questionnaires because the population is literate and large, and the time for collecting data was limited. Additionally, to get proper and accurate data, survey was conducted and revealed the analytical correlation of data and other specific information explored in the discussion and the findings section.

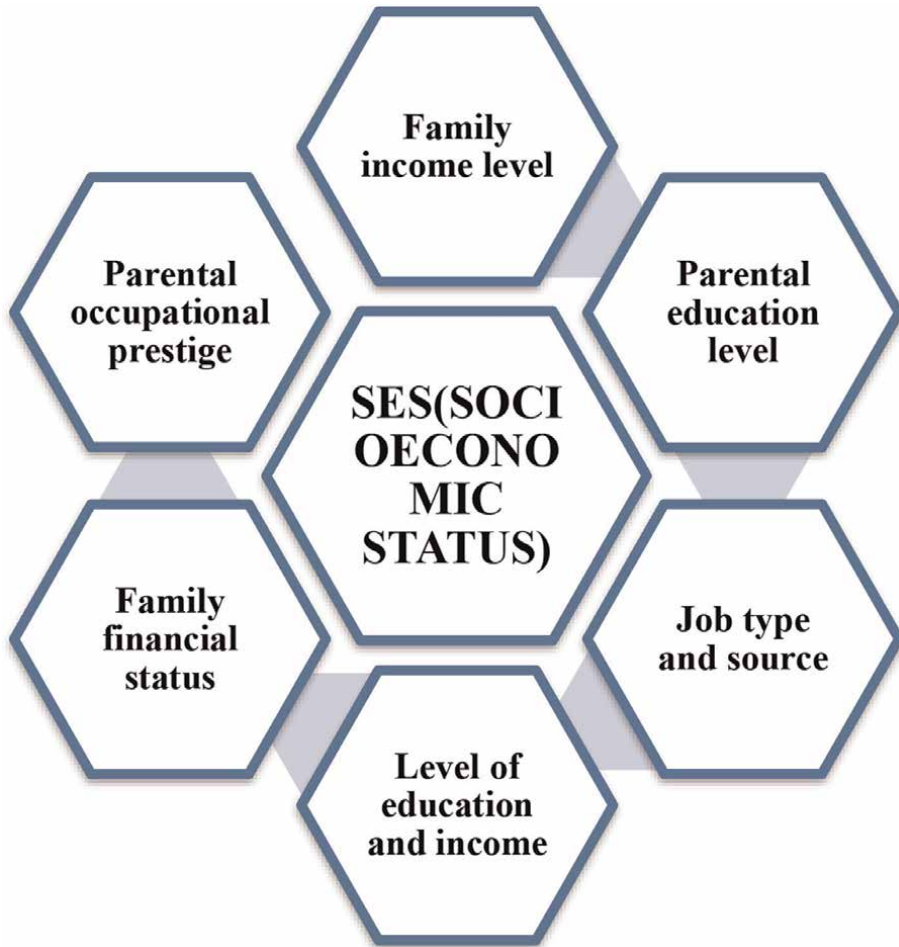
4. Literature review

Socioeconomic sketching is referred to an individual's or group's position within a classified social structure. Socioeconomic status is defined as having three proportions: family income, parent's education level, and parents' occupational status.² Granger stated that students supposed a larger benefit from performance progress from peers who are in the same performance grouping or socioeconomic level [9]. King found that having a growth mindset was linked with better encouragement and engagement for students, and its effects on academic achievement were moderated by SES [10].

Socioeconomic status depends on a combination of variables, including occupation, education, income, capital, and place of residence. Sociologists often use socioeconomic status as a means of predicting behavior.³ SES is a variable that states the condition held by every individual or group in the structure of society (on the social ranking) and so their social stratification [11]. It is understood as a status-achievement model that defines the stratification process: "discriminations in the family lead to the educational attainment inequalities that result in inequalities in service status". Also, the SES level of the family has a positive association with the student's performance [12, 13].

² https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01297/full&ved=2ahUKEwjR1ou9zv5AhUrS2wGHVU_DQ4QFnoECAgQBQ&usg=AOvVaw2y4P5pHQT5ry7sVHtNWbKV

³ (Islam, shariful, Socio-Economic Profile of the Students of University of Dhaka, February 04, 2015, https://www.academia.edu/16367867/Socio_Economic_Profile_of_the_Students_of_University_of_Dhaka)



The SES can be reflected in several different ways; it is most often considered by observing parental education, occupation, income, and services used by individuals separately or collectively. Parental education and family SES level have positive associations with the student's quality of success [14]. Simiyu claims that family income refers to earnings, revenue, rents, and any flow of earnings received. Income can also come in the form of joblessness or worker's recompense, pensions, interests or surpluses, sovereigns, beliefs, or other governmental, public, or family financial support [15].

A family's socioeconomic status is based on family income, parental education level, parental occupation, and social standing in the community (such as interactions within the community, group relatives, and the community's perception of the family) [16]. Socioeconomic factors, such as family income level, parents' level of education, race, and gender, all affect the excellence and accessibility of education as well as the capability of education to progress life conditions.⁴ Socioeconomic status has been

⁴ https://www.google.com/url?sa=t&source=web&rct=j&url=https://classroom.synonym.com/socioeconomic-factors-affecting-education-8240412.html&ved=2ahUKEwjR1ou9zv5AhUrS2wGHVU_DQ4QFnoECAcQBQ&usg=AOvVaw2czfDEbMZL12CxbNAxiiSo

measured in many traditions, including enlightenment and work-related attainment, experience with poverty, income, and exposure to adversative life measures such as joblessness or monoparental families [17]. Lareau, Annette [18] detects that socioeconomic status is naturally broken into three categories, high, middle, and low, to define the three parts in which a family or an individual may fall into. When engaging a family or individual into one of these groupings, any or all of the three variables, income, education, and occupation, can be measured. The socioeconomic status of parents not only affects academic performance but also makes it possible for a student from a low background to participate well with their counterparts from a high socioeconomic background in the same academic atmosphere. Education is an instrument for development, and it spreads knowledge, helps to identify good and bad, makes people aware, and brings enhancement for an individual and also to the nation. The measure of a person's work experience and an individual's or family's economic and social positions comparative to others is based on income, education, and profession. When examining a family's SES, the family income, earners' education, and occupation are observed as well as the joint income versus an individual's, when their qualities are evaluated.⁵ Although the socioeconomic status indicators seem to differ, the most used are the educational level, parental occupation, and family's financial level [19]. Socioeconomic status is an economical and sociological shared total quantity of a person's work experience and an individual's or family's economic and social positions relative to others, founded on income, education, and occupation [20].

Additionally, low income and little education have shown to be strong interpreters of a variety of physical and mental health problems due to environmental conditions, which may be the entire cause of that person's social difficulty to begin with [18]. Ominde detects that education plays a major part in skill sets for obtaining jobs as well as in definite qualities that stratify individuals with higher from those with lower socioeconomic standing [21]. Students with a high level of SES have better grades than those from the middle class. However, middle-class students have healthier results than students from low-SES families [13]. The American Psychological Association (APA) describes socioeconomic status as the social standing or class of an individual or group [22]. SES has been usually used as a hidden idea for measuring family context [23]. Bourdieu proposed that capital can present itself in three essential forms and that economic capital is the foundation of all other forms of capital. The further types of capital are treated as converted and disguised forms of economic capital. Economic capital can be used in the pursuit of other forms of capital; for instance, family income can be used to pay for systematized after-school activities, accessing elite educational prospects, or building up appreciated social networks [24]. Liu illustrates that academic achievement is one of the most important indicators for evaluating students' performance and educational achievement, and also, the relationship between SES and academic achievement has progressively reduced in the past several decades [25].

A student's preliminary reading capability is associated with the parental education, knowledgeable environment, the number of books owned, and parent suffering [26, 27]. However, poor families have less access to educational resources and understandings, including books, computers, motivational figures, skill-building instructions, or teachers, to create a positive learning environment [28]. According to the U.S. Census Bureau [29], individuals within the high family-income quartile are 8 times more probable to acquire a bachelor's degree by age 24 as related to individuals

⁵ Wikipedia Encyclopedia

from the lowest family-income quartile [29]. Low SES and revelation of difficulty are related to a decreased educational achievement [30]. Such mental stress in early childhood leads to lifelong impacts on learning, performance, and health [31]. Awareness of family economic stress and personal financial restrictions affected emotional suffering/depression in students and its academic consequences [32]. A study exposed that individuals from a lower social class commonly had less career-related self-efficacy when it came to professional ambitions [33]. Those from higher social-class circumstances tend to be more successful in rising career ambitions and are generally better organized for the sector of work because of access to capital such as careers office, good school, high-level social performers, and household experience with higher education [34]. Rodríguez explored that academic achievement, university experience, and work standing are more strongly related to academic performance than to SES [35].

5. Findings of the study

Jatiya Kabi Kazi Nazrul Islam University contains many knowledge seekers representing the overall socioeconomic status of Bangladesh. An excellent survey of the students of this university about their current economic and social conditions can help to explain the current state of economic classes, social behaviors, and rural empowerment conditions that may be influenced by sources of income, the level of education, living conditions, academic performance, educational background, and the opportunities provided by this university.

This study analyzed the socioeconomic factors and conditions that affect the students' life. Based on the collected sample, the analysis is divided into the socioeconomic background and other parts, which have been discussed below:

Table 1 shows that from the total number of 180 respondents, 99 respondents are female (55%), and 81 respondents are male (45%). The table also reveals that only 10% of the respondents are married, and 90% of the respondents are unmarried. The percentage of respondents aged from 18 to 22 is 55%, and the percentage of respondents aged from 23 to 28 is 45%. Moreover, it illustrates that among all the respondents, 60% of the respondents' place of residence is residential (university halls), and 40% of them are nonresidential (stay outside of the university halls).

Characteristics	Categories	Percentage (%)
Sex	Male	45.0
	Female	55.0
Age	18–22	55.0
	23–28	45.0
Religion	Islam	95.0
	Hinduism	05.0
Academic year	2nd year Hons	25.0
	3rd year Hons	30.0
	4th year Hons	40.0
	1st year Master's	05.0

Characteristics	Categories	Percentage (%)
Community	Bengali	100
	Indigenous	00.0
Marital Status	Married	10.0
	Unmarried	90.0
Place of residence	Nonresidential	40.0
	Residential	60.0

Source: Author's calculation from survey data.

Table 1.
Socio-demographic characteristics of the respondents.

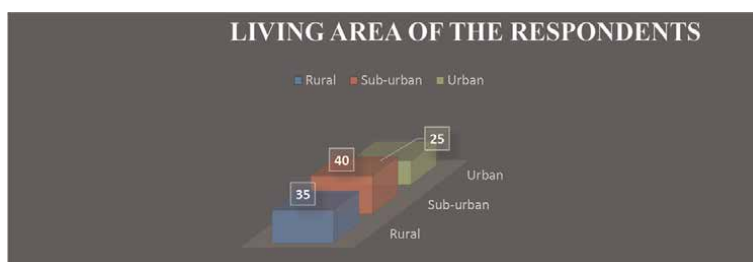


Figure 2.
Living area of the respondents. Source: Author's calculation from survey data.

Figure 2 compares the rate of the living area of the respondents in rural, suburban, and urban areas. Accordingly, among the total number of respondents, 40% used to live in the suburban area, and the lowest rate (25%) used to live in the urban area. Another 35% of them used to live in rural areas.

Table 2 shows the scenario of the parental monthly income of the respondents. Here, the highest percentage is 65% of the respondents (out of 180 respondents) who had a parental monthly income from 10,000 TK to 25,000 TK. In the present situation, this quantity of parental monthly salary reductions largely influences every student because the new age observed that in the present condition, people of Bangladesh are suffering from price hikes. The middle-income family suffered much in the present situation in Bangladesh.

Figure 3 reveals that the largest percentage of the respondent's father education is 35%, which is below SSC level. Their educational qualification is below SSC, which indicates that the quality of education is not good enough. The educational status is one of the biggest significant factors to the development and also an element in the progressive sector of the nation. Its impact also influences every student's personal and academic lives. Besides, the other 65% of the respondents' father's educational qualification categories are 30% for SSC/HSC, 20% for undergraduate/graduate, and only 15% belong to postgraduate.

Figure 4 indicates the mother's education of the respondents. It reveals that 40% of respondents' mother's education is below SSC. The other 40% is SSC/HSC, and undergraduate or graduate level is 20%.

Variables	Categories	Percentage (%)
Family members	1–4	40.0
	5–8	55.0
	9–12	05.0
Parental monthly income	10 k–25 k	65.0
	25 k–40 k	10.0
	40 k+	15.0
	Below <10 k	10.0
Family status	High class	10.0
	Middle class	90.0
Family house type	Own	80.0
	Rental	20.0

Source: Author’s calculation from survey data.

Table 2. Parental monthly income, family members, status, and house-type of the respondents.

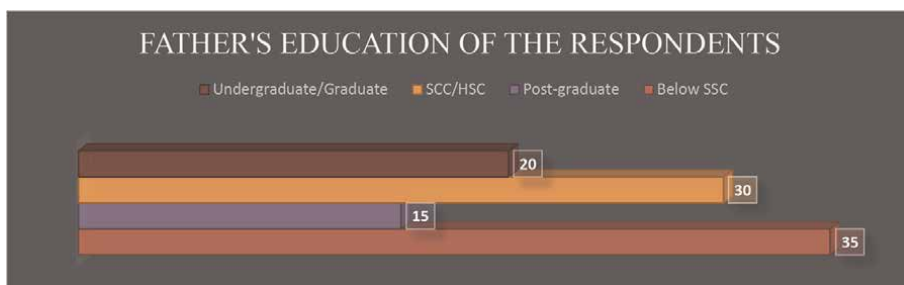


Figure 3. Father’s education of the respondents. Source: Author’s calculation from survey data.

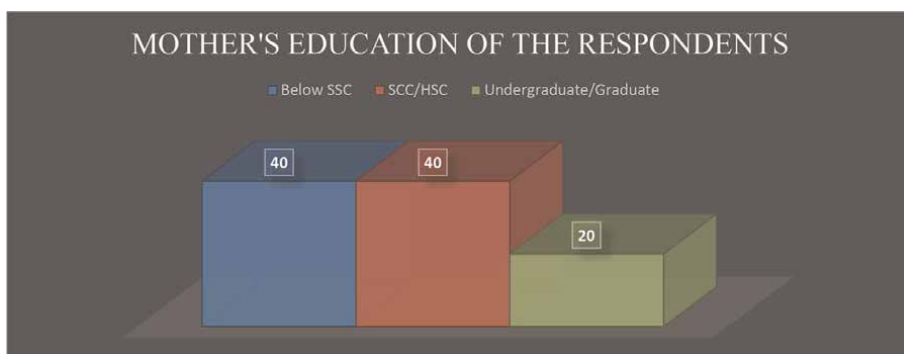


Figure 4. Mother’s education of the respondents. Source: Author’s calculation from survey data.

Figure 5 shows the rate of the scenario of the father’s occupation of the respondents. The largest rate of it is 40%. Accordingly, 40% of the respondent’s father involve with the business-related occupation. The next occupation rate is 15% for



Figure 5. Father's occupation of the respondents. Source: Author's calculation from survey data.

farming and government-job holders. The other 30% is divided equally among foreigners, madrasa directors, shopkeepers, and teachers. All these percentages are 5%, respectively.

Figure 6 shows the respondent's mother's occupation. Here, various types of occupations were found among 180 respondents' mothers. Accordingly, out of 180 respondents, 45% of the mother's occupation is homemaking; only 23% of the respondents' mother's occupation is teaching, and others are involved in a different occupation.

Table 3 mentions the respondents' monthly income, income source, and overall expenditure. Among all the students, 80% of the respondents do not have a monthly income, and only 20% of the respondents have a monthly income, and the source is 20% for tuition, and 5% is business.

Figure 7 reviews who bears the respondents' overall expenditure. Here, 75% of the respondents' overall expenditure was borne by family. And other 25% bore an equal rate by themselves, husband, guardian outside the family, close loved ones (elder brother or sister or friends), agency, organization, and institutions.

Table 4 shows that of the total respondents, 90% of the respondents have enough facilities for accessing the internet. Other 10% of the respondents do not have enough facilities for accessing the internet. It also reveals that half of the respondents are



Figure 6. Mother's occupation of the respondents. Source: Author's calculation from survey data.

Variables	Categories	Percentage (%)
Student’s monthly income (own self)	Below <10 k	20.0
	None	80.0
Income sources (own self)	Business	5.0
	None	75.0
	Tuition	20.0
Student’s education or other monthly expenditure	10 k–25 k	15.0
	Below <10 k	85.0

Source: Author’s calculation from survey data.

Table 3. Monthly income, sources of income, and expenditure of the respondents.

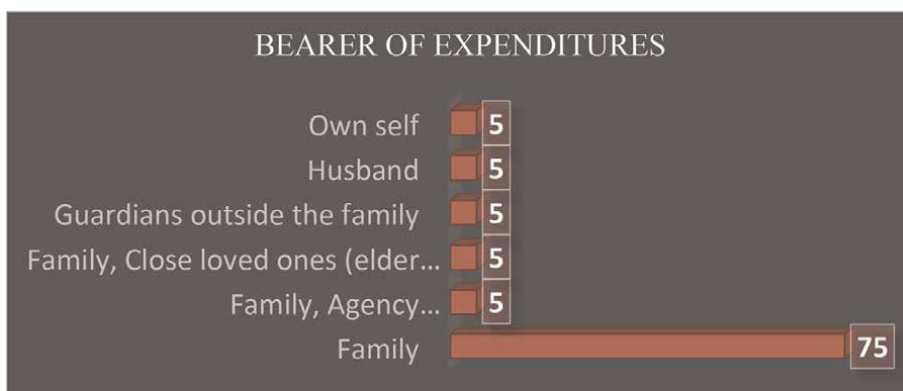


Figure 7. Bearer of expenditure of the respondents. Source: Author’s calculation from survey data.

Questions	Categories	Percentage (%)
Do you have enough facilities for accessing the internet?	No	10.0
	Yes	90.0
Is monthly money good enough to fulfill your needs?	No	50.0
	Yes	50.0
Do you have to support your family financially?	No	95.0
	Yes	05.0
Do you have any mental stress about your economic condition?	No	30.0
	Yes	70.0
Are you satisfied with your socioeconomic background?	No	50.0
	Yes	50.0
Does your living area/status impact your study?	No	25.0
	Yes	75.0

Source: Author’s calculation from survey data.

Table 4. Different questions and responses of the respondents.

satisfied with their socioeconomic status, and half of the respondents' monthly money is also enough. Another half of the respondents are not satisfied with their socioeconomic status, and the other half of the respondents' monthly money is not enough. Of all of the respondents, 5% of the respondents support their family financially. 70% of the respondents have mental stress about their economic condition. Other 30% of the respondents have no mental stress about their economic condition. The living area impacts the study for a large percentage, that is, 75% of the respondents. For only 25% of respondents, the living area does not have an impact on their study.

Figure 8 mentions the respondents' rate of involvement with various human welfare or helpful activities. Here, 50% are involved in social activities, 10% are involved in religious activities, 5% are involved in social and political activities, and the other 5% are involved in social and cultural activities. 30% of the respondents have not been involved with any kind of human welfare or helpful activities.

Figure 9 describes the rate of the relationship between respondents and family. Here, 70.70% of the respondents' relationship with their family is very good, 25.25% is good, and 5.5% is very bad. The relationship between respondent and their family is highly related to their social and economic condition.

Figure 10 mentions the rate of respondents' family's rights, priority, or access to make decisions in society. Here, 90% responded in a positive way, and only 10% of the respondents' families did not have the right, priority, or access to decide in society.



Figure 8. *Involvement with welfare/helpful activities of the respondents. Source: Author's calculation from survey data.*

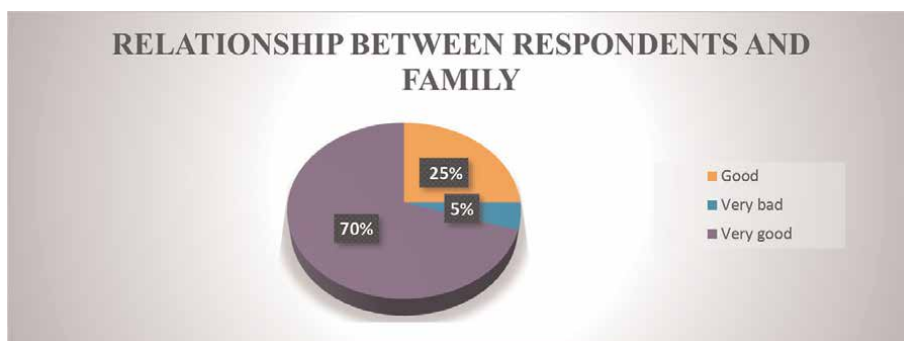


Figure 9. *Relationship between respondents and his/her family. Source: Author's calculation from survey data.*

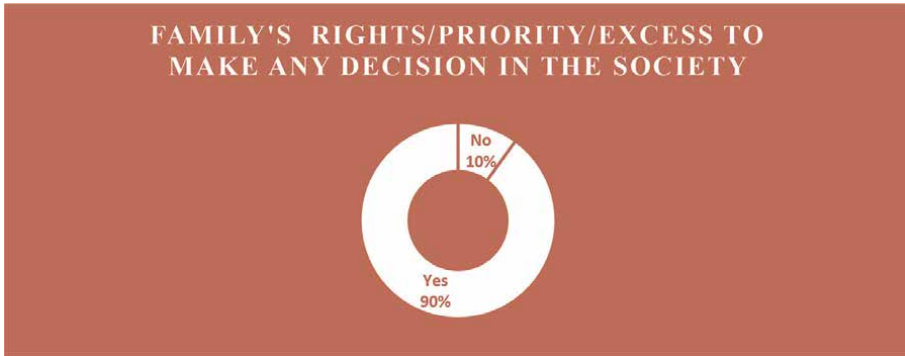


Figure 10. Respondents' family's rights/priority/access to make any decision to the society. Source: Author's calculation from survey data.

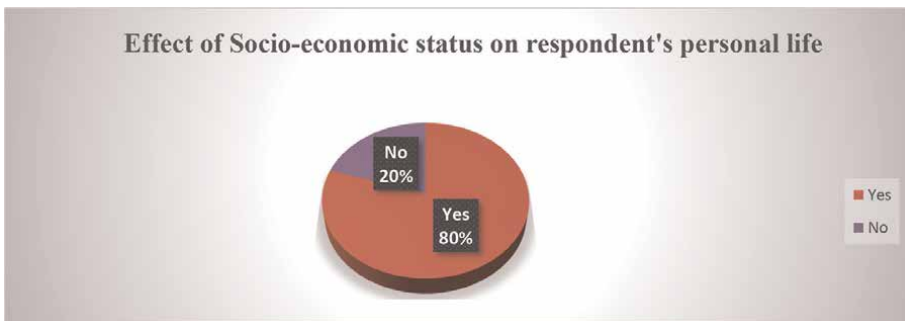


Figure 11. Effect of Socioeconomic Status on respondents' personal life. Source: Author's calculation from survey data.

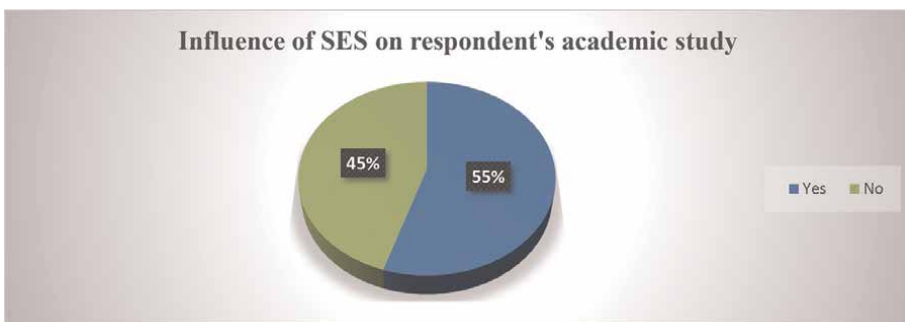


Figure 12. Influence of SES on respondents' academic study. Source: Author's calculation from survey data.

Figure 11 shows that 80% of the respondents think their socioeconomic status affects their personal life, and for only 20%, SES has no effect on their personal life.

Figure 12 mentions that 55% of the respondents think that their SES influences their academic study. And 44% of respondents do not think that their SES influences their academic studies.

5.1 Correlation among the respondents' various variables and the socioeconomic factors, issues, and related criteria

Table 5 shows that male students are more mentally stressed by socioeconomic status (SES), about 72.7%. Again, their SES influences their academic study and also more highly (81.8%) than the female students, and 66.7% of females are satisfied with their SES.

Table 6 reveals the academic year and other SES criteria of the respondents. 4th year Hons students are the 2nd highest in being mentally stressed about their SES, and the highest are the 1st year master's students. For the influence of SES on students' academic study, the 2nd year students of honors level are more in percentage (81.8%). The impact of SES on students' personal life is more among the 3rd year Hons students. 4th year students are highly satisfied with SES.

Table 7 illustrates that 72% of unmarried students are mentally stressed because of SES, and also, 55.6% of unmarried students have been influenced by SES, and it

Sex	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
Female	33.3	66.7	77.8	22.2	33.3	66.7	33.3	66.7
Male	27.3	72.7	18.2	81.8	9.1	90.9	63.6	36.4

Table 5.
Sex and other socioeconomic criteria of the respondents.

Academic year	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
1st year Hons	—	—	—	—	—	—	—	—
2nd year Hons	40	60	60	81.8	20	80	60	40
3rd year Hons	33.3	66.7	33.3	66.7	16.7	83.3	50	50
4th year Hons	25	75	37.5	62.5	25	75	37.5	62.5
1st year Master's	00	100	100	00	00	100	100	00

Table 6.
Academic year and other socioeconomic criteria of the respondents.

Marital Status	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
Married	50	50	50	50	50	50	00	100
Unmarried	27.8	72.2	44.4	55.6	16.7	83.3	55.6	44.4

Table 7.
Marital status and other socioeconomic criteria of the respondents.

Parental Monthly Income	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
10 k-25 k	23.1	76.9	46.2	53.8	15.4	84.6	53.8	46.2
25 k-40 k	50	50	00	100	00	100	50	50
40 k+	66.7	33.3	66.7	33.3	66.7	33.3	00	100
Below <10 k	00	100	50	50	00	100	100	00

Table 8. Parental monthly income and other socioeconomic criteria of the respondents.

impacts their academic study. Again, 83.3% of the unmarried respondents have the impact of SES on their personal life, and all (100%) of the married students are satisfied with SES.

Parental income affects students' SES, and **Table 8** explains the parental monthly income and other socioeconomic criteria of the students. All of the respondents whose parental income is under 10000Tk have the highest mental stress for socioeconomic status (SES). Those students whose parental monthly income averages from 25,000 to 40,000 Tk have the influence of SES on their academic study and also the impact of SES on their personal life. On the other hand, all of the respondents are satisfied with their SES whose parents have above 40000Tk of monthly income.

Table 9 shows that all the respondents (100%) whose father's education is under the SSC level have the most mental stress. Those whose father's education levels are undergraduate or graduate think that their SES influences their academic study, and those whose fathers are postgraduate (100%) are fully satisfied with their SES.

Table 10 reveals that of the respondents, those with the mother's education under the SSC level (88%) have the most mental stress. Also, for those whose mother's education levels are SSC/HSC (87.5%), their SES influences their academic study, and those whose mothers are undergraduate/graduate (80%) are mostly satisfied with their SES.

Table 11 illustrates that those respondents whose fathers are in a government job, private job, or teaching position have less mental stress for SES. Again, those respondents whose fathers are farmers, retired government officers, shopkeepers (67%), and retired government employees are more influenced by the SES, and this impacts their

Father's education	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
Below SSC	00	100	57.1	42.9	14.3	85.7	57.1	42.9
Postgraduate	66.7	33.3	66.7	33.3	66.7	33.3	00	100
SSC/HSC	33.3	66.7	33.3	66.7	16.7	83.3	83.3	16.7
Undergraduate/graduate	50	50	25	75	00	100	25	75

Table 9. Father's education and other socioeconomic criteria of the respondents.

Mother's Education	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
Below SSC	12	88	62	38	20	80	62	38
Post-graduate	—	—	—	—	—	—	—	—
SSC/HSC	25	75	12	88	13	87	62.5	37.5
Undergraduate/graduate	75	25	75	25	75	25	40	60

Table 10.
Mother's education and other socioeconomic criteria of the respondents.

Father's occupation	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
Business	50	50	40	60	35	65	41	59
Farming	40	60	50	50	47	53	50	50
Foreigner	60	40	35	65	43	57	45	55
Government job	70	30	82	18	56	44	35	65
Madrassa-related job	45	55	38	62	41	59	44	56
Private job	63	37	60	40	32	68	48	52
Retired government job	38	62	54	46	23	77	50	50
Shopkeeper	33	67	24	76	35	65	60	40
Teacher	55	45	58	42	40	60	45	55

Table 11.
Father's occupation and other socioeconomic criteria of the respondents.

academic study highly. On the other hand, those whose father's occupation is shopkeeping (60%) are less satisfied with their SES.

Table 12 reveals the data about the mother's occupation and other socioeconomic criteria of the respondents. Among the students, those whose mothers are teachers (30%) are mentally less stressed about the SES, and those whose mothers are involved

Mother's occupation	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
Housewife	22	78	44	56	45	55	56	44
Teacher	70	30	50	50	43	57	50	50
Others	40	60	35	65	37	63	58	42

Table 12.
Mother's occupation and other socioeconomic criteria of the respondents.

Supporting the family financially	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
No	32	68	42	58	21	79	47	53
Yes	30	70	40	60	35	65	60	40

Table 13. Supporting the family financially and other socioeconomic criteria of the respondents.

Family's equal rights/access/priority to make any decision in the society	Student's mental stress for SES		Influence of SES on student's academic study		Impact of SES on student's personal life		Student's satisfaction with SES	
	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)
No	30	70	40	60	25	75	50	50
Yes	28	72	45	55	17	83	50	50

Table 14. Family's access/priority to equal rights for making any decision to the society and other socioeconomic variables of the respondents.

with other occupations (65%) have the most influence of SES on their academic study, and 63% have the impact of SES on their personal life. Among the students whose mothers are teachers, 50% of the respondents are satisfied with their SES.

Table 13 shows that those students who are supporting their families financially, 70% are mentally stressed about their SES, and have the impact of SES on their personal life. This table also says that for students who are not supporting their families financially, 58% have the influence of SES on their academic study, and 53% of them are satisfied with their SES.

Table 14 illustrates that for those students whose family has equal the rights/ access/priority to make any decision in society, 72% of the students have mental stress from SES; 55% have an influence of SES on their academic study; 83% have the impact of SES on their personal life; 50% of the students have satisfaction with SES. On the other hand, those students whose family has not had equal rights/excess/priority to make any decision in society, 70% of the respondents have mental stress from SES; 60% have the influence of SES on their academic study; 75% have the impact of SES on their personal life; and 50% of the students are satisfied with their SES state.

6. Case study of the respondents

6.1 Case study-1

Ramisa (pseudonym) comes from a lower-class family in Bangladesh's rural areas. She is an Hons 3rd year student at Jatiya Kabi Kazi Nazrul Islam University. The

financial condition of her family is not very good. Her father is a farmer, and her mother is a housewife. There are seven members in her family. Her family's monthly income is 15,000 Taka. Since her family members are large in number, they face some problems surviving on less income. Her educational or other monthly expenditure is 5000 Taka. Her family bears her educational or other expenditure, and she said that it is good enough to fulfill her needs. As she does not have any income sources, she cannot support her family. She wants to change her current socioeconomic status because she faces some practical problems like underestimating her neighbors and classmates. Her current socioeconomic background makes some social and economic problems, so she is not satisfied with this background. She said, "Sometimes I face an economic shortage. I feel tension to manage the money insufficiency. But I try to prevent it and let it not affect my academic studies."

6.2 Case study-2

MD Omar Farooqui comes from a middle-income family in Bangladesh's rural areas. He is now 21. He is a 2nd year Hons student at a public university in Mymensingh from 2022. Even though he was expected to complete his undergraduate by 2023, the problematic environment due to Covid-19 has hampered his educational preparation. He tries to abide by the rules of Islam. He comes from the Bengali community. He is unmarried. He is a resident of Bangabandhu Sheikh Mujibur Rahman Hall at JKKNIU, a suburban area. His family consists of 7 members called an extended family. His parent earns monthly around 25,000 TK. His parent's educational background is below SSC due to a lack of financial aid and mental support. His father is making a business to run his family in a good way. They are living in their own house, which is in a rural area of Bangladesh. His monthly expenditure (including education or others) is around 5 to 6 thousand TK, but he has no connection to earning in his own way. His family bears his monthly expenditure, but sometimes that is not good enough to fulfill his needs. He does not have to support his family financially. He is associated with social activities such as the blood donation club whose main focus is to serve free blood. He is now facing mental stress for educational worries and some financial condition. Despite his financial condition, he has a very good relationship with his family and is satisfied with his socioeconomic background. He considers that socioeconomic status affects his life, increases the financial difficulties, and influences his academic study. He does not have enough facilities for using the internet. His family is connected with social activities such as the madrasa or mosque. As a result, they have a distinct acceptance and equal rights, access, or priority to make any decisions in society.

6.3 Case study-3

Every student has different characteristics. Their socioeconomic status is also different. Similarly, a 3rd year student of Jatiya Kavi Kazi Nazrul Islam University, who does not want to reveal his name, describes his socioeconomic status and says that he comes from Barguna; he stays in the mess without getting a seat in the university hall. His family lives in a village in Barguna. His father is a farmer, and his mother is a housewife. They are six siblings. He is the second child among the siblings. All his siblings are currently studying. All the expenses of the family along with their education expenses are borne by his father alone. And for this, his father has to work a lot. However, the individual cannot afford all the expenses. In such a case, he gives

tuition between classes. This makes it a little easier to manage his educational expenses. When asked if it is possible to cover all the expenses with the money from the family and that he earns, he replies that no, more money is needed to complete it. For example, he says that he cannot buy all the teaching materials and takes the help of friends. Again, in terms of food, he cannot eat three full meals daily. In addition, he has to reduce other expenses. Meanwhile, as Trishal is a upazila city, the fee for tuition here is much lower than in other university areas. He does not have enough time to study due to the large amount of time required for tuition and is not paid accordingly. It was his main aim to get admission to the university and take regular classes and study regularly. But due to financial difficulties, he cannot devote much time to his studies. Sometimes, he even has to miss classes. He also said that if his socioeconomic status was good then he could have done very well in his studies. And he hoped that he would do well by enrolling in the university. But that was hampered by him not being able to take regular classes. In each course of each semester, he only managed to take the number of classes required to qualify for the minimum exam. And he could not devote much time to his study's department. Although there were various organizations at the university, he could not get much involved in the organization due to a lack of time. At one point, he says that a student's socioeconomic status has a great influence on his studies and that goes without saying if that student is a university student. University students have to be regularly involved in various academic activities including regular classes and studies. Without a good certificate in appreciation of academic studies, it becomes very difficult for them to get a job. Therefore, it is very urgent to say that the socioeconomic status of a university student has a great influence on his studies. The student even deviates from the original goal of university admission at one point to meet his financial needs.

6.4 Case study-4

Md Samir is a boy from a middle-class family. He is 22 now. He is a 2nd year Honors student at JKKNIU; he comes from a Muslim family, belonging the Bengali community. He is living in a suburban area and is unmarried. There are 4 members in the family. His father's monthly income was less than 10 thousand, and he did not study further after SSC because of his familial problem. Samir's father is a farmer, and his mother is a homemaker. There is a small house on their land. Samir does not have any monthly income because he does not do anything to study. His monthly expenditure is less than 5 thousand, and his father bears this expenditure, but this is not enough for him. He involves in many social welfare activities. He is suffering from too much mental stress for his economic condition. His socioeconomic status affects his personal life. He is not satisfied with his socioeconomic status. Apart from this, his relationship with his family is very good. Their economic condition influences his academic study badly. He cannot bear his academic cost properly. As a result, he sometimes becomes depressed. And it affects his study. He is living in a residential hall at his university. For this reason, his living area does not impact his study, and he has enough facilities for internet access. The moral of the story is that Samir's socioeconomic status is not good, and it affects his academic life.

6.5 Case study-5

Uttam Kumar (pseudonym) is a student in the Finance and Banking Department of Jatiya Kabi Kazi Nazrul Islam University. While conducting an interview on his

socioeconomic status, it is known that he lives in the village of Ulipur upazila under the Kurigram district. He belongs to a middle-class family. His father is the sole earner in their family and his mother is a housewife. He is the eldest among three sisters and two brothers. When asked about the cost of Uttam's education, he said that he earns two thousand Tk per month from tuition and takes the rest of the cost of education from his family. However, this money is not enough to meet his needs. Uttam said that the income from his father is enough for his family. He does not have to provide any financial support to his family. He is associated with a voluntary organization called Rangdhanu of the university. Because he takes a certain amount of money from home every month, if there is no tuition in a month, the money gets strained. The relationship between Uttam and his family is quite good. But he has to study very hard. He is not satisfied with his financial condition. He said, "This economic condition of mine has had a lot of impact on my formal education because I have to get tuition along with my studies. I have to keep calculating. Thinking about money sometimes disrupts my focus on studies." He said that he has enough opportunities to use the internet. And both men and women have equal rights in decision-making in their families.

7. Limitations of the study

This organized assessment has certain limitations; all of the studies were done using self-reports, which caused socially desirable responses. However, associated with offline and/or face-to-face surveys, the study's online arrangement (some) may have increased the reliability of the responses. The data sample was small, but the researcher did his best to acquire as much evidence as possible. Because of the limited time and capital, a country-wide study could not be conducted among all university students. The most significant limitation was gaining access to all the students of because many of them had no access to phones and had limited time to face the interview.

8. Conclusion

Some economic factors like family income, parental occupation, social standard, lifestyle, and others describe the socioeconomic status of a man. We assume that the students of Jatiya Kabi Kazi Nazrul Islam University have come from different economic backgrounds including different occupations, diverse sources of income, different amounts of annual family income, and various economic classes. The profession of the parents of students was mainly from business groups and jobholders who lived in the urban areas. But gaps between the rural and the urban and those between the economic classes are going to equalize. So, this research will find information about the students. The majority of the students of Jatiya Kabi Kazi Nazrul Islam University belong to middle-class families. Omoraka noted that all students have certain requirements, physical and sociological, which, when met, really contribute to their academic performance.⁶ These desires may include a favorable reading atmosphere, good food, playing ground, adequacy of books, and easy availability of good schools. All of these

⁶ www.du.edu

help students with effective learning and good achievement in schools [36]. Viewing such a medium as a form of innovation, the five socioeconomic characteristics, namely, gender, age, income level, education level, and exposure to the internet, were hypothesized to see whether there was any relationship between these five factors and the consumer's willingness to adopt e-commerce.⁷ According to Sabzwari (2004), the following factors play a vital role in academic achievements of pupils [37].

1. Separation of the parents
2. Family size
3. Parental contribution
4. Parents' education level
5. Level of earning

Most of the students depend on family income. Socioeconomic status has a greater influence on personal life. By knowing someone's background, a decision will be taken easily. But there is no database of students about their condition, and the university authority does not take any initiative in this.⁸ All decisions about students are taken by ignoring their socioeconomic status. Above data, most students come to Jatiya Kabi Kazi Nazrul Islam University from different districts of Bangladesh [38]. A student from high socioeconomic status is treated nicely, but unfortunately, students coming from lower-class families are not seen equally. For example, a lower-class student faces much discrimination for only his/her socioeconomic status. Above 60% of the students stay outside of the hall, which means that the university's residential facilities are not enough. On the other hand, the university has no career plan for students according to the demand of the present era. To revise the system's understanding of the socioeconomic status of students, there is a crying need for the university to make a database at the time of admission with a well-designed form, and modern information technology can be used to develop this. University authority and teachers should take a decision based on the socioeconomic profile of the students [39]. Furthermore, labeling someone badly, such as poor or lower class, affects his/her life deeply, which has an intense impact on the academic performance too, and the student cannot easily get out from this labeling. We sometimes tag or label someone without knowing something or with knowing something, and this incident effect much of a person's life. An individual rarely can overcome the imagination of being labeled by someone or a group of people, and for that reason, he/she perhaps continues his/her previous work badly. For example, when people say some bitter words to a poor child, he sometimes feels bad and starts crying. Labeling someone as poor or rich is not a good deed, because it impacts them negatively. Sometimes, we often identify someone only by seeing their clothes or something similar. Rich people get many advantages from being labeled by society, and the poor are facing problems. Again, we accept the crime done

⁷ https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.worldscientific.com/doi/10.1142/S021962200600199X&ved=2ahUKEwif5Oamz_v5AhXxxDgGHUr5AWIQFnoECAIQBQ&usg=AOvVaw26LaoOaOfu48JaoHD_HAv6

⁸ work.chron.com


by the rich for their power and dominance, but we are strict about the similar work done by poor or low socioeconomic-status people. This condition creates many impacts on the people coming from lower socioeconomic status; they are labeled and are becoming the bad victim of something worst. A student from a lower socioeconomic status is not the bearer of low brilliance or low productivity of knowledge, and the student can also prove himself/herself. But when we label someone for their outward appearance or social class, they may suffer from depression over their position, and it also impacts their academic education or life. However, a high-resources family invests high budgets in the development of children (students), which is a supportive thing for their entire life, if applied politely, but the poor students cannot get more facilities from the investment of family, because their SES is not good. Finally, socioeconomic status (SES) is an efficient factor for the students, which impacts their academic life and also influences their mental health and overall personal life.

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Number Sense Performance of Gifted and General Fourth Graders in Taiwan

Der-Ching Yang and Tsu-Ming Chang

Abstract

The study was designed to enable researchers the opportunities to investigate the number sense performance and methods used by both the gifted and general students. A mixed-method design was used, and 48 gifted students and 95 general students in fourth grade from two elementary schools in Southern Taiwan were selected. The sample was chosen using a convenience sampling method. Nine students in each group were randomly selected and interviewed. The results showed that the gifted students performed significantly higher than the general students on the whole test and in each component of number sense. The contributions of this study based on the findings are discussed.

Keywords: fourth graders, general student, gifted student, number sense, elementary school

1. Introduction

Number sense plays an important role in the elementary and middle-grade mathematics curricula [1–5]. Many of number sense-related studies have been conducted worldwide [6–11]. In addition, there are many studies which focus on examining the gifted students' performance on mathematics [12–14]. However, few researchers have investigated the gifted students' number sense performance. Moreover, there are not studies dedicated exclusively to the variations on the topic of number sense between the gifted and general students. Whether the number sense of the gifted students is superior to that of general students should be determined. Results show that number sense is a good predictor for further mathematics achievement [15]. In addition, data also show that the gifted children can apply multiple methods to solve problems flexibly [13, 14]. Children who have good number sense should develop and apply flexible and efficient methods to solve problems [4, 16]. Therefore, the number sense performance and methods used to solve number sense related questions for the gifted students should be examined. The more understanding the thinking and performance of number sense methods used by the gifted students, the more we can design a better approach to help them develop number sense. The kinds of differences should be examined to pursue better mathematics education for the gifted students in the future. Thus, the two research questions are as follows:

1. Is there any significant difference on number sense performance between the gifted and general students?
2. What kinds of differences on number sense-based methods used by the gifted and general students when solving number sense-related problems?

2. Background

2.1 Meaning and components of number sense

Number sense refers to an individual understanding of numbers, operations, the relations between numbers and operations, and the ability to solve real-world problems that involve numbers [1, 17].

Based on previous studies [1, 7, 9, 16, 17], the current study's definition of number sense comprises four components.

C1. Understanding the basic meaning of numbers and operations

This implies an ability to fully understand the meaning of the base-10 number system (e.g., integer, fraction, and decimal), place value, patterns of numbers, multiple methods of representation, and the four basic operations [9]. For example, students should realize that infinite decimals and fractions are found between 0.41 and 0.42 for middle-grade students [18].

C2. Composing and decomposing numbers

Decomposing numbers means to decompose numbers to facilitate the computation, such as $18 = 2 + 16$, $18 = 15 + 3$; composing numbers means to add numbers to become a number, such as $19 + 1 = 20$, $37 + 3 = 40$ [9]. For example, when encountering a question such as $96 + 76 = ?$ Students can first decompose 76 into 72 and 4, then add 4 to 96, which equals to 100, and finally, add 72. The result is 172.

C3. Ability to judge the reasonableness of a computational result

After obtaining an answer, students can use the information given by a question to determine the reasonableness of a computational result [9]. For example, when students were asked to answer: "How many digits is the sum of 2 three-digit numbers?" They should know that a small three-digit number plus another small three-digit number could be a three-digit number and a large three-digit number plus another large three-digit number could become a four-digit number.

C4. Recognizing relative number size

Students can determine relative number size or determine which number is closer to the target number. For example, "Arrange the following rational numbers in order from the lowest to the highest: $\frac{1}{2}$, 0.65, $\frac{5}{4}$." Students should know that 0.65 is greater than $\frac{1}{2}$, and $\frac{5}{4}$ is greater than 1. Therefore, the order is $\frac{5}{4} > 0.65 > \frac{1}{2}$ [18].

2.2 Gifted students' characteristics and related studies

In this study, gifted students were defined as students who passed two levels test instituted by the Ministry of Education in Taiwan [MEiT] [19]. The first level is the Intelligence Quotient Test, with a passing score of ranking above 93%, and the second level is the Wechsler Intelligence Scale (fourth edition) for Children, with a passing score of ranking above 97%. The IQ test was designed by educators in Taiwan and includes three subtests (e.g., language, mathematics, and graphics) [19]. The IQ test

was used to assess students' intelligence. In this test, student's IQ score ranked over 93% is considered to have a high IQ. The Wechsler Intelligence Scale (fourth edition) was designed by Wechsler [20] to measure a child's intellectual ability. The test includes five primary index scores: the Verbal Comprehension Index (VCI), Visual Spatial Index (VSI), Fluid Reasoning Index (FRI), Working Memory Index (WMI), and Processing Speed Index (PSI). In this study, a student whose score ranked above 93% on the IQ test and ranked above 97% on the Wechsler Intelligence Scale (fourth edition) was defined as a gifted student.

Clark [21] discussed the characteristics of a gifted student from four perspectives, including cognitive, affective, physical, and intuitive perspectives. From a cognitive perspective, a gifted student has excellent memory and comprehension abilities, being capable of fast and flexible thinking, producing different ideas and problem-solving strategies, and so on (Clark). From an affective perspective, a gifted student has a strong motivation to explore new knowledge (Clark). From a physical perspective, a gifted student can absorb a lot of new information at a same time (Clark). From an intuitive perspective, a gifted student has a higher degree of creativity than peers (Clark). Davis and Rimm [22] indicated that gifted students possess many different characteristics, such as excellent analysis, reasoning, and problem-solving ability, ability to use abstract, complex, and high-level logical thinking abilities, and producing effective strategies to solve questions, having good meta-cognitive abilities, and so on. Earlier studies in Taiwan also showed that Taiwanese gifted students are better in abstract thinking, logical reasoning, fast and flexible thinking, using multiple and effective strategies, having good meta-cognitive abilities, and so on [23, 24].

Based on the above studies, the characteristics of gifted students include excellent abilities on concentration, comprehension, and creativity; flexible thinking, good abstract and logical reasoning ability, and insights; strong learning motivation; having the ability to self-reflection and meta-cognition, and so on. In fact, the gifted students in mathematics also have some characteristics that gifted students have [14, 25–29]. Number sense is a foundational content area in mathematics education [5, 9, 16, 30]. However, there is no research that focuses on the examination of the relationship between gifted students and number sense. This motivated the conduct of this study.

2.3 Number sense and gifted students-related studies

Earlier studies showed that there are several common methods used by general gifted students when solving questions [13, 14, 28, 31]. These methods included (1) composing and decomposing, (2) finding patterns, (3) connecting to prior experience, (4) graphic representation, (5) eliminating possibilities, (6) making and testing conjectures, (7) intuition, and (8) logical reasoning. Some of the methods are similar to the number sense strategies.

Some methods are not specific to number sense. For example, flexibly using pictorial representations, which consists of drawing figures, is typically considered a problem-solving strategy [32]. "Making and testing conjectures" means that students make guesses by observing patterns, test these guesses, and then evaluate the result [33]. Regarding logical reasoning, Greeno [34] asserted that number sense is a set of capabilities for constructing and reasoning with a mental model. Students can estimate the area of a given region by using benchmarks and reasoning, which is an example of logical reasoning. "Intuition" is a type of number sense [28]. According to the previous discussion, the variations in performance and strategies between the

gifted and general students in solving number sense questions are not definitive. Therefore, this study is relevant.

Study related to the gifted students on variations in number sense and use of strategies for solving number sense-related questions is lacking. Examining the difference and recognizing the characteristics between the gifted and general students would contribute to the future studies. Hence, this lack of research encouraged us to conduct this study.

3. Methods

A mixed-method approach was used in the current study. For quantitative analysis, the number sense data on the students in this study were collected using a number sense web-based two-tier test system. A statistical analysis was used to evaluate the performance of the gifted students and general students. For qualitative analysis, data were collected through semi-structured interviews.

3.1 Sample

Fourth graders from two public elementary schools (A and B) in Southern Taiwan were selected. Student numbers in each school are over 1,000. School A had 28 gifted students and 320 general students in fourth grade; School B had 20 gifted students and 200 general students in fourth grade. All 48 gifted students from both schools and three classes with 95 general students from School A and B (two classes from school A and one class from school B) were randomly selected to join this study. The families from schools have a wide range of socioeconomic backgrounds. All of the participants were voluntary to join the test and under the agreement of parents and the school administration.

According to the results of the number sense web-based two-tier test, the students in each group were classified into three categories: high-level (top 20%), middle-level (middle 50–60%), and low-level (bottom 20%). Three students at each level of both the gifted and general student groups were randomly selected and interviewed to examine their methods of thinking about number sense problems. Therefore, the sample for the interviews consisted of nine gifted students, coded as low (GL1–3), middle (GM1–3), and high (GH1–3) level students, and nine general students, coded as low (NGL1–3), middle (NGM1–3), and high (NGH1–3).

3.2 Instrument

A Number Sense Web-Based Two-Tier Test System for fourth graders designed by Lin [35, 36] was adopted in this study. The online test system consisted of a two-phase evaluation. The first-tier test (answer-tier) in the two-tier test assesses children's responses to number sense-related questions, and the second-tier test (reason-tier) examines children's reasons for their related choice made in the first-tier test [16, 37]. One example is shown in **Figure 1**.

This test included four components, with eight questions for each component, resulting in 32 total questions. The test was divided into two subtests. Each subtest included 16 items. The items in the web-based two-tier test were written in Chinese and translated into English for writing this manuscript. Each question in the test was

Step 1 : Student chooses an answer

Question 23 / total question of the test is 32	
Question	Which of the two fractions $\frac{5}{7}$ and $\frac{5}{8}$ is larger?
Answer	<input type="radio"/> $\frac{5}{7}$
	<input type="radio"/> $\frac{5}{8}$
	<input type="radio"/> The same
	<input type="radio"/> Can't tell
<input type="button" value="Submit"/>	

Step 2 : According to the answer, the student is required to choose a reason for the selection

My reason is	
<input type="radio"/>	The more pieces I cut, the smaller the pieces become. Therefore, 5 parts of 7 parts is larger than of 8.
<input type="radio"/>	This is a formula. When the numerator is the same, the larger the denominator is, the smaller the fraction is.
<input type="radio"/>	I am guessing.
<input type="button" value="Submit"/>	

My reason is	
<input type="radio"/>	8 is larger than 7, $\frac{5}{8} > \frac{5}{7}$
<input type="radio"/>	$5.8 > 5.7$, so $\frac{5}{8} > \frac{5}{7}$
<input type="radio"/>	$8.5 > 7.5$, so $\frac{5}{8} > \frac{5}{7}$.
<input type="radio"/>	I am guessing.
<input type="button" value="Submit"/>	

My reason is	
<input type="radio"/>	Both $\frac{5}{7}$ and $\frac{5}{8}$ are both five pieces.
<input type="radio"/>	I am guessing.
<input type="button" value="Submit"/>	

My reason is	
<input type="radio"/>	$\frac{5}{7}$ and $\frac{5}{8}$ can't be compared because they have different denominators.
<input type="radio"/>	I am guessing.
<input type="button" value="Submit"/>	

Figure 1.
 One example for the two-tier number sense test.

reviewed by mathematics educators and experienced elementary school teachers. They all agreed that the tests are appropriate for the sample students.

To deeply explore students' thinking, a semi-structured interview was used to collect data [38]. Three questions were derived from each of the four components, and a total of 12 questions from the test were selected and used in the interviews to examine the gifted and general students' methods when solving number sense-related problems.

3.3 Procedure

The web-based two-tier test was conducted via an online setting in which students were asked to complete 16 items on computers individually for each subtest. The test included two subtests with 32 items in total. Due to the test included answer-tier and reason-tier, the answer-tier limited 40 seconds and reason-tier limited 60 seconds for students to answer the questions [36, 39]. Hence, participants required about 35 minutes each subtest to complete the test. During the test, students were required to follow the testing rules and procedures: (1) the papers and pencils were not allowed for students to use; (2) log on to the web-based system; (3) key in the individual data; (4) review the rules for the on-line test; (5) practice one item presented on the computer; and (6) begin the formal test.

Each participant was given a booklet during the interview. Each page of the booklet included one item and ample space for allowing students to record their thinking and methods. Each interview took about 40 minutes. Before the interview, the following directions were read aloud to each interviewee: 1. You are encouraged to estimate or mentally compute and do not necessarily to use written computation to find an exact answer on each item; 2. You can write an answer to the question and then briefly explain how you arrived at the answer; and 3. You are welcome to use different approaches to solve questions; the time on each item for you to answer was 3 minutes, so you should not turn to the next page without permission. The interviewer controlled the time to ensure that all interviewees would have an opportunity to answer each question.

3.4 Data collection and analysis

Data were collected through online tests and interviews. Based on the results of the online test, computer software was used to assemble statistical data; in the interview segment, video- and audio-recorded information of the interviews was transcribed into written records.

3.4.1 Quantitative data analysis

The scoring criteria of the two-tier test was calculated based on the students' answer and reason choices. In the first tier, if the students chose the correct answer, 4 points were given. In the second tier, if the students selected the number sense-based method, 4 points were given because the purpose of this study was to examine students' performance on the use of number sense-based method. If the students selected the rule-based method, 2 points were given. Therefore, the highest score was 8 points, and the lowest score was 4 points. If the students chose the wrong answer in the first tier, then 0 points were given in the first and second tiers.

Two independent groups (the gifted and general students) were used in this study; therefore, SPSS statistical software was used to perform the *t* test to determine the variation in number sense performance between the gifted students and the general students. In addition, an ANOVA was used to detect any variation between the gifted students and general students in the use of four components of number sense.

3.4.2 Qualitative data analysis

The students' responses were examined and sorted carefully. In an effort to identify the different methods used by the interviewees, each response (whether correct or incorrect) was sorted according to one of the following categories [17, 38]:

1. Number sense-based method: The students who used meaningful approaches to solve questions were coded as number sense-based method. For example:
Question 4: “Which answer is equal to $2 \times 42 + 2 \times 58$? (1) 2×100 (2) 4×100 (3) $2 \times 44 \times 58$ (4) 86×58 ”.
GH1: Because 42 and 58 are all multiplied by 2; therefore, $2 \times 42 + 2 \times 58$ equals $2 \times (42 + 58)$. The answer is 2×100 .
GH1 knew that “ $2 \times 42 + 2 \times 58$ equals $2 \times (42 + 58)$.” This was coded as “being able to decompose and compose numbers.”
2. Rule-based method: The students who used this strategy applied the rules of standard written algorithms to solve problems.
3. Misconception: The students used an incorrect method to solve problems.
4. Other methods: students’ responses, except the above methods, were classified.

Two researchers independently reviewed the transcripts and categorized the students’ responses for each correct and incorrect answer. These initial reviews produced agreement in over 92% of the categorization of student responses. The remaining responses were reexamined and discussed by the coders until agreement was reached.

3.5 Reliability and validity

The Cronbach’s α coefficient of reliability was 0.828, and the construct reliability indices derived from structural equation modeling analysis for the two-tier test was 0.875. In addition, the difficulty indices of the test items were .26–.67, and the discrimination power was .48–.80.

Regarding the content validity, the options (both answer options and response options) in the NS came from earlier number sense studies (e.g., [36]). Especially, the options, including number sense-based method, misconceptions, and so on, used in the reason selections of the test were collected from interviewing over 100 fourth graders from earlier studies (e.g., [39]). Therefore, these options represented students’ most frequent responses. In addition, the web-based test was reviewed by several experienced teachers, researchers, and mathematics educators who are experts in number sense to check whether those questions in the test were appropriate and relevant to the fourth graders. They all agreed that all the 32 questions in the test including wording, content, and the reasons for were appropriate for fourth graders.

4. Results

4.1 Variation in number sense performance between the gifted and general students

In **Table 1**, the number sense performance of the gifted and general students is reported. The t test results show statistically significant differences in the number sense performance of the gifted and general students for each number sense component (F1: $t = 9.5, p < .000$; F2: $t = 9.51, p < .000$; F3: $t = 8.3, p < .000$; and F4: $t = 8.96,$

$p < .000$) and total score ($t = 11.65, p < .000$). This indicates that the gifted students significantly outperformed the general students in each number sense component and overall number sense performance. Moreover, the results also reached a high effect size ($\eta^2 = .44$). It indicates that the gifted students significantly outperformed the general students in number sense.

4.2 Variations in number sense performance for each component for both groups

To further examine the variations in number sense performance for each component for both groups, a one-factor repeated measures analysis of variance was used. Before proceeding with the statistical analysis, we ensured that these data did not violate the sphericity assumption. The Mauchly values were $W = .847$ ($\chi^2 = 7.613, p > .05$) for the gifted students and $W = .969$ ($\chi^2 = 2.90, p > .05$) for the general students. The results show that the data did not violate the sphericity assumption. Therefore, the one-factor repeated measures analysis of variance could be performed.

In **Tables 2** and **3**, the results of the one-factor repeated measures analysis of variance for both groups are shared. In **Table 2**, the results of ANOVA show that a value of the 48 gifted students did not reach the significance level [$F(3, 141) = 2.444, p > .05$]. Therefore, no significant variation was found among the four number sense components for the gifted students. In **Table 3**, the ANOVA value of the general students reached the significance level [$F(3, 282) = 2.962, p < .05$], indicating a significant variation among the four number sense components for the general students. The results of post hoc tests showed a significant variation between F4 ($M = 27.95$; recognizing the relative number size) and F2 ($M = 24.08$; ability to decompose and compose numbers). This implies that the general students performed higher on F4 than on F2.

4.3 Similarities and differences in methods used by students of both groups

In **Table 4**, the interview results regarding the methods used by the students of both groups are shown. To explain the three types of methods used by the students, their responses are reported as follows. The interview Question A10 (F4, recognizing the relative number size) asked: “A box had 24 moon cakes. John bought 0.4 of a box, and Mary bought $\frac{1}{2}$ of a box. Who bought more moon cakes?: (a) John; (b) Mary; (c) John bought as many moon cakes as Mary; (d) Cannot be compared.”

Variables	Gifted students ($n = 48$)		General students ($n = 95$)		t	P	η^2
	M	SD	M	SD			
C1	45.48	10.57	25.29	14.43	9.50	.000**	0.34
C2	48.46	13.67	24.08	14.87	9.51	.000**	0.39
C3	43.77	10.36	26.46	14.15	8.30	.000**	0.29
C4	46.38	10.38	27.95	13.74	8.96	.000**	0.32
Total	184.09	34.01	103.78	47.17	11.65	.000**	0.44

Note. The total score was 256; each dimension score was 64.
** $p < .01$.

Table 1.
The statistical analysis of number sense between the gifted students and general students.

Source of variation	SS	df	MS	F value	P value
Between (A)	548.292	3	182.764	2.444	.067
Within (error)					
Between (B)	13589.917	47	289.147		
Residual (A*B)	10543.708	141	74.778		
Total	24681.917	191			

Note. Post hoc: F_3 (Recognizing the relative number size) > F_2 (Being able to decompose and compose numbers).
 * < .05.

Table 2.
 ANOVA analysis of components of number sense for the gifted students.

Source of variation	SS	df	MS	F value	P value
Between (A)	775.516	3	258.505	2.962	.033*
Within (error)					
Between (B)	52292.447	94	556.303		
Residual (A*B)	24608.984	282	87.266		
Total	77676.95	379	902.074		

Note. Post hoc: F_3 (Recognizing the relative number size) > F_2 (Being able to decompose and compose numbers).
 * < .05.

Table 3.
 ANOVA analysis of components of number sense for the general students.

	Number sense		Misconception		Written method	
	Gifted	General	Gifted	General	Gifted	General
C1	25 (93%)	12 (44%)	2 (7%)	15 (56%)	0 (0%)	0 (0%)
C2	23 (85%)	7 (26%)	0 (0%)	16 (61%)	4 (15%)	3 (11%)
C3	25 (93%)	12 (44%)	2 (7%)	10 (37%)	0 (0%)	6 (22%)
C4	18 (67%)	9 (30%)	2 (7%)	9 (33%)	7 (26%)	9 (33%)
Total	91 (84%)	40 (37%)	6 (6%)	50 (46%)	10 (10%)	18 (17%)

Note. The number of people taken the interview was 108 times (9 people × 12 questions) for each group.

Table 4.
 The frequencies of number sense methods used by students of both groups.

4.3.1 Number sense-based method

The following student response is an example of using a number sense (NS)-based method.

GH3: I think Mary bought more moon cakes than John, because Mary bought half of the box. But what John bought, 0.4 of a box, is less than half. Therefore, Mary bought more moon cakes.

GH3 responded that “0.4 is less than half.” This indicated that GH3 could apply $\frac{1}{2}$ as a benchmark and knew that 0.4 is less than $\frac{1}{2}$. Therefore, the response of GH3 was coded as a NS-based method.

4.3.2 Rule-based method

The following student response is an example of using a rule-based method.

GM1: Mary bought more moon cakes, because $\frac{1}{2} = 0.5$, and compared with 0.4, 0.5 is greater. That is why Mary bought more moon cakes.

R: Can you explain it another way?

GM1: It can be solved by comparing $24 \times 0.4 = 9.6$ and $24 \times 0.5 = 12$. Therefore, $12 > 9.6$.

As seen in the previous exchange, GM1 had two ways to solve the problem. One was converting $\frac{1}{2}$ to 0.5 and then comparing it with 0.4. The other was converting $\frac{1}{2}$ to 0.5 and then multiplying it by 24. GM1 also multiplied 0.4 by 24. Both solutions were based on written computation. Therefore, GM1’s responses were coded as a rule-based method.

4.3.3 Misconception

The following student response is an example of a misconception.

NGL2: John bought more moon cakes because $24 \times 0.4 = 96$, and Mary bought $\frac{1}{2}$ of them, which is less.

R: Can you do it another way?

NGL2: 0.4 is greater, and $\frac{1}{2}$ is less.

R: How do you determine that 0.4 is greater, and $\frac{1}{2}$ is less?

NGL2: By multiplying the two numbers (meaning 24×0.4). I do not know how to explain it.

The previous explanation shows that NGL2 had a misconception when solving this problem. This was coded as a misconception.

The data showed the gifted students used number sense methods more frequently (84%) than did the general students (37%). By contrast, the general students had more misconceptions (46%) than did the gifted students (6%). The λ^2 test ($\lambda^2_{\text{cri}} = 5.991$, $df = 2$, $p = .000$) showed significant variation between the methods used by the gifted and general students. The results of the Marascuilo post hoc test showed significant variation in the use of the NS-based method between the gifted and general students. Moreover, a significant variation was found in the number of misconceptions between the gifted and the general students. However, no significant variation was found in the use of written methods between the gifted and the general students.

5. Discussion and conclusion

The quantitative results show that the gifted students significantly outperformed the general students in number sense and had a high effect size. Previous studies have shown a positive relationship between number sense and mathematics achievement [15, 39]. Earlier studies also agreed that students who have good number sense should be able to develop and apply flexible and efficient strategies (including mental computation and estimation) to handle numerical problems [9, 17, 38, 39]. In addition,

several studies reported that the gifted students have the ability to use various methods efficiently and flexibly when solving problems [13, 25, 27, 29]. Therefore, the result that the gifted students significantly outperformed the general students in number sense is reasonable. In addition, the data also show no significant difference between each number sense component for the gifted students. This is probably due to the facts that the gifted students can develop more flexible and efficient methods to solve problems. Therefore, they have more balanced development on each number sense component. However, a significant difference was found between each number sense component for the general students.

The general students' performance on F4 (recognizing the relative number size) was significantly higher than that on F2 (being able to decompose and compose numbers). This is probably because Taiwanese mathematics textbooks typically have several "recognizing the relative number size"-related problems, and Taiwanese students have limited exposure to problems in mathematics that require them to compose and decompose numbers. Therefore, these Taiwanese students performed well on "recognizing the relative number size"-related problems due to they have ample opportunities to solve these kinds of problems. This result is consistent with the findings of a previous study [38, 39]. In addition, decomposing and composing numbers to solve problems need more flexible thinking; therefore, it is reasonable to believe that general students not performed well on this number sense component. Moreover, the teachers of the gifted students also provided several challenging problems to deepen their mathematical learning and thinking. However, these problems are not necessarily related to decomposing and composing numbers.

The interview results showed that the gifted students outperformed the general students in using the number sense-based method. It is reasonable to believe that gifted students can flexibly apply number sense-based methods, including the use of benchmark, estimation, and so on to solve problems. This supports Sands' finding [40] that showed that the gifted students tend to develop multiple methods to solve problems which relate to flexibility in thinking. Therefore, the result that the gifted students outperformed the general students in using the number sense-based method is reasonable. Moreover, the general students obviously had more misconceptions regarding number sense than the gifted students did. This result is probably due to insufficient basic mathematics knowledge exist among the general students. In fact, there is still the lingering question of curricula, learning opportunities, etc. This will lead more studies in the future.

This study was conducted to examine whether the gifted students outperform general students on number sense. Additionally, variations in the use of number sense methods between the gifted and general students when solving number sense-related problems were examined. Although limited by a small sample size, this study provides three major contributions to mathematics education:

1. The findings added a new knowledge about the gifted students' performance on the topic of number sense and the difference on number sense between the gifted and general students. That is the gifted students significantly outperformed the general students in each number sense component and on the whole number sense test.
2. The interview results also added a new knowledge about the methods used by the gifted students when responded to number sense-related questions. The gifted

students are significantly higher in applying number sense-based method to solve problems than the general students.

3. The findings showed that the gifted students performed equally well on each number sense component. This is special and different from the earlier studies that students in Taiwan did not perform equally well on each number sense components [39]. Earlier studies showed that general students performed poor on judging the reasonableness of a computational result (Authors).

We do hope the findings in this study may contribute the future teaching and research relating to number sense and the gifted students.

5.1 Limitations

Due to the sample size and the representativeness of the sample, generalizability of the results is a serious concern. More students with additional grade levels should be invited to participate in this kind of study. These factors should be considered by future researchers. In addition, two important issues not investigated in this study relate to the gifted students and number sense. Do the gifted students naturally have good number sense? How the number sense is developed by the gifted students?

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Chapter 10

School Improvement Inclusion Model for Schools with Changing Demographics: The Impact of Changing Demographics in Schools

Jean Madsen

Abstract

By 2026, students of color will make up 54% of the school population. The increase of demographically diverse students in our schools requires us to reflect on how we are serving these students, as they enter the doors of our schools. This chapter provides an overview about the implementation of a school inclusion model. The model was based on a wide array of strategies which focused on engaging demographically diverse parents, culturally competent training for school leaders, analyzing school equity data, implemented postsecondary strategies at the elementary and middle schools. An important finding was the 4% drop in teacher absences at the treatment schools. Both teachers and leaders reported significant improvements in terms of workplace satisfaction and positive feelings about their schools. A review of the findings on teachers' perceptions about inclusion indicated that teachers in the treatment schools had greater job satisfaction than their counterparts. Finally, the accomplishments of this model require more research to insure its viability and its generalizability to schools.

Keywords: changing student demographics, school improvement, inclusion, demographically diverse schools, workplace satisfaction

1. Introduction

The demographic student composition in many schools continues to change. Cultural differences between teachers and students are often discernible in both student and school outcomes. In schools with changing student demographics, there are higher number of students of color expelled or suspended. There are also noticeable indicators resulting in low graduation rates and lesser numbers of students of color in advanced math, science, and gifted courses. With the increasing numbers of students of color in schools, it requires us to reflect on how are we serving these students' needs and how are we making them feel as they enter the doors of our schools.

By 2026, students of color will make up 54% of the school population. It is not clear if the projections for teacher and principal demographics will reflect the same ethnicity and culture as the students. Major shifts in student populations are

a forerunner of what is to come for public schools [1, 2]. This growth indicates an increase of Latinx population and Asian-Americans [1]. In the fall of 2019, for the first time, the overall number of Asian, Latinx, and African-American students will exceed the number of White students [2]. As students of color enter the school door, there is a feeling of uneasiness that teachers and leaders are unprepared to address the cultural and language differences of their students [3].

By the time, students of color come to school, many of them have experienced poverty, domestic abuse, and a fear of food insecurity [4–6]. These students face incredible odds as they begin their educational experience. Because of language barriers, these students may not finish high school or attend postsecondary schooling. As students begin their educational journey, schools will need to assume responsibility for understanding the educational, cultural, and social needs of students of color [7]. Thus, as these demographics continue to change, what solutions are available to assist schools in addressing their changing student demographics?

As more families of color settle into communities that have historically been white, many schools are confronting the reality that the old ways of doing things may not work. Thus, as schools become more demographically diverse, there is a critical need to attract and retain teachers of color. Consequently, conflict may occur between teachers of color and majority teachers because of differences in instructional approaches. Bell's [8] study unearthed the many disagreements between teachers of color and majority teachers. These arguments focused on differences over instructional practices, discipline, and the degree of multicultural emphasis. Additionally, Achinstein's [9] research revealed that demographically diverse groups of teachers clashed over professional ideology, which resulted in teachers not trusting each other.

2. Inclusion models for schools with changing student demographics

In response to the changing demographics, there have been solutions, which appear piecemeal and segregated. Schools in efforts to respond to demographic change in the organization have largely turned to diversity management strategies. These efforts have focused on educating a workforce about culture, promoting family friendly policies, and recruiting a diverse workforce [10]. In some situations, diversity management strategies have actually created more tensions, because people form opinions about diverse employees [11]. Diversity management involves educating the workforce about the importance of diversity and attempts to minimize disruptions to the organization [12]

Due to the challenges in implementing diversity management strategies, it has been argued that these efforts should be broader and more inclusive [11]. Thus, inclusion models should stress varying aspects of inequities from an organizational lens. In the following paragraphs, various models of inclusion are presented. Each model is unique. One inclusion model involves the identification of school disparities using an equity audit. Another inclusion model believes it is important for the leader to be culturally competent and be kept accountable for addressing inequities in schools.

For instance, Theoharis' and Scanlan's [13] school inclusion model illustrates that by examining school inequities, there will be improved school outcomes. Hayes, Bartle, and Major [14] believe inclusion should be a "climate of opportunity" where equal opportunity, justice, and climate are defined by people's perception of fairness. Another model is Sabharwal's [12] Organizational Inclusive Behavior (OIB). The OIB model focuses on multiple aspects of diversity and the importance of inclusive

dimensions of performance and leadership. It is believed this model leads to greater inclusion among individuals and focuses more on performance and the important role the leader plays in creating an inclusive environment.

Other school inclusion models focus on equity audits, which function as inventories of school-level data to spot inequities. Audits produce valuable information to measure the degree of fairness and equity in schools for students and employees [15]. These audits examine inequities at the classroom level. (i.e., children of color). Items included within an equity audit might field questions related to giftedness and race, discipline and special education for children of color, sexual orientation, and religion.

Ferdman's [16] inclusion model is different, as it believes the leader should hold people responsible to insure that organizational policies are fair and equitable. This model centers on the establishment of norms where the group defines what inclusion should look like. Ferdman [16] believes group efforts are pivotal to insure people are accepted and valued. Thus, the group and individuals can seek others' opinions and collectively reach consensus.

As an extension of diversity management, Booysen [17] believes inclusive leadership should be an extension of diversity management. Consequently, inclusive leadership encompasses more than equity, social justice, and fairness. This type of leadership reveals members of an inclusive organization should be empowered to make decisions to benefit everyone. Leadership has increasingly been included in inclusion models. Gallegos [18] believes leadership theories need to focus on equity, diversity, and social justice. His framework calls for leaders to be more responsive to their followers. Leaders must devoid themselves of possible bias and stereotype beliefs which will influence actions. The differences across these variations on inclusion are mostly subtle, but it is clear each promotes a unique view and approach.

The inclusion model proposed in this chapter has been applied in demographically diverse schools. This model emphasizes the importance of analyzing school data, increasing parent engagement, and improving college and career readiness. It also suggests creating culturally competent leadership strategies to support their demographically diverse students. As student demographics increase over time, there is a critical need to examine how schools construct inclusive school environments.

3. School improvement inclusion model

This school improvement model was developed to insure a conceptual framework, which could be employed to create inclusive schools. An important aim in the development of this inclusion model was to build a meaningful partnership between districts and universities. Researchers worked collaboratively with school personnel and the larger community in two urban school districts in South Texas. The school improvement values the importance of both research and practical application with regard to school inclusion. Based on the early findings, researchers developed an inclusion survey to measure how responsive schools were in responding to their changing demographics. Survey results and talking with school administrators led to the type of interventions needed to enhance school inclusiveness.

Using the inclusion model along with an emphasis on Every Student Succeeds Act (ESSA) guidelines, researchers developed a school improvement model. The district who we used to validate the inclusion scale was asked to participate in the school improvement project. This district's demographics had changed dramatically over

the past 5 years. Thus given the focus of the study we collaborated with the district to identify which schools would be included in the research project. The research team worked with eight schools during the intervention phase for 3 years. Each year of the grant, the team worked on specific areas.

These are the student demographics of the schools we worked during this study. TEA (Texas Educational School A (South San Antonio Independent School District (ISD)) numbers reflect a 2013–14 dropout rate at 15.6%, while both school districts reflected 20% or higher economically disadvantaged populations [19]. School enrollment projections according to National Center for Education Statistics (NCES) data reflect an increase in current and projected minority enrollment. Additionally, English Language Learners (ELLs) comprise 16% of each school's population with an average of 17% or higher than state percentages of at-risk populations (cf., Texas at-risk, 59%, [19]).

Evaluation of this school improvement model included both formative and summative assessments. The process of evaluation included multiple measures. A school survey was developed to measure the degree of responsiveness in responding to students' needs. The survey was sent each year to teachers, leaders, parents, and students to both treatment and nontreatment schools. Specific interventions were implemented in the treatment schools which included parent engagement strategies, culturally competent strategies and identification of equity variables were shared with leaders, and strategies to improve college and career readiness. The model wanted to emphasize authentic engagement relationships with the district and schools. Finally, the intent was to build capacity in schools to insure sustainability once the model was fully implemented.

The primary goal of this project was to develop an exploratory school improvement model. The intent was to improve school outcomes related to inequities in the schools. The evaluations involved both formative and summative evaluations. The formative evaluation was to gather information from stakeholders (i.e., teachers, leaders, students, and parents) on their perceptions of school inclusiveness as well as feedback on the professional development workshops. The School Inclusion Survey (SIS) for teachers, leaders, and parents was administered yearly. For the second year of the grant, an inclusion survey for students was validated using inclusion measures based on students' perceptions.

In the last year of the project, one of the researchers reframed the survey to insure the survey was more "student friendly." Formative data helped researchers to identify leadership skills needed in leading demographically diverse schools. We validated the quality of the principals' leadership using interview responses from parents and students. For the summative evaluation, district data were analyzed to determine if there was a difference between the Kellogg and non-Kellogg Schools in terms of teacher and student outcomes. Because of the high number of teacher absences in these schools, it was measured each year. The collection of student outcomes included attendance, suspension, achievement, and career and college readiness. The results of the formative evaluation were to improve the school inclusion model and identify areas for future development [20].

Surveys were used to determine areas of professional development along with integrating ESSA guidelines. These included parent engagement, college and career readiness, and literacy. In addition to the professional development workshops offered to the eight intervention schools every summer and during the year, the research team also met with the leadership team of each school every month for structured and sustained follow-up activities. During the follow-up meetings, the research team assisted principals on interpreting survey results and used data to

address areas of their schools' changing demographics. Goals were set in response to teacher, parent, and student concerns. We also kept schools accountable to insure the sustainability of the project.

The research team believed that developing parent engagement should be the primary focus. If you increase parent engagement, it would insure sustainability and build collaborative relationships with the school community. Specifically, the schools worked with parents to provide them guidance on the process of moving from elementary to middle and from middle to high schools. The focus on literacy also was critical with involving parents in reading to their children. Major changes were made to the literacy curriculum because of the interactions with district-level administrators.

We used the School Inclusion Survey (SIS) developed by the research team to gauge teachers' and leaders' perceptions of how their schools responded to their student changing demographics. The survey consists of three main scales: Organizational Leadership, Organizational Justice, and Organizational Outcome. Within each main scale, there are several subscales reflecting the multiple dimensions of each construct [20].

To assess parents' perception of school inclusiveness, we developed the School Inclusion Survey—Parent Version that covers the same three main aspects as in the teacher and leader survey. Version 1.0 of the survey was administered to all parents in the district in the summer of 2019. Based on the feedback from parents and the examinations of the psychometric properties of the survey, we revised some items and updated the survey to version 2.0, which was administered to parents in May 2020. The parent survey has an English and a Spanish version, and consists of three subscales: inclusiveness, positive relationship, and fairness.

The team developed a process called Empathy mapping, which is a simple way to increase the number of parents in giving feedback to schools. Using empathy mapping along with interviewing parents allowed the research team to gather important feedback from parents. The data were collected and analyzed using a qualitative thematic analysis approach. The results of the analysis primarily focused on safety and security, sense of care and belonging, and accessibility to resources. Empathy mapping exercises assisted with adjustments to the campus improvement plan and introduced new goals during the project. It is important to note that qualitative interviews were conducted in both English and Spanish.

4. Students' perceptions of school inclusiveness

Another area added to the formative evaluation was the development of a student survey. It was critical to recognize the importance of student voice. The research team developed a student inclusion survey, they took items from the school inclusion survey. However when students' responses were returned, it was obvious they did not understand the questions. Thus, the team decided to interview students to get their thoughts personally. After two rounds of pilot testing and revisions, the final version of the survey was administered to students in the 9th to 12th grades in 2020. In addition to the survey data, we obtained data on teacher absence as an indicator of the teacher outcome. To examine the impact of the research program on student outcomes, we retrieved longitudinal data on student achievement (e.g., The State of Texas Assessments of Academic Readiness (STAAR) reading and math test scores), college and career readiness, chronic absenteeism, and discipline (i.e., in school and out of school suspension rate) from 2017 to 2019.

Due to school closures caused by Coronavirus 2019 (COVID-19), we only received 52 valid responses to the student survey. Hence, no statistical analyses were conducted on the student data due to the small sample size and low response rate. However, qualitative analysis of focus group discussions revealed that safety and security, sense of care and belonging, and accessibility to resources were issues parents needed to be addressed in the school. Using these data, campus principals who participated in the empathy mapping exercise used this information to revise their campus improvement plan document.

Many high schools similar to the school in this study are contending with a myriad of challenges in how to create inclusive schools for all students. It appears as if administrators and teachers are either underprepared or unwilling to respond to their students' changing demographics. We did share students' qualitative responses with district administrators and principals. At the end of the meeting, school administrators in this district had few solutions to address students' concerns. We also want to note that during the student interviews, students stated how much they enjoyed participating in this project. What the researchers set out to accomplish was to interview those students who had behavior problems and did poorly in school. Much to our chagrin, this was the first opportunity for these students to provide their opinions and perspectives. The students who participated provided an overall perspective of their personal experiences and treatment from administrators and teachers at their respective campuses [21].

Student voice matters in relation to achievement disparities and treatment of diverse racial, linguistic, and socioeconomic groups. The study's general aim was to capture these students' perceptions concerning the fairness and responsiveness of their school environment. Students' responses from this study fall in line with previous research that belonging is a catalyst to building a community [22]. It was evident that in High School B, Administrators did not demonstrate behaviors that conveyed a sense of belonging to students. While principals in High School A were building a sense of belonging, it was geared more to the others and not Hispanic students. In short, not connecting with students through a sense of care and a sense of belonging explained how these students felt. Researchers set out to connect with students and their experiences in their schools. Students' responses made us rethink about the ways we interact with these students.

While K-12 school leaders appear resistant to change, it is more about making leaders culturally competent and have the ability to adapt as the school demographics change [7]. As schools remain indifferent, it results in more racial tension and cultural marginalization for students of color [16, 23, 24]. Even within the Latinx community, diversity exists. Remaining stagnant and uninformed about the changes within seemingly homogeneous groups is a treacherous practice.

As previously noted, little research exists on student voice in schools undergoing a change in their student population. This study revealed the importance of listening to students and responding to their concerns. Findings indicated schools are often unwilling to collaborate and coordinate with students [21]. This approach is particularly important in populations with high mobility and high percentages of low socioeconomic populations.

The administrators' and teachers' goals and training must make efforts of managing the needs of their diverse students. In the day-to-day practices of school leaders and teachers, students' voices are needed in the decision-making for change. Changes to address inequities in schools must be purposeful with a focus on continually monitoring and addressing areas of concerns. Lastly, to be an inclusive school we need to give incentives to those who deliberately and purposefully work to make schools inclusive.

	2017	2018	2019	2020
Number of participants	56	60	63	65
The goals of this workshop were clear.	5.45	5.22	5.58	N/A
The goals of this workshop were met.	5.32	5.09	5.61	N/A
Time was used well.	5.30	5.11	5.60	N/A
I gained many ideas that will help me or my school.	5.37	5.10	5.57	N/A
There were opportunities to share ideas with others.	5.56	5.31	5.48	N/A
Overall, this workshop was worthwhile.	5.38	5.10	5.58	N/A

Table 1.
Evaluations of the summer workshops.

The Latinx high school student often faces racial-ethnic stereotypes, which lead to low expectations. Equity and fairness is not possible if there is an uneven distribution and an overreliance on rules, which prejudice a target group [21]. For there to be an equitable school environment, students must perceive fairness in how discipline rules are applied and feel appreciated for their ability to transcend their social and emotional conditions [21].

Professional development workshops were provided to the four schools every summer from 2017 to 2020, covering a specific topic each year. These sessions focused on parent engagement, high school and career readiness, and literacy for ELL students. An evaluation of the 2020 summer workshop was not performed due to COVID-19. We did continue working online with the schools and used Jimmy Casas' work on building school culture. Each school selected a group of participants consisting of teachers, leaders, and parents to attend the workshops. Participants completed a short survey to provide feedback about the workshops. **Table 1** shows the number of participants for each year's workshop and the average evaluation scores on a 6-point Likert scale (1 = strongly disagree and 6 = strongly agree).

5. Changes in teachers' perceptions of school inclusiveness

We hypothesized that our intervention will have an impact on teachers' perceptions of school inclusiveness in the following seven aspects measured by the SIS: inclusive instruction, workplace satisfaction, cross-culture comfort, diversity and inclusion, cultural competence, responsive school image, and positive relationship among groups. **Table 2** shows the average teacher survey scores on a 6-point Likert scale in the control and treatment conditions from 2017 to 2020, respectively.

The descriptive statistics showed that certain subscales in the treatment group had most improvement over time in the subscales for workplace satisfaction (8%), cross-cultural comfort (9%), and cultural competency (8.4%). Other subscales in the treatment reflected positive trends under subscales for responsive (school) image (7.6%), diversity and inclusion (7.2%), (building) positive relationships (7%), and inclusive instruction (5.4%). Conversely, control group subscales demonstrated diminishing trends over time across all subscales.

Using the more advanced statistical technique Hierarchical Linear Modeling (HLM) to test the statistical significance of the effects, we also accounted for

Variables	2017		2018		2019		2020	
	Control (n = 471)	Treat (n = 268)	Control (n = 370)	Treat (n = 283)	Control (n = 348)	Treat (n = 265)	Control (n = 367)	Treat (n = 298)
Inclusive instruction	4.66	4.82	4.72	4.82	4.71	4.81	4.88	5.03
Work satisfaction	4.38	4.47	4.51	4.62	4.44	4.48	4.85	4.85
Cross-cultural comfort	4.50	4.67	4.64	4.80	4.58	4.66	4.81	4.91
Diversity and inclusion	4.85	5.02	5.05	5.14	4.90	5.03	5.00	5.20
Cultural competency	4.78	4.89	4.90	5.03	4.82	4.91	4.94	5.18
Responsive image	4.87	4.87	4.95	5.06	4.86	4.94	5.07	5.24
Positive relationship	4.95	5.02	5.02	5.15	4.97	5.07	5.14	5.30

Table 2.
Means of teacher School Inclusion Survey (SIS) scores.

School	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Elementary School A	4.72	4.69	4.63	4.52	4.99	4.58	4.96	5.00	4.65
Elementary School B	5.02	5.11	4.78	4.98	5.40	5.28	5.36	5.40	5.08
Elementary School C	4.97	5.07	4.76	4.99	5.02	5.20	5.07	5.24	4.97
Elementary School D	4.88	5.02	4.86	4.95	5.18	5.15	5.25	5.27	4.93
Elementary School E	4.75	4.93	4.40	4.72	5.05	5.09	5.12	5.21	4.85
Middle School A	4.96	5.03	4.85	4.95	5.20	5.04	5.06	5.15	4.93
Middle School B	4.75	4.65	4.36	4.61	5.02	4.93	4.74	4.98	4.71
High School A	4.29	4.30	3.98	4.25	4.80	4.81	4.62	4.91	4.07

Note: Subscale: (1) fairness and justice; (2) inclusive instruction; (3) workplace satisfaction; (4) cultural comfort; (5) diversity and inclusion; (6) cultural competence; (7) school image; (8) positive relationships; (9) adaptive organization

Table 3.
Campus means among teacher responses.

clustering effects in the data. We discovered that teachers in the intervention group perceived greater workplace satisfaction ($b = 0.21, p = 0.036, \text{effect size} = 0.22$) and more positive relationships among groups ($b = 0.149, p = 0.047, \text{effect size} = 0.20$) in 2018 compared to the baseline year (i.e., 2017). Teachers in the control group did not report any changes in those areas. In addition, teachers in the intervention group perceived that their schools were better in creating a responsive image in both 2018 ($b = 0.20, p = 0.006, \text{effect size} = 0.28$) and 2020 ($b = 0.23, p = 0.006, \text{effect size} = 0.32$) compared to the baseline while teachers in the control group did not perceive any changes in their schools.

A review of the findings on teachers’ perceptions on inclusion indicated that teachers in the treatment schools had greater job satisfaction than their counterparts. Teachers in the treatment group believed their schools were perceived as responsive to their students’ changing demographics than the other teachers. Further thoughts reveal that the inclusion survey provides insights on how teachers envision their school as being more responsive to their students and parents.

6. Means across school campuses

Highlighting school campus responses, the researchers noted shifts in subscale means over time and higher outcomes in a few subscale mean scores than others (see **Table 3**). Particular trends demonstrated higher outcomes in the means for building positive relationships among groups across treatment campuses, with the exception of the two middle school campuses whose mean scores remained second highest after their diversity and inclusion subscale score. This indicates that at the

7. Changes in leaders’ perceptions of school inclusiveness

We hypothesized that our intervention influenced leaders’ perceptions of school inclusiveness in the same seven areas as measured by the SIS. **Table 4** shows the average leaders’ survey scores in the control and treatment conditions from 2017 to 2020.

Variables	2017		2018		2019		2020	
	Control (n = 32)	Treat (n = 31)	Control (n = 42)	Treat (n = 29)	Control (n = 39)	Treat (n = 35)	Control (n = 67)	Treat (n = 53)
Inclusive Instruction	4.87	4.63	4.76	4.71	4.66	4.32	4.86	5.06
Work satisfaction	5.05	4.24	4.65	4.75	4.69	4.28	4.93	4.91
Cross-cultural comfort	5.02	4.24	4.72	4.55	4.83	4.39	4.93	4.97
Diversity and inclusion	5.44	5.44	5.17	5.63	5.36	5.59	5.33	5.61
Cultural competency	5.28	5.15	4.94	5.15	4.99	5.01	5.04	5.28
Responsive image	5.22	4.90	5.09	5.05	4.98	4.98	5.00	5.30
Positive relationship	5.49	5.36	5.14	5.38	5.31	5.32	5.25	5.52
Adaptive structure	5.00	4.86	4.69	4.76	4.75	4.70	4.66	5.17

Table 4.
Means of leader School Inclusion Survey (SIS) scores.

A similar statistical analysis¹ of the trend over the 4 years revealed that leaders in the intervention group perceived greater workplace satisfaction in both 2018 ($b = 0.95$, $p = 0.001$, effect size = 1.42) and 2020 ($b = 0.52$, $p = 0.073$, effect size = 0.78) compared to the baseline year (2017). In comparison, leaders in the control group did not perceive any changes in workplace satisfaction. In 2018, leaders in the treatment condition perceived improvement in terms of taking diversity and inclusion into consideration on policy-related issues compared to the baseline year ($b = 0.36$, $p = 0.054$, effect size = 0.95). Yet, leaders in the control group did not report any changes. In 2020, leaders in the treatment condition perceived that their schools were better in creating a responsive image ($b = 0.34$, $p = 0.066$, effect size = 0.77) and developing adaptive school structures ($b = 0.47$, $p = 0.053$, effect size = 0.54) compared to the baseline. It is important to note that leaders in the control group did not perceive any changes in their schools. We were pleased that after working with leaders from the treatment schools, there were positive outcomes in their leadership behavior.

Comparing the perspectives of teachers and leaders in the treatment condition, we found that they were consistent. Both teachers and leaders reported significant improvements in terms of workplace satisfaction and creating a responsive image. Both areas of workplace satisfaction and being perceived as a responsive school were critical steps in creating inclusive schools. As mentioned previously, it is important to note that teachers and leaders in nontreatment schools saw little or no change in their cultural competence. Interestingly, only teachers perceived improvement in positive relationships among groups, whereas only leaders reported improvement in developing adaptive school structures.

8. Parents' perceptions of school inclusiveness

A total of 619 parents (51.37% in the treatment group and 48.63% in the control group) provided valid responses to the parent SIS administered in May 2020. Controlling for grade levels, no statistically significant differences were found between the two groups of parents in any of the three aspects (i.e., inclusiveness, positive relationship, and fairness). However, qualitative analysis of parents' empathy mapping showed that parents felt their voices diminished calling concern to safety, security, and sense of care and belonging for students and families of diverse backgrounds. The results of the analysis also indicated poor accessibility to information and material resources for parents of limited and non-English-speaking communities. While we were unable to analyze parent surveys, we also conducted qualitative interviews to gather insight on how if they felt welcomed when they entered their schools.

9. Teacher outcomes

Teachers' chronic absenteeism is defined as missing more than 10 days (5.5%) in a typical 180-day school year. At baseline, 22.90% of teachers in the control group and 25.48% in the intervention group were chronically absent. In 2019, 20.84% of teachers

¹ Due to the smaller sample size of leaders, we used 0.1 as the significance level in the hypothesis testing.

Outcome	N	Grades	ATT	SE	t	df	p	Robustness
Chronic absence (0/1)	5490	3–8	0.02	0.01	2.19	19	0.04*	$\Gamma = 1.3$
Suspended (0/1)	5490	3–8	–0.01	0.01	–1.12	19	0.28	
Math STAAR (SD)	2120	3–5	–0.07	0.04	–1.69	16	0.11	
Reading STAAR (SD)	2949	3–6	–0.03	0.04	–0.96	17	0.35	
Algebra EOC (SD)	811	6	0.11	0.06	1.84	14	0.09*	$\Gamma = 1.1$

* $p < 0.05$.
 † $p < 0.1$.

Table 5.
Impact estimates on student outcomes for elementary and middle schools.

Outcome	N	Grades	ATT	SE	t	df	p	Robustness
Chronic absence (0/1)	3306	9–11	0.12	0.02	7.18	10	0.00**	$\Gamma = 1.5$
Suspended (0/1)	3306	9–11	0.08	0.02	4.71	10	0.00**	$\Gamma = 1.4$
English EOC (SD)	1570	9–10	–0.11	0.04	–2.81	9	0.02*	$\Gamma = 1.4$
Took CTE Courses (0/1)	2310	9–10	–0.11	0.02	–4.97	9	0.00**	$\Gamma = 1.2$
AP/IB Test participation (0/1)	3306	9–11	0.01	0.01	1.37	10	0.20	
Took College-Level Courses (0/1)	2310	9–10	–0.08	0.02	–4.74	9	0.00**	$\Gamma = 1.7$
Completed Career Training & Received Certificate (0/1)	1733	9–10	–0.06	0.02	–2.34	9	0.04*	$\Gamma = 1.1$
Received College Readiness Point (0/1)	1862	9–10	0.06	0.02	2.55	9	0.03*	
High School Graduation (0/1)	996	11	0.01	0.03	0.43	8	0.68	

Table 6.
Impact estimates on student outcomes for high schools

in the control group and 21.29% of teachers in the intervention group were chronically absent. There was a 2.06% drop in the rate of chronic absenteeism in the control condition and a 4.19% drop in the treatment condition. However, the two were not statistically significantly different as indicated by an HLM analysis.

10. Student outcomes

To examine the impact of the school improvement model on student outcomes, we examined whether there are differences between the intervention and the control conditions. These included student chronic absence, suspension, math achievement, reading achievement, and college and career readiness. Because the study uses a quasi-experimental design, there were systematic biases between the students in the intervention condition and those in the control condition. Intervention students were more disadvantaged than the control group. Thus, students in the intervention group dealt with more issues of poverty, language barriers, and parent engagement. Hence, students in the intervention group were more likely to be English language learners (ELLs), less likely to be economically advantaged, and had lower baseline math and reading test scores. To reduce the effect of these biases on the impact estimates, we used propensity score analysis (PSA), in which students were matched on baseline measures of achievement as well as grade levels and demographic characteristics including gender, race, ELL status, special education status, free or reduced lunch eligibility, and gifted program status.

In the last year of the grant, the COVID-19 really influenced the work with students in the treatment group. It is important to note that when we approached the district about participating in the project, the district assigned us the lower performing schools that had a similar feeder pattern. We believe if COVID-19 had not occurred, student outcomes may have improved.

Two sets of PSAs were conducted, one for elementary and middle schools (ESMS) and the other for high schools (HS). In both analyses, the matching successfully reduced biases in covariates to less than 4%. **Table 5** shows the results of the ESMS analysis, including sample size, grade levels, average treatment effect (ATE), statistical test results, and robustness. There was one statistically significant negative effect (i.e., chronic absence), one statistically significant positive effect (i.e., Algebra), and three nonsignificant effects (i.e., suspension, math STAAR test scores, and reading STAAR test scores). Specifically, treatment group students were more likely to be chronically absent by 2%. In addition, treatment group students had higher Algebra end-of-course (EOC) scores by 0.11 standard deviations. The robustness parameter measures how robust an estimated impact is against unmeasured confounders. Values closer to 1 indicate less robust effects. The estimated robustness parameters of the two statistically significant effects indicate that both effects were very sensitive to potential confounders.

The PSA for high schools only matched students on demographic characteristics because one high school in the treatment group did not enroll any students in the first year, thus did not have baseline measures of student achievement, attendance, and suspension. The results (see **Table 6**) showed one statistically significant positive effect, six statistically significant negative effects, and two nonsignificant effects. The high school results should be interpreted with caution. This was because there was only one high school in the treatment group and only one high school in the control condition. Thus, it was a challenge in separating school effects from the treatment effects. In addition, the lack of baseline measures also made the results less robust.

11. Results and application for schools

Most reform efforts in addressing changing demographics are based on awareness training, equity audits, and culturally competent training for school leaders. While each method has noted some success, this inclusion model used multiple strategies.

Thus, this research explored the potential of developing a more holistic model to create inclusive schools for all demographic groups. An important element for implementing this model was the development of a survey to measure inclusion. Survey constructs measured the degree of responsiveness to students and parents. Thus, this instrument assessed the principals' cultural competence, culturally relevant strategies, and fair and equitable treatment for all students. Use of the survey allowed the researchers to measure if this school improvement model was effective in creating inclusive schools. The model was based on a wide array of strategies which focused on engaging demographically diverse parents, culturally competent training for school leaders, analyzing school equity data, implemented postsecondary strategies at the elementary and middle schools.

Interventions were developed to address the model's three dimensions of outcome awareness, organizational justice and fairness, and leadership capacity. Over a 3-year period, interventions were implemented to address inequities and engage parents. Theoretically, this study provided strategies to use with schools to improve student outcomes. It also included a survey based on inclusion constructs to assess if the schools were truly measuring and addressing inequities in school outcomes. Findings were positive which indicated this model has promise.

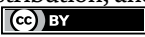
Findings conclude that the intervention had a statistically significant positive impact on teachers' and leaders' perceptions about creating inclusive schools. The qualitative data corroborated the statistical findings. However, the impact on student outcomes is indeterminate due to mixed effects and confounding factors. Based on the findings from this study, this improvement model has potential to assist schools in addressing a change in their student demographics.

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Science Teacher Experiences in Developing STEM Literacy Assessment

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Abstract

STEM education gives practice experiences for students. However, the assessment in identifying its impacts has not been developed in Indonesia widely. Teachers are responsible to assess students' achievements as an impact of learning activities. They said that they have difficulties in developing the assessment instruments. Therefore, workshop activity was designed to minimize and identified the difficulties. This study aims to evaluate teachers' experiences in developing assessments in STEM learning. Workshop activities were conducted over three days. It covered three main topics: the best practice of STEM education from experts, explanation of STEM literacy, and the group discussion session in creating STEM literacy assessment tools. The tools that were passed through the expert judgment process will be proceed to the validation process to find out its response from students. Data were analyzed using person separation method in Rasch model analysis. The result showed that the assessment tools are less sensitive in distinguishing students' abilities. It indicated that teachers should create more sensitive tools in diagnostic students' STEM literacy. It is also found that most of teachers face difficulties in creating technology and engineering literacy items.

Keywords: STEM literacy, teachers' difficulties, assessment, workshop, items validation

1. Introduction

The reform in science education is triggered by the workforce demand. The World Economic Forum [1] reported that there are worker displacements because of the pandemic COVID-19 impact that create global recession in the world economic. It forces million workers to experience the transformation of work, lives, and productivity. World Economic Forum has identified the labor market impact of the fourth industrial revolution. The employer survey result indicated that there are some business adaptations in response to COVID-19. One of them is accelerate the digitalization of work processes along with accelerate digitalization upskilling/reskilling. Therefore, technological adaptation is also needed by the companies, such as cloud

computing, big data analysis, cybersecurity, artificial intelligence, ML, NLP, and robots (non-humanoid).

Education in science, technology, engineering, and mathematics (STEM) fields become important to face future workforce demand. In many undergraduate institutions, number of graduates who works in STEM fields is a primarily tools for the assessment of teaching. Higher number of graduates describes higher quality of teaching.

Technology changed human life in one-way to another for many years. For instance, the mechanism of transportation that changed from using feet power and simple rides to sophisticated machines. These machines help humans to travel and discover the world. In other fields, technology creates easier communication internationally that impacting information transfer around the world and triggering the globalization. Jerald [2] noted that new technologies along with demographic, political, and economic changes have altered human work and social lives in ways of significant consequences for young people.

Those facts have triggered educators argue that traditional curriculum is not sufficient, schools must develop “something new” for students as a preparation to face the twenty-first century. Indonesia is facing this need, thus they are creating to new policies. New curriculum is created to emphasize it on creating productive, innovative, creative, good effective human through reinforcement of attitude, skill, and knowledge in order to face challenges in the twenty-first century. On the other hand, the developed countries decided to put more attention in emphasizing science and technology education through enhancing science and technology promotion in education to students by providing some grants for researchers and practitioners Ishikawa et al. [3]. However, this brings questions for researcher of what method and strategy is needed to fulfill new policies goals.

Most of STEM activities were conducted to improve students’ interest toward STEM disciplines and careers. It was believed by some researchers that the early interest in pursuing science and engineering is a better indicator whether the students will pursue a career in these fields [4].

The translation process in practice faced several difficulties because of its different perspectives [5]. However, STEM literacy should become the main consideration in translating the content curriculum into the learning practice, in instruction form. NRC report noticed that effective STEM learning engages students’ interests and experiences, identifies and builds on their knowledge, uses STEM practices, and provides experiences that sustain their interest [6]. The report also helpfully identified key elements that provided the foundation for effective STEM instruction. Those elements included a coherent set of standards and curriculum, teachers with high capacity to teach this discipline, supportive system of assessment and accountability, adequate instructional time, and equal access to high-quality STEM learning opportunities [6].

Analyzing the curriculum content is the first step that should be taken by teachers in starting the implementation. It is to find out whether STEM education could be embedded in it. Previous study teacher analysis results of the coherency of STEM education implementation to science content in the curriculum. The sample school is using two curriculums, 2006 and 2013 curriculum. A total of 13 elementary teachers and 5 junior high school teachers analyzed the science content. The result showed that the 2013 curriculum more coherent than 2006 curriculum [5]. Teachers analyzed the curriculum content and possibilities for integration, and they were asked to think of an example of two and full integration of STEM disciplines. The results showed

lower-level teachers can identified full STEM integration by giving the examples, but the higher-level teachers were failed to find it.

The interview results showed that fourth-grade teachers found the representation of STEM in the fourth grade from its thematic concept that could be coordinated well with the subjects. They hoped higher-order thinking skills can be practiced to fourth-grade students, so they can be a problem solvers and speak communicatively in describing ideas. Furthermore, fifth- and sixth-grade teachers thought that STEM was represented by some of the subject matter, and they believed that STEM learning in these areas would motivate students in class. Moreover, they said that learning activities, teachers' ability, and students' discipline should be innovated in order to improve STEM education.

2. Teacher workshop of STEM literacy

STEM-based learning is in line with the breadth of the current science curriculum [7]. The 2013 curriculum places subject matter more as a vehicle to develop a variety of skills, creative thinking, awareness of technology, the environment, awareness of the existence of a masterful regulator other than humans, and the values of life where the students are. With another understanding, the 2013 curriculum of all subjects accommodates the achievement of national education goals in a holistic, non-fragmented, and proportional manner. For science education, this is of course very encouraging and is expected to be able to increase the relevance of science learning, bearing in mind the essence of science learning always places science as a vehicle for building students' skills and attitudes/values. In addition, the new curriculum, if implemented properly, will increase the popularity of science [8].

However, we realized that we are facing challenges in preparing the teacher [5]. Teachers in Indonesia were produced at education-based universities such as UPI. Based on the new ministry policy, not only UPI that can produce teachers but also other educational college or universities. These facts triggered UPI to create professional and qualified teachers so that the graduate could compete well. On the other hand, Japan has different policy. Teachers in Japan were produced from two institutions for different levels of teachers [9]. Elementary teachers come from normal universities, while the secondary-level teachers come from higher normal universities and universities level. They were well prepared in their bachelor studies so that most of teachers in Japan have only bachelor degree. In fact, for the past several decades, Japan's students have consistently ranked among the world's top performing in science, mathematics, and reading. This achievement is one proof of the good quality of teachers in Japan.

The good quality of teacher leads a good quality of learning. They plan learning as a medium to transfer knowledge to students. They consider the main aspects of learning processes— students and instructions. Professional development program is needed to produce qualified teachers [10–12]. Therefore, we design workshop activities for teachers that focused on creating STEM literacy assessment.

Here are some considerations of workshop and the detailed activities.

What does teacher need?

- The explanation of STEM literacy
- The example of STEM literacy instruments

- Training session to develop STEM literacy instrument
- The evidence of STEM integration on science learning to students' STEM literacy

What should researcher do?

- Share the definition and perspectives of STEM literacy
- Show the examples of STEM literacy instrument
- Conducting workshop
- Investigate the impact to STEM literacy

Workshop on STEM literacy introduction for middle school teachers will be conducted to limited participants. They come from three region: Bandung, Bogor, and Semarang. Each region will choose nine in-services science and math teachers. They got lectures from several keynote speakers, developed lesson plans, and STEM literacy instruments.

Figure 1 showed the lecture session from Prof. Yoshisuke Kumano, Ph.D. who shared STEM/STEAM education implementation in Japan. He talked about one of STEM activities that conducted as afterschool activities. It showed students' activity in investigating the Earth's climate using Dagik Earth. Students discuss issues that gave by instructors. They try to find the best solution. On the second day, teachers presented lesson plan that included the STEM education activities. They share ideas and discuss about the challenges. In the third day, they got lecture of STEM literacy assessment and created it based on the lesson plan topic.

STEM literacy instruments were developed by considering four aspects of its disciplines. Bybee [13] defines STEM literacy, which refers to an individual's STEM-related

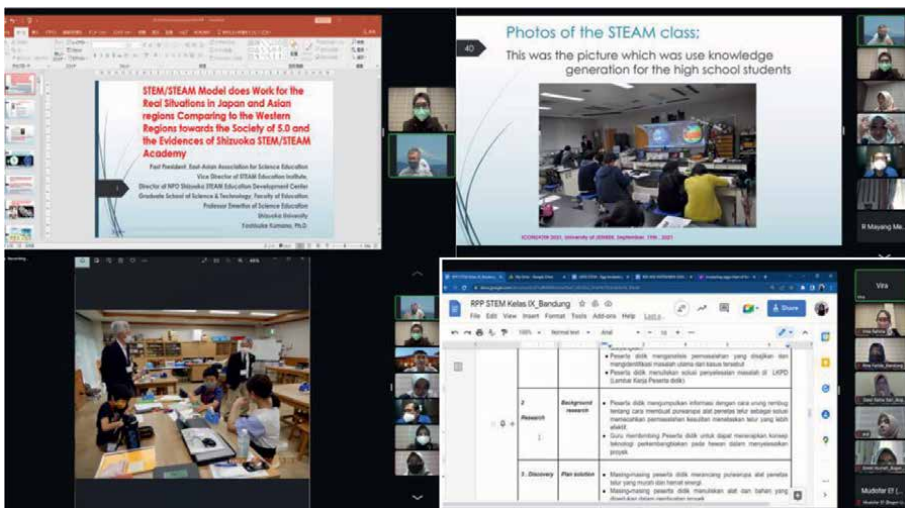


Figure 1. Lecture from STEM expert.

issues competencies, ability in identify STEM disciplines characteristics as forms of human knowledge, inquiry, and design, STEM awareness, and willingness to engage in STEM-related issues.

On the other hand, Tang & Williams, [14] defined STEM literacy based on its discipline literacy definition (**Table 1**).

From those definitions, we develop the indicators of STEM literacy as follows (**Table 2**).

Table 3 shows the results of lesson plans and instruments that develop by teachers. Each region picked one level and content based on curriculum. They plan around 3–4 meetings of learning implementation and created 25 STEM literacy items. Some teachers from Semarang never have experience in developing or implementing STEM-based lesson plan and assessment. They face difficulty and asked more time to learn about STEM.

Literacy	Organization	Definition
Science literacy	OECD [15]	An individual's scientific knowledge and skills in identifying questions, explaining phenomena scientifically based on the evidence, understanding of the characteristic science, understanding how science and technology develop human life, and willingness to engage in science-related issues as a scientific society.
Technology literacy	ITEA [16]	Person who has technology literacy understands what technology is, how it is created, and how it shapes society and its changes by society. He or she eager to engage in technology issues.
Engineering literacy	OECD [15]	The understanding of how technologies are created through the engineering design process. Ability to combine the scientific and mathematical principles to practical ends systematically and creatively.
Mathematics literacy	OECD [15]	An individual's capacity to identify and understand the role that mathematics plays in the world, to make well-founded judgments, and to use and engage with mathematics in ways that meet the needs of that individual's life as a constructive, concerned, and reflective citizen.

Table 1.
STEM literacy definition at each discipline [14].

Literacy	Aspects	Indicators
Science literacy	Content knowledge	explain phenomena scientifically
	Procedural knowledge	Interpreted data and evidence scientifically
Technology literacy	Technological principal	Understanding technological principal
Engineering literacy	Generating idea solution	Developing solutions and achieving goals
Mathematics literacy	Mathematics roles	Formulating situation mathematically

Table 2.
STEM literacy assessment aspects and indicators.

City	Lesson Plan Theme	Number of STEM Literacy Item
Bandung	Technology in reproductivity	25
Bogor	Temperature and changes	25
Semarang	Digestion	25

Table 3.
Workshop results.

3. STEM literacy assessment

3.1 Blueprint of STEM literacy assessment

During the workshop, teachers guided to build the items. Most of them face difficulties in creating technology, engineering, and mathematics literacy items. They said it is hard to find the technology that refers the concept of core discipline ideas. They thought that students will hard to understanding the technology principle. Therefore, it should be integrated in the learning processes. It would be easy for students if the technology is used as learning media (Meryl [17], Burnett [18], Grabe & Grabe [19]). They can understand the application of scientific concepts from the technology that brought to the class. Furthermore, they can understand how it is created by experiencing the engineering practices in the class [20, 21]. They triggered to find solution ideas and test those ideas, which are best to solve the problem by creating innovative technology.

Engineering literacy items are related to the solution ideas based on the problem. In this study, the problems are related to technology of reproductivity, temperature, and digestion system. Teachers started to find the related problems. They identified the global, regional, or local problems around students daily life. Contextual problems will help students to perceive the problems and generating solution ideas. **Table 4** showed the example of engineering literacy items that created by teachers.

Based on the interview, teachers face difficulties on creating engineering literacy items. It need more time than science literacy items. The number of engineering items is smaller than that science literacy items. Most of them created 10 science literacy items, 8 mathematics literacy, 4 technology literacy, and 3 engineering literacy. They said it is hard to find ideas of technology and its engineering processes that can be a stimulus in the items. It might be caused by the lack of teacher's information literacy in finding out technological resources or engineering problem items. Margaret and Dave [22] wrote that information literacy is an important aspect in engineering programs. On the other side, Correia and Bozutti [23] study that an ideal teaching methodology for engineering nowadays is conducting practices, followed by the frequent use of technological resources. Kelley and Wicklein [24] also investigated teacher difficulties in engineering class assessment. He found that the teacher indicated difficulties in locating and integrating appropriate levels of mathematics and science for engineering design.

The mathematics literacy items that developed by teachers also reach smaller number than the science literacy items. Gattie & Wicklein [25] conducted research to find out the instructional needs of high school technology educators regarding engineering design instruction. It is noticed that more than 90% of the in-service teachers indicated that engineering design was a suitable focus to be integrated in the instructional activities. However, the teachers in this sample also indicated some demand to properly include engineering design in technology education. Several indications

Aspect	Indicator	Items
Engineering literacy	Choosing appropriate solution to solve animal reproduction problems related to improving offspring in animals (C1)	Technology was created to help humans in dealing with problems that occur in everyday life, one of which is the provision of good quality beef for consumption. In your opinion, the right reproductive technology to produce good quality cattle in an efficient time is.... a. clone b. artificial insemination c. hybridization d. genetical manipulation
	Choosing appropriate solution to solve animal reproduction problems related to energy sources	In general, the source of electrical energy comes from PLN as the operator of the national electricity provider. However, some consumers, such as groups of breeders, require alternative energy sources to reduce operational costs. The energy source that breeders should use for their egg incubators is.. a. PLN electricity b. Solar heat c. Biogas d. PLN-solar panel hybrid system

Table 4.
 STEM literacy in engineering literacy aspect.

described that 93% of the teachers need to learn how to integrate the appropriate levels of mathematics and science into instructional content and 87% realized the need to develop additional analytical (mathematics) skills.

3.2 Validation of STEM literacy items

The results of measuring items and persons can be seen in **Table 5**. Person separation obtained a value of 0.96 or less than two. This means that the test instrument may be made less sensitive in distinguishing students with high abilities and students with low abilities. Based on these results, additional test items may be needed to increase the sensitivity of the test instrument. There are three difficulty levels of test items based on item separation, namely easy, medium, and difficult. The reliability of the person is 0.48, while the item reliability is 0.89. These results reflect that the consistency of student answers is weak. However, the overall quality of the items in the instrument's reliability aspect is good.

There are several factors that affect person reliability. The first factor is the variance of the student's ability level. A wider range of abilities equals a higher person's reliability. The measurement results in **Table 5** show low personal reliability caused by the low variance of students' ability levels. In addition, the value of person separation is still less than two. The second factor is the length of the test or the length of the rating scale. A longer test is a test with a higher person reliability score. The next factor is the number of categories per item. Person reliability will be higher if each item has many categories. The last factor is the targeting of sample items. Better targeting will result in higher person reliability measurements.

Summary of 34 measured person								
	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT		OUTFIT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	12.9	24.0	52.06	4.94	1.02	.05	.94	-.13
SEM	.5	.0	1.26	.06	.04	.17	.04	.13
PSD	2.9	.0	7.22	.34	.21	.97	.24	.77
S.SD	2.9	.0	7.33	.35	.21	.98	.25	.79
MAX.	20.0	24.0	71.24	6.20	1.34	1.56	1.36	1.09
MIN.	8.0	24.0	40.35	4.77	.61	-2.12	.50	-1.85
REAL RMSE	5.22	TRUE SD	4.99	SEPARATION	.96	Person RELIABILITY		.48
MODEL RMSE	4.95	TRUE SD	5.26	SEPARATION	1.06	Person RELIABILITY		.53
S.E. OF Person MEAN = 1.26								
Person RAW SCORE-TO-MEASURE CORRELATION = 1.00								
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .48 SEM = 2.09								
STANDARDIZED (50 ITEM) RELIABILITY = .70								
SUMMARY OF 24 MEASURED Item								
	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT		OUTFIT	
					MNSQ	ZSTD	MNSQ	ZSTD
MEAN	18.3	34.0	50.00	4.28	.99	.14	.94	.01
SEM	1.7	.0	2.77	.15	.04	.33	.07	.34
PSD	8.3	.0	13.26	.74	.20	1.56	.32	1.62
S.SD	8.5	.0	13.55	.76	.20	1.60	.32	1.65
MAX.	30.0	34.0	77.71	6.25	1.48	4.17	1.64	4.05
MIN.	3.0	34.0	30.26	3.62	.72	-2.05	.44	-1.90
REAL RMSE	4.45	TRUE SD	12.49	SEPARATION	2.81	Item RELIABILITY		.89
MODEL RMSE	4.35	TRUE SD	12.53	SEPARATION	2.88	Item RELIABILITY		.89
S.E. OF Item MEAN = 2.77								

Table 5.
Items analysis results.

The factors that affect item reliability are the variance of item difficulty, sample size, and do not depend on the length of the test. Higher item reliability will be obtained on condition that the item difficulty range is wider. In addition, the larger the sample used, the higher the reliability of the items obtained by the researcher. The item reliability factor that differs from person reliability is that item reliability does not depend on the length of the test and is also not influenced by model fit.

Cronbach's alpha value (KR-20) in **Table 6** shows that the results of the measurement of the interaction reliability between items and persons. The KR-20 value of 0.48 (weak) is a reliability value in classical theory measurements, which in the Rasch

t	Logit Average	Separation	Reliabilities	Alpha Cronbach (KR-20)
Person	52,06 (7,22)	0,96	0,48	0,48
Item	50,00 (13,26)	2,81	0,89	

Table 6.
 Cronbach alpha analysis results.

	MNSQ		ZSTD	
	Infit	Outfit	Infit	Outfit
Person	1,02	0,94	0,05	-0,13
Item	0,99	0,94	0,14	0,01

Table 7.
 Mean square fit statistic results.

model is equivalent to person reliability. Therefore, the low KR-20 value is caused by the low variance of the student's ability level. To improve this reliability value, instrument tests can be carried out on a number of samples with extreme variance in ability levels. Items are declared fit with the model when the more difficult items must be more difficult for students to answer. And conversely, the item is declared not fit with the model when the easy to answer item is easy for students. Both statements are true regardless of the student's ability level.

MNSQ infit-outfit value (mean square fit statistic) (Table 7) indicates the suitability of the data with the model. Based on the results of the analysis of the overall test, the infit-outfit value is in the excellent range, which indicates that the overall test instrument is fit with the model. Meanwhile, the infit-outfit ZTSD (z-score standardized fit statistic) shows the results of the t-test for the hypothesis of the suitability of the data with the model. The ZSTD infit-outfit value is in the range of -1.9 to +1.9, which indicates that the overall data can be estimated logically.

4. Conclusion

Teachers experienced the workshop activities in developing STEM literacy assessment. They got knowledge of STEM education best practice in Japan from the expert. Most of the teachers have experienced in developing and implementing STEM-based lesson, but no one has it in the STEM literacy assessment. Teacher found difficulties in creating technology, engineering, and mathematics literacies. It indicated from the validation results, which showed low reliability. Person separation obtained a value of 0.96 or less than two. This means that the test instrument may be made less sensitive in distinguishing students with high abilities and students with low abilities. Based on these results, additional test items may be needed to increase the sensitivity of the test instrument. Therefore, it needs more practice for teachers in creating more sensitive items to distinguish students ability.

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Student Teacher Experiences of the Teaching Practicum in an Initial Teacher Education Programme in the Western Cape

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Abstract

Teaching practicum effectiveness is determined by several factors: adherence to the norms and standards that govern acceptable school-based-student teacher practicum assessment and student teacher assignment to teaching schools, as prescribed under the teaching school-university partnership practicum model. At the heart of the teaching experience are two relationships: one between mentor teachers and student teachers and the other between teacher educators and student teachers in assessment of their practices. Assessment plays a multifaceted role in supporting the process of learning, in judging student achievement in relation to course requirements, and in maintaining standards of the profession. As enacted in the teacher program, assessment assists teacher educators in the formative and summative evaluation of student teachers when assigned for the practicum in teaching schools. A qualitative research phenomenological case study design, targeting 10 student teachers who completed their teaching school-based practicum after a four-year BED foundation phase program, was adopted to explore student teacher experiences of school-based assessment. To substantiate the findings, qualitative data were collected through biographical forms, semi-structured interviews, teaching practicum portfolios, and the Teaching Practicum Manual for Sessions 1 and 2 as implemented by a selected university offering an initial teacher education (ITE) program with practicum mentorship. Content and thematic analyses were used to identify themes, with a series of common themes identified based on empirical, theoretical, and policy findings, to determine the impact of the existing practicum approach, a practicum assessment model, on student teacher levels of readiness to teach. Not all student teachers received the expected assessment experience. Several student teachers felt that the way the formative and summative evaluation processes were conducted and the feedback from the teacher educators based on only two visits were insufficient for fair performance evaluation over the 8–12 weeks of school practicum, although they regarded evaluator visits as helpful for reflection, grading, nurturing and a fair critique of their performance. Student teachers indicated to have gained considerable knowledge to improve lesson delivery and classroom management.

Keywords: student teachers, practicum experiences, school-based mentors, assessment, teacher educators

1. Introduction

Teaching practicum occupies a key position in the teacher education program, serving as the culminating experience in teacher preparation; it offers beginning teachers the opportunity to practice in a real setting and be socialized into the teaching profession.

Overall, practicum experiences of student teachers are determined by multiple integrated and interrelated factors, including the nature of the school environment for the practicum, the duration of the practicum exercise, the effectiveness of the teacher educator who evaluates the student teachers, the expertise of the school-based mentors, and the nature and consistency of the feedback received from both school-based mentors and teacher educators [1]. A recent study by Mokoena [2] revealed that student teachers face challenges pertaining to on-time placement in schools, placement in approved schools to undertake teaching practice [3], and supervision and mentoring during the practicum. Some schools, for example, while willing to accommodate student teachers, may struggle with poor management, non-existent timetables, insufficient staff, and inadequate mentoring, all of which can be detrimental during practicum and leave students feeling demotivated and disillusioned.

According to Yaylı [4], practicum experiences in teaching schools help in translating theoretical aspects of the program into practical, doable actions, which are valuable to student teachers as they reflect on the support, guidance, and assessment provided by the schools and higher learning institutions. Allen [5] contends that the practicum period must be enhanced by the involvement of stakeholders who are well capacitated and distinctly aware of their roles and responsibilities. Those in the program must be acquainted with the coordination of the teaching schools' and higher education institutions' practicum-work relationship.

Student teaching experiences are regarded as the most influential component of a teacher education program [6–8], shaping student teacher development from novice teachers to competent teachers. At the heart of the teaching experience is the relationship between mentor teachers and student teachers [9], a relationship that leads to the transformation of the teachers involved [10]. The overall success of the professional practice unit—the entire practicum—depends heavily on a positive relationship between these two parties [11].

Assessment, another core element of the practicum, is utilized to determine the progress of the student teacher, the need for support and guidance, and the readiness to enter the teaching profession upon graduation. According to Joughin [12], assessment plays a multifaceted role in supporting the process of learning, judging student achievement in relation to course requirements, and maintaining the standards of the profession. As enacted in the teacher program, assessment assists teacher educators and school-based mentors in formative and summative evaluation of the student teachers when assigned for the practicum in teaching schools [13].

This research study has been designed to explore student teacher experiences of the teaching practicum based on their perceptions of assessment of their performance during this practicum. These experiences, as determined in this study, will contribute to the roles and responsibilities of school-based mentors and teacher educators in

shaping relevant skills and knowledge desired for a qualified educator to ensure that these roles and responsibilities are carried out efficiently and effectively based on the procedures and guidelines of ITE programs.

This chapter explores student teacher experiences of the teaching practicum in an ITE program, posing the following question:

How do student teachers perceive teacher educator assessment of their teaching practicum?

2. Review of the teaching practicum

2.1 Concept of practicum

A practicum, if well implemented and executed, provides practice for university students to become successful teachers [14]. Teacher educators and school-based mentors are extremely important sources of practical experience for student teachers because they work as supervisors, assessors, mentors, observers, model teachers, and supporters to develop student teachers [14].

2.2 Impact of practicum experiences

Practicum experiences are necessary for the development of a student teacher's professional knowledge [15] and beneficial in transitioning the student teacher from theoretical knowledge to practical classroom experiences [16]. The expectation is that student teachers acquire the knowledge to become qualified educators through mastery of content knowledge [17]. According to Ramsden [18], practical experience imparts soft skills such as problem solving, professional work relationships, and professional values and attitudes, which are vital components of an ITE program to prepare student teachers for the realities of student teaching.

2.3 Challenges impeding student teacher development

During teaching practicum experiences, student teachers encounter several challenges. For instance, studies by Sarıçoban [19] discovered that most of these problems occur because there is a gap between the academic institution and the current real teaching situation.

According to Manzar-Abbas and Lu [20], the analysis of practicum experiences of Chinese University students found that notable impediments to student teacher development included complaints from the students describing practicum as done in a very short time, with inappropriate time to transfer student teachers to the field and involving the use of outdated methods to conduct practicum training. Other impediments identified during field training relate to academic supervision, cooperative schooling, and cooperative school students [21].

Challenges inherent to the student teaching process and associated with the student teacher's professional growth include acquiring and applying effective feedback from cooperative teachers during post-lesson conferences [22]. A related problem in teaching practicum, identified by Wang and Odell [23], is psychological and emotional pressures that can affect student teacher performance during teaching.

2.4 Policies and procedures guiding practicum in the south African context

ITE programs, designed to equip prospective teachers with the professional knowledge and skills for effective teaching in schools [24], intend to transform student teachers into capable and competent teachers [25]. Higher education institutions (HEIs) in South Africa implement ITE programs based on policy guidance, that is, the Higher Education Act [26], the Higher Education Qualifications Framework (HEQF), the Policy on the Minimum Requirements for Teacher Education Qualifications [27], and the National Qualifications Framework (NQF), and highlight the significance of school-based practicum learning with the assumption that student teachers will be thoroughly supervised.

School-based teaching practicums are compulsory for all university-registered students in an ITE program. Teacher educators and school-based mentors entrusted with supervisory roles are required to assess student teachers on lesson plan preparation, research skills, classroom management, time management, relations with fellow staff members, school management, and education project innovation [28].

2.5 Theoretical frameworks

The study adopted the 8P's model in assessing student teacher readiness to teaching.

The 8P model of teacher practice, developed by Shulman [17], underscores the importance of performance-based assessment (PBA), which measures a student's ability to apply the skills and knowledge learned from the previously studied theory. Shulman's work suggests that to improve classroom teaching, the teaching profession needs a continuously evolving and growing knowledge base. Teacher education programs that uphold this view focus on how teachers organize aspects of subject matter to adapt and represent it for instruction. The teaching practicum model of assessment comprises eight stages, which have been categorized into three phases, namely peer assessment, formative assessment, and summative assessment. However, not all these stages are currently implemented by the HEI under study. For instance, principals and students are not given an opportunity to assess the student teachers except for school-based mentors and teacher educators from the HEIs [29].

The 8P model of teacher practice provides the stages that student teachers are obliged to pass through for their teaching practicum in schools, as well as the stages that teacher educators and school-based mentors use for supporting and guiding student teachers and assessing these student teachers throughout the teaching practicum period. The model clarifies the roles of teacher educators who are assessors and school-based mentors who are assessors, guiders, supporters, and resources providers. It further shows how the triad is integral to the entire process, rendering the process relevant and reliable for studying student teacher experiences as it intertwines the cumulative stages to define their experiences of practicum.

2.6 Teaching practicum assessment practices

During practicum, student teachers are assessed on their current knowledge, skills, and practices by the school-based mentors and teacher educators, offering an opportunity for growth in their journey to enter the profession [30]. According to Tillema et al. [13], school-based mentors and teacher educators have dual roles in formative and summative assessments: school-based mentoring serves formative

assessment, while summative assessment remains with the HEI teacher educators who join the triad toward the end of the practicum for the final evaluation of the student teacher performance [12].

The intention of teacher education providers is that the practicum be implemented through a partnership model whereby student teacher attachment to a school is supported by school-based mentors who are licensed for that role and teacher educators who are charged with role assessment as documented in the program policy [24].

The practicum component of an ITE program is commonly identified in the literature as “the factor that has the strongest impact on teaching” [31–33] and is viewed by most student teachers as a positive experience [34–36]. However, in South Africa, current assessment of student teachers is frequently ineffective in supporting student teachers to transition into professional teachers with the knowledge and skills necessary to effectively practice as teachers. The weakness of the system is that despite school-based mentorship serving as the most powerful source of influence on student teachers undergoing pre-service training, there exists a tendency for the mentor’s assessment role to overshadow the other roles of support, advice, and instruction, and in so doing, “impede[s] the development of the student teacher’s learning, the very objective of the assessment” [37]. Other notable issues relate to the mentors who support student teachers in schools—too often they are underqualified and lack subject matter and pedagogical content knowledge to assist student teachers in developing desired competencies because these mentors are not phase specialists [37] despite the stated requirements of the school-based practicum.

The South African Education Policy, delineating key competencies for teacher education qualifications [38], requires that proper supervision and suitable school placement be guaranteed [39] and specifies the minimum and maximum time to be devoted to practice teaching, including learning in and from practice. Not all students are supervised (assessed) by teacher educators at HEIs because time constraints and finances are a reality; consequently, at times, school-based mentors assume the roles of both mentor and assessor.

With reference to Burn and Council on Higher Education [39, 40] reviews have led to questions on the overall quality of most existing ITE programs, as it was found that: (i) too many teacher education programs do not meet minimum standards in the areas of program design, coordination, and work-based learning; (ii) the quality of program staff is weak with respect to staff development, research output, and orientation; and (iii) many students lack sufficient opportunities to engage in practical learning, a problem exacerbated by weak university-school relationships, poor communication, and inadequate supervision and mentorship arrangements.

Shortcomings in subject knowledge, poor relationships with mentors, and an inability or disinclination to cope with imposing discipline, preparing lessons, or managing time [37] are some of the hindrances to successfully conducting school-based mentorship and assessment during the teaching practicum in South Africa.

3. Methodology

The study followed a qualitative research approach [41] to understand fourth-year student teachers’ experiences of the teaching practicum in a BEd foundation phase program.

It is important that the design selected suits the nature of the research being conducted and outlines how the research is carried out from the beginning to the

end [42]. According to DeFranzo [43], qualitative research accesses experiences and concepts to be studied and can be developed and refined as the research is conducted, rendering it a semi-structured process and procedure. This approach was deemed suitable for studying student teacher experiences of the practicum as it is flexible and honors an inductive style, focusing on individual meaning and the importance of rendering the complexity of a situation.

Creswell [44] explains that a phenomenological study describes the meaning of the lived experiences of several individuals regarding a concept or the phenomenon. The concept of practicum in a teaching program has highlighted student teacher experiences, which was the concept to be studied. In the human sphere, phenomenology normally translates to gathering “deep” information and perceptions through inductive qualitative research methods such as interviews and observations, representing information and perceptions from the perspective of the research participants [45]. Observation and interviews are the key data collection methods for a phenomenological study [46].

The sample for this study was purposively selected from fourth-year BEd foundation-phase student teachers, comprising 10 female student teachers who completed their teaching practicum and school-based mentorship and assessment procedures.

Considering the depth to which the researcher wanted to explore the phenomenon under study, both non-probability purposive sampling and probability random sampling were deployed. The choice of a non-probability sample means the study targeted a deliberate unit reflecting the outcome of the activities within the new ITE curriculum program, while a probability sample was used because of its higher level of reliability of research findings and increased accuracy of sampling error estimation.

3.1 Choice of participants

The study purposively selected student teachers who completed their teaching practicum, specializing in the BEd foundation phase program, and who were in their final year of study (Year 4) at the time of this study. The researcher endeavored to gain an in-depth understanding of the student teachers’ fresh experiences of the program through information-rich samples [47].

The research population targeted in this study was homogenous: all female student teachers within the BEd foundation phase program who have completed and passed their practicum. While the targeted population comprised nearly 100 student teachers, the researcher intended to interview only 10 student teachers.

The institution selected for the study is diverse, enrolling students of various social classes, racial compositions, and home locations. The institution has adequately trained and qualified staff and administrators with world-class resources and infrastructure and a variety of staff and students: Black, White, Asian, and colored from high, middle, and low economic classes. Hence, the sample of participants varied in age, race, socio-economic class, and schools where they conducted their practicum.

The study employed semi-structured in-depth interviews to obtain data, with participants encouraged to reflect on their experiences of assessment, support, and guidance during the practicum, sharing strengths, areas of development, outcomes of summative assessment, and details of their qualifications for passing [47].

The study used content and thematic analyses for the data collected from the semi-structured in-depth interviews with the student teachers. Content analysis explores lived experiences [48]. In this study, the data collected were transcribed, and patterns of teacher experiences and mentor and teacher educator assessment were analyzed.

Ethical consideration is vital for both quantitative and qualitative studies [49]. The researcher sought ethical approval from a selected university offering an ITE BE D program to collect data from student teachers. With regard to participants, anonymity and confidentiality were maintained throughout the study; information collected was kept private.

4. Findings and discussion

This section discusses the findings of the study with reference to the research question.

4.1 Student teacher experiences of the teacher educator assessment of their competencies during the teaching practicum

The student teachers had varying perceptions of the teacher educator assessment of their competencies during the teaching practicum. Generally, the 10 student teachers in this study regarded evaluator visits as helpful for reflection, grading, nurturing, and a fair critique of their performance. Zeichner and Liston [50] accentuate the importance of student teacher reflection in the practicum component and other field-based activities of ITE programs. Supervisors expect certain competencies from student teachers in terms of the practicum when they visit for assessment [51], evaluating the student teachers' performance in practical teaching situations and monitoring their performance progress with feedback to the HEI and to the student teachers themselves.

4.1.1 Nature of school-based assessment of competencies by teacher educators

Student Teacher 8 indicated this about her assessment:

They assessed me on competencies of research on topic, classroom management, time management, learner engagement.

Student Teacher 3 added,

My experiences with both of my evaluators were positive. They equally taught me valuable lessons and gave good criticism where needed ... and conducted a fair evaluation.

According to these two student teachers, assessment procedures went well with their teacher educators—assessment was fair, and feedback was given for areas requiring improvement.

However, Student Teacher 9 indicated that the number of assessor visits was not adequate for a fair arrival at a final grade.

4.1.2 School-based practicum assessment: Mode

Most student teachers were assessed at intervals as stipulated in ref. [28], although some mentors also valued the school-based mentorship evaluation as formative assessment and applied this rating regularly. The student teachers were assessed on

the expected norms and standards as stipulated in the manual, although not all educators conformed to standards, with some not abiding to the 48-hour rule notification and some observing student teacher lessons at incorrect times, affecting student teacher application of practice skills in the classroom. This was noted in the Student Teacher 1 interview:

They wrote up an evaluation based on the details of my lesson and gave feedback on that. And then generated a mark based on that. There was no rubric involved.

Student Teacher 10 added,

They would sit at the back of the class and observe how I taught a specific lesson. They observed classroom management and learner involvement during the lesson, and ... if I was able to think on my feet and handle it professionally.

Another student teacher said,

Performance was assessed by internal evaluators, one of which used the guidance of the mentor teacher and her feedback was given mainly by evaluators. Tutor teacher would provide oral feedback about areas to improve.

During the lesson observation, the supervisor provided constructive comments about various aspects of the lesson. The CPUT Manual for Teaching Practicum contains a well-established assessment and scoring aggregate intended as a tool to guide lesson observation. However, analysis of the three lessons reveals an absence of evaluation forms and assessment rubrics, as none mentioned these tools.

4.1.3 School-based practicum assessment: Cultivated competencies

The areas most assessed by teacher educators during the practicum in the teaching schools were as follows: lesson plan preparation, time management, classroom management, dress code, and research on lesson topics. Numerous scholars have emphasized the role of assessment in determining a student teacher's readiness to teach and the achievement of expected graduate standards. It is anticipated that practicum assessment will comprise elements of supportive guidance for the student teachers, with evaluation of the achievement of the expected competencies [52].

According to Student Teacher 9,

They were assessing our professionalism, lesson planning, attitude, initiative, work ethic, understanding of planning, teaching and learning resource development, learner involvement, class management, communication skills, time management and admin and organizational skills.

Further, Student Teacher 3 indicated,

The competencies that were of focus were: Do I plan with purpose, allow active participation from my learners, provide opportunities for meaningful knowledge? ... They also assessed if my teaching was inclusive, appropriate to their grade level and provides enjoyment in the learning process.

Coll et al. [53] explain that assessors should focus on areas of technical competencies rather than higher level teaching skills. Student teachers mentioned research on the topic, instructional strategies, organization and planning, classroom management, caring and inclusiveness, and communication and interpersonal skills as the areas most assessed by teacher educators during practicums.

4.1.4 School-based practicum assessment: Student teacher: Teacher educator relationship

Practicum supervisor impact is classified into professional, personal, and procedural parameters. Different scholars have defined assessment in different ways [12, 24], for example, refer to assessment as a procedure of judgment about student teacher work through analysis of what they are capable of in the assessed domain: hence, what they know, value, or are capable of doing. The 10 student teachers in this study described the relationship with their school-based mentors as professional, assessing, mentoring, affirming, and providing feedback to facilitate their professional growth—people who, according to Student Teacher 6,

Give feedback and advice as well as showing the ropes, how to go about a lesson if we struggle.

In addition, Student Teacher 1 commented,

I have a good relationship with them. But I think that is due to knowing them as lecturers for 4 years. They were always professional and kind to me during assessment. They never interrupted me ... Never made me feel uncomfortable.

As professionalism constitutes the backbone of the teaching process, teacher educators must avoid bias when affirming student teacher practice. It is expected, as suggested by student teachers, that judgment about student teachers is conducted positively, through analysis of what they are capable of in the assessed domain and thus what they know and value and can do.

4.1.5 School-based practicum assessment: Nature of support

Student teachers listed several areas of focus in their practicum lesson performance as assessed by teacher educators, mentioning planning, research, and practice skills as the most developed during assessment. The collected practicum biographical data revealed the most developed competencies to be time management, classroom management, research on content areas, and learner involvement. Construction of portfolios has recently gained attention as a tool to promote reflection among student teachers [54]. During other in-class and outside-the-classroom activities, student teachers construct an educational portfolio [55] containing lesson plans, weekly summaries of lessons taught, class timetables, class learner lists, school policies, information on lesson content, and finally, CAPS documentation.

Student Teacher 3 spoke of her competencies:

The competencies I developed was to teach with a purpose. Plan detailed lessons with a variety of learning styles and activities to allow meaningful engagement and knowledge construction.... I also developed a skill to adapt to any situation.

Student Teacher 6 expressed her improvements:

I became more aware of my surroundings and how I present myself, I have become more mature and a multitasker.... I am able to cope under pressure and my time management has improved tremendously.

The assessors maintained a broad holistic focus on developing qualified teachers. They focused their plans on CAPS, appropriate teaching and learning methodologies, teaching and learning resources, capabilities in discharging duties based on school policies, abilities to develop education portfolios, and abilities to reflect on classroom practices.

4.1.6 School-based practicum assessment: Opportunities and challenges of assessment

When asked of opportunities gained from the practicum assessment, student teachers mentioned knowledge for improving lesson delivery and classroom management. They saw the evaluation visits as opportunities to converse with teacher educators on substantial issues pertaining to practice improvements.

Student Teacher 3 said,

The opportunities that I took from my lecturers were that I asked them many questions as to how I could improve on my lessons for the future. They gave me good insight and advice in those areas.

Student Teacher 9 added,

There were many opportunities for growth in classroom management and planning adapted to the learners' needs. I also felt that I was assessed fairly.

It is evident that teacher-educator assessment of student teachers is vital for their growth as capable, qualified educators. According to Atputhasamy [56], sharing practical experiences of expert teachers who observe student teacher lessons, receiving feedback, and practicing various teaching strategies at school are the most important factors in student teacher professional growth.

Student teachers mentioned several challenges affecting their performance: inadequate evaluation visits and lesson observations, poor timing of teacher educator evaluations, inconsistency of evaluations, and lack of uniformity in the assessment processes. A study conducted by Haigh and Ell [30] condones transparency in relation to the purpose and practice of practicum assessment, taking into consideration the problematic nature of a practicum and unfairness for student teachers. For example, evaluators had problems meeting the rules and regulations for assessing student teacher classes, which affected the classroom management of the student teachers.

Student Teacher 1 commented,

A challenge... is that I wish they had observed more... because I do not feel that they could truly assess your ability to be a teacher in 45 minutes. In my case, I was lucky because I knew my evaluators for first year. And my final evaluator ... was also my first evaluator in first year.

In support, Student Teacher 2 said,

I felt like I was not assessed fairly as the two teacher educators who had visited me separately were not using the same criteria of assessment. I never saw any rubric.... It is frustrating as the grades which I got did not match my efforts.

If the assessment aspect of the program is problematic, the outcome of the assessment is likely not a true reflection of student teacher performance. According to the student teachers, both school-based mentor and teacher educator formative assessments were crippled by a physical absence of classroom observations and a lack of mentor specialization, while the summative assessment was conducted inappropriately (not all teacher educators followed the recommended assessment procedures or used the correct assessment instrument), or the number of visits were inadequate to determine the actual performance of the student teachers [57–59], attribute assessment problems to bias, unreliability, and inconsistency, emphasizing that HEIs and teaching schools need to resolve these problems if the integrity of the assessment system and awarded qualification is to be protected and for the “public to have confidence in teacher educators as the gatekeepers to an initial teaching position” [59].

4.1.7 School-based practicum assessment: Its value

Student teachers used assessment to question evaluators on conflicting realities between theoretical training at HEIs and practical knowledge in teaching schools and to reflect on knowledge and skills gained from first to final year practicum experiences. Clarke and Collins [60] contend that assessment is a core component of school-based practicum for determining student teacher progress of readiness to qualify as competent teachers.

Student Teacher 7 said,

When you get assessed, it's like a direct reflection of what your lecturer thinks of your LR teaching capabilities, so the assessments hold a lot of value as you always try to push and do your best.

Student Teacher 9 added,

It informs you of loopholes in your own classroom and teaching practice that you might have failed to see. Thus, it makes you a better teacher, as you know your strengths and weaknesses and can work on them.... When you have your own classroom, you know which aspects you need to improve.

Student teachers enter the teacher education program with re-established beliefs about teaching and learning derived from their own educational experiences [61]. Part of the role of teacher education and practicum is to encourage a transformation in which existing beliefs are challenged against theory and practice [62].

4.2 Discussion of school-based assessment experiences

Findings reveal variations in student teacher reflections on their experiences of the teaching practicum because of a teacher educator's assessment of their practice in the classroom. Even in the case of schools associated with universities to strengthen the teaching practice component of teacher education programs as stipulated in ref. [63], not all student teachers receive the expected school-based assessment

experience. The expectation is for collaborative efforts in modeling, observing, guiding, discussing, and reflecting with expertise to be drawn from both the university and the school [33, 64–66]. However, this was not the case with all assigned schools, as mismatches were evident in the expectations of the role of the teaching schools and the role of the universities. For instance, there was a particular case where one student teacher had the same person acting as both mentor and assessor, which, according to ref. [28], is not recommended. The role of summative assessment is assigned to teacher educators at HEIs who conduct the assessment and grading after an interval of mentorship sessions with student teachers and observations of lesson presentations in the classroom.

Darling-Hammond and Snyder [67] confirm that authentic assessment is enacted by multiple sources and involves more than one measure to assess student teachers with the intent of encouraging a broader acquisition of skills and competencies. Multiple data sources used to reach assessment decisions may include documentation of student teacher practices of achievements over time and in various situations. Contrary to this, in respect of the study findings, several student teachers felt that the way the formative and summative evaluation processes were conducted and the feedback received from the teacher educators based on only two visits were insufficient for a fair performance evaluation over the 8–12 weeks' time span of the school practicum.

Despite acknowledgment of the student teacher practicum as integral to assessment [30], several concerns have been raised about its validity and reliability: procedure seems to have been taken for granted in practice with little regard for formal observation processes.

Unlike the evaluation of school-based mentors who had no score aggregate on the performance of the student teacher, the assigned teacher educators from the university awarded the final marks of the Session 1 assessment. The grade was determined from the teacher educator's evaluation of the school-based mentor's sheet and their own evaluation of the student teacher's assessment. The expectation was that each teacher educator's assessment would be guided by the evaluation forms and assessment rubrics as per the recommended procedures of the school-university partnership. However, student teachers noted the absence of such documents, bringing into question the uniformity of assessment and the reliability and validity of their final grade.

Teacher educators' frequency of assessing a student teacher's readiness to teaching is determined by several factors, as stipulated by the HEI, namely: their position (whether appointed as external moderator or not) and the purpose of the assessment. Student teachers' responses on their practicum assessment frequency were determined by what they perceived as assessment and who they perceived as an assessor. At times, for example, student teachers would refer to the tutor teacher as the teacher educator, whilst others referred to the school-based mentor, a clear indication of displacement of assessment roles in certain schools. An analysis of student teacher responses found numerous false assumptions that student teachers are capable of automatically and smoothly transitioning from theoretical to practical teaching in the classroom as not all mentors availed themselves fully to uphold the expected standards of quality for delivering competent teachers.

5. Conclusion

As a qualitative study, the research concentrated on one HEI offering a teaching practicum for combining theory and practice in each of the program's 4 years. Based

on the findings, the current teaching practicum model as implemented by the selected HEI faces challenges in meeting the expected school-based support, guidance, and advisory role as well as in yielding quality assessment results and, more importantly, in producing the expected quality of competent teachers.

This chapter highlighted how an HEI is implementing the teaching practicum component of its ITE program, noting the opportunities as well as the challenges. In so doing, it adds to the limited research on the implementation of the teaching practicum component in ITE programs in South Africa and globally.

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Conflict of interest

The authors declare no conflict of interest.

Thanks/dedication

I dedicate this research work to all higher education institutions which are providers of initial teacher education programmes, entrusted with the responsibility of professional growth and development of future specialist foundation phase teachers.

I dedicate this to my mother, Mrs. Ellen Namvuwa Malikebu, father Brigadier General Victor Phillip Malikebu (Rtd) and my brothers Benedicto (Thamsanqa), Charles (Mthokozitsi) and Francis (Mduduzi) for their moral support and undying love.

Declaration

I hereby declare that the text of this Chapter entitled Student Teacher Experiences of the Teaching Practicum in an Initial Teacher Education Program in the Western Cape is my own work and has not been presented for any other award at the Centre for International Teacher Education, Cape Peninsula University of Technology.

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Teacher Candidates Using Annotated Technology Foster Cultural Responsiveness and Ethics

Jillian Ardley, Angela Goodloe and Keesha Kerns

Abstract

Education preparation programs are guided by national and state standards in training teacher education candidates for a career in education. Though embedded in coursework and assessed through various assignments, there is limited assessment of whether teacher education candidates comprehend specific concepts within a standard. There are advances that allow observation and assessment of teacher candidates, which gives all parties involved in student teaching a method to gauge the candidates' ability to identify distinctive archetypes within a standard as it applies to the candidate's culture and beliefs. Digital tools, such as video annotation software (VAS) programs, include settings that permit their users to provide feedback on a digital platform. The feedback can be used to measure candidates' comprehension of their own culture and beliefs in relation to specific concepts within a standard to cultivate the development of cultural responsiveness and ethics. GoReact is a VAS program used at a top 20 Historically Black College University (HBCU) to assess teacher candidates' knowledge of cultural responsiveness and ethics in student teaching. The information from the digital platform was quantified, showing emergent themes and findings that are relative to whether VAS programs are a useful tool for measuring cultural responsiveness education and ethics in teacher candidate training.

Keywords: teacher candidate training, culturally responsive education, ethics, CAEP, InTASC, VDOE standards, HBCU, digital tool assessment, GoReact, video annotation software programs, culture, education preparation programs

1. Introduction

Sitting in a classroom with a laptop open to a rubric that targets the five dimensions of multicultural education [1] and multicultural approaches [2], a professor digitally evaluates the performance of teacher candidates (TCs) in the student teaching course on a learning management system. One by one, the TCs share multimedia presentations on culturally relevant activities for their selected English Language Learner (ELL) case study students. Simultaneously, teacher candidates in the audience who are enrolled in the same student teaching course are notating their favorite colleague activities and justifying their opinion with their university-issued I-pad pen

and digital journals. While teacher candidates pause to allow others to prepare to present, the professor asks students to address where they are cognitively in their understanding of Banks' dimensions and approaches. Students journal privately to their professor's comments such as:

"I need more work on understanding knowledge construction. I say this because I will need to work towards helping my students become effective critical thinkers".

"The concepts that I learned the most today were content integration and an equity pedagogy. The concept that I need more work on is prejudice reduction and empowering school culture".

"The concepts that I learned about the most today was Content Integration. I learned that there is more to it than just showing different cultures flags, holidays, and famous people".

"The concept I need more work on is content integration cause including other cultures and not creating biases against my students through the activities I chose is important. I see now that my Hispanic holiday stuff could reinforce stereotypes".

Faculty members and teacher candidates are able to depict and assess how cultural relevance is represented using a fictitious ELL case study student within the four walls of their university multiculturalism classroom. But the question presents itself as to what can be observed in teacher candidates who move cultural relevance from theory to practice in student teaching? What digital tool is used to measure and evaluate students' culturally responsive behaviors or lack thereof in actual classroom settings? This chapter responds to address these questions by sharing the 4-year experience of implementing an annotated software system to promote collaborative assessment of learning outcomes required by educational preparation programs for preservice teachers.

2. Literature review

2.1 Consideration for a digital tool selection to assess cultural responsiveness

When moving teacher candidates from the classroom to field experiences, key factors must be addressed before purchasing technology. Considerations for practical and useful technology should include, but not be limited to cost, safety of information, accessibility, user-friendliness, universal design, and sustainability. Miller [3] suggests that the following be critiqued before purchasing educational technology which includes responses to the questions reflecting how the purchase may impact the teaching and learning of cultural responsiveness and/or relevance. First, does the educational technology align with the toughest course goals? Cultural relevance can be more abstract at the highest dimension and approach of learning how to implement multicultural practices within teacher candidates' instruction. So, knowing realistically what a digital tool can or cannot capture must be factored in how the tool is utilized. Second, does the educational technology align with what is known about how people learn? Traditional teacher candidates are familiar with asynchronous and synchronous digital tools. The ideal tool for teaching and learning of cultural relevance would promote both in a student teaching environment. Third, is the educational technology of high quality in the areas of accurate content, functionality, and support? A tool that allows a preview of the platform for learning, as well as describes and shares to new user online manuals, training sessions, and follow-up support, is at a premium for all users because not all learners are comfortable with Web 2.0-based

technologies. Fourth and final, is the educational technology of a notable value? Between the cost to teacher candidates or the institute of higher learning, the commitment required by the institute to gain access, awareness, and usage of the tool, the amount of faculty and student time they will have to commit, and the learning outcome benefits of the new technology versus previously or presently supplied digital supports need to be reviewed. Moving students effectively from the acquiring of knowledge to demonstrating knowledge through technology is a goal of educational technology. But the assessor or potential purchaser of the technology should ask if there are other methods or materials that could supply the same outcomes in a manner that supports teaching and learning of cultural relevance for teacher candidates.

Educational Technology to indicate the growth and development of multicultural concepts is not new. Traditionally, multiculturalism and/or an ethics course are offered in universities and colleges with educational preparation programs. As institutes of higher education adopted more technological advancements, curriculums transitioned with the advancements as well. Video-Mediated Technology, Telementoring, online courses with diverse digital tools connect college students with communities beyond the campus walls and are used to address multiculturalism, social justice, and diverse cultural practices and perspectives within a digital platform [4, 5].

Combining the strength of a digital tool that meets the criteria for purchasing an educational technology with a best practices multicultural teacher education framework has the capability of addressing important educational outcomes in an educational preparation program. Due to the availability and ever-increasing number of digital tools, the challenge in higher education is to select an instrument that is easy to implement for faculty and supplies the level of depth required to meet the needs of diverse prospective teachers. Kompar [6] suggests choosing a digital tool that is “mile deep,” meaning it is flexible across subject areas and user-friendly enough to allow the development of twenty-first century skills throughout the various levels of Bloom’s taxonomy [7]. This concept laid the foundation for selecting a digital tool that could address the learning outcomes associated with cultural responsiveness within a student teaching experience.

3. Digital tool selection

In an educational preparation program, teaching faculty are tasked with the responsibility to assess their teacher candidates’ level of understanding in a manner that distinguishes between levels of performance fairly and objectively [8]. Faculty are also encouraged to help teacher candidates use reflection to self-assess progress [9]. Another aspect that comes into play is the relationship between the cooperating teacher and the student teacher. No longer is the educational preparation program faculty member the majority provider of information about subjects for the student. Instead, the cooperating teacher is the person who provides real-world examples, or the lack of them, for the student teacher to emulate. With that information in mind, the digital tool must be able to show the perspective of all parties (faculty, cooperating teachers, teacher candidates, university officials, etc.) to support the final assessment of the teacher candidate [10].

In researching Web 2.0 technologies that support interactive communication and assessment, the researchers explored video annotation technology. Video annotation software (VAS) programs permit participants to provide feedback in a video recording setting. The feedback can be given in the form of text comments, video feedback,

or simple oral recordings to the person being viewed on an uploaded recording. The software program includes places for associated rubrics, documents, and instructional videos to provide directions for any participant. VAS programs can be purchased or used as a free tool from the World Wide Web (See, Top Tech for Digital Annotation by Common Sense Technology at <https://www.commonsense.org/education/top-picks/top-tech-for-digital-annotation>).

When looking at considerations for using a digital tool, privacy is important and that is lacking in online tools without The Family Educational Rights and Act (FERPA) rights or regulations for the children and adults recorded and commented upon within the system. Software in the paid category was examined by an educational preparation program at a Historically Black College University (HBCU) during a 4-year period. Though many Video-Annotated Software programs are on the market, three of the for-pay tools that are available and were designed to be marketed to different educator preparation programs (EPPs) are Edthena (<https://www.edthena.com/about.html>), Torsh Talent (<http://www.torsh.co/classroom-observation-tools/torsh-talent/>), and GoReact (goreact.com). GoReact was chosen for the educational preparation program at a top 20 HBCU due to cost factors and caps by the university on student materials and supplies per course as well as the thoughtful practices for reviewing educational courses as described by Miller [3]. Considerations also included if this tool could help the participants note their understanding of cultural responsiveness based on their multiculturalism instruction such as the one described in a university diversity course. An example of annotation text synchronized with a teaching behavior is shown in **Figure 1**, Example of GoReact.

Within the annotated system noted, a time stamp is stated beside each text. A round symbol with two letters shows the category reviewed. A graph is depicted in the right bottom corner to show how many times a category was discussed by the viewer. The paperclip icon shows that two items are attached and available for downloading. The clipboard with the check depicts that there is a rubric attached to this assignment. Other symbols, such as the camcorder, microphone, and library books, indicate that other multimedia sources can be uploaded for additional feedback.

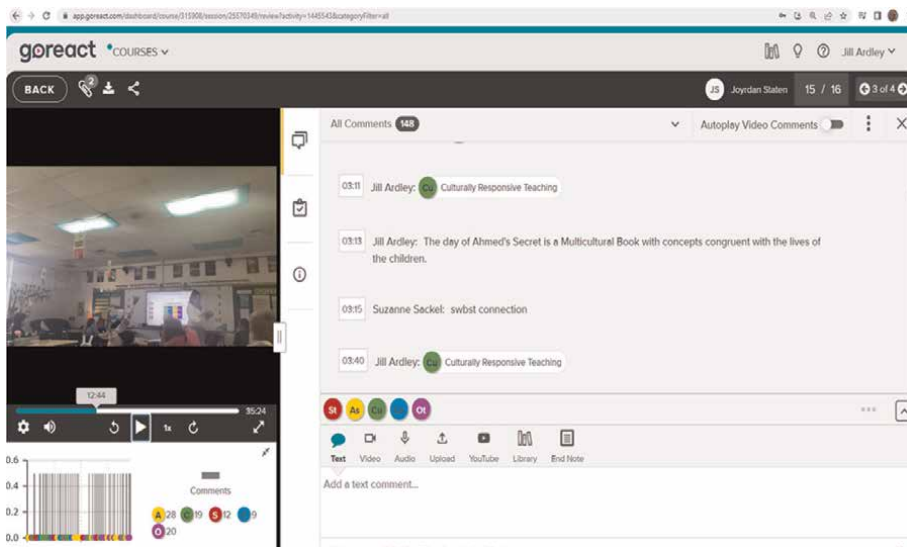


Figure 1.
Example of GoReact.

4. Standards

Most recently, the educational preparation program at a top 20 HBCU uses Council for the Accreditation of Educator Preparation (CAEP) national standards, Interstate New Teacher Assessment and Support Consortium (InTASC) national standards, and Virginia Department of Education (VDOE) state standards to assess cultural responsiveness in teacher candidates. These standards are actualized through the demonstration of lesson plans that are presented in real time or asynchronously to the faculty member of record, also known as the university supervisor (US) and the cooperating teacher (CT).

4.1 CAEP

The Council for the Accreditation of Educator Preparation (CAEP) is composed of a board of directors, volunteers, assessors, and staff members whose goal is to review and support the accreditation and pre-accreditation of educator preparation providers whose degrees lead to teacher licensure, certification, or endorsements for applicants within the United States and internationally [11]. Through evidence-based practices for accreditation, CAEP provides teacher candidates with assurance that a CAEP program is governed by high standards that include the principles of equity, diversity, and inclusion. The CAEP standard of focus in this study, as noted in the chart, is Standard 1: Content and Pedagogical Knowledge. This means that the provider ensures that candidates develop an understanding of the critical concepts and principles of their discipline and facilitates candidates' reflection of their personal biases to increase their understanding and practice of equity, diversity, and inclusion. The provider is intentional in the development of their curriculum and clinical experiences for candidates to demonstrate their ability to effectively work with diverse P-12 students and their families (2022, Initial Level Standards <https://caepnet.org/~media/Files/caep/standards/2022-initial-standards-1-pager-final.pdf?la=en>).

4.2 InTASC

The Interstate New Teacher Assessment and Support Consortium (InTASC) is a consortium of state education agencies and national educational organizations dedicated to the reform, preparation, licensing, and ongoing professional development of teachers. The InTASC standards are composed of 10 standards with multiple indicators that review the knowledge, skills, and dispositions expected of teachers [12]. The standards of focus, 2, 4, 5, and 9 are noted in **Table 1**. The Level III Field Experience requires candidates to focus on these InTASC standards throughout the entire student teaching experience.

4.3 VDOE

The Virginia Department of Education's (VDOE's) uniform performance standards include seven standards [13]. Within each of the seven standards are key elements that describe the knowledge that teachers should possess, and actions required to advance student learning. Together, these seven standards represent the scope and complexity of teaching and noting learners' outcomes within school divisions. The Level III Field Experience requires candidates to address these standards throughout the student teaching experience in conjunction with the InTASC standards.

Council for the Accreditation of Educator Preparation Standards
Standard 1: Content and Pedagogical Knowledge
CAEP: R1.3 Instructional Practice
The provider ensures that candidates are able to apply their knowledge of InTASC standards relating to instructional practice at the appropriate progression levels. Evidence demonstrates how candidates are able to assess (InTASC Standard 6), plan for instruction (InTASC Standard 7), and utilize a variety of instructional strategies (InTASC Standard 8) to provide equitable and inclusive learning experiences for diverse P-12 students. Providers ensure that candidates model and apply national or state-approved technology standards to engage and improve learning for all students.
Retrieved from https://ccsso.org/sites/default/files/2017-12/2013_INTASC_Learning_Progressions_for_Teachers.pdf
Interstate Teacher Assessment and Support Consortium Standards
Standard #2: Learning Differences. The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.
Standard #5: Application of Content. The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues
Standard #9: Professional Learning and Ethical Practice. The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.
Retrieved from https://ccsso.org/sites/default/files/2017-12/2013_INTASC_Learning_Progressions_for_Teachers.pdf
Performance Standard 6: Culturally Responsive Teaching and Equitable Practices
The teacher demonstrates a commitment to equity and provides instruction and classroom strategies that result in culturally inclusive and responsive learning environments and academic achievement for all students.
Retrieved from https://doe.virginia.gov/teaching/performance_evaluation/teacher/

Table 1.
Standards for educational preparation programs.

With the national and state standards as the precedence, culturally responsive education is embedded into the curriculum, but an across-the-board assessment is needed to for consistent measure of application on the various standard's concepts. Video annotation technologies that support interactive assessment are methods to both gage awareness of culturally responsiveness within a standard and address the inconsistencies in that recognition. GoReact is the video annotation software (VAS) program with the capabilities not only to assess, but also to evaluate teacher candidates as well as providing a platform to evaluate themselves.

5. Defining culturally responsive education at a historically black college and university

Culturally Responsive Education is the teaching-and-learning process in which students' different cultural references, home cultures, and previous experiences are taken into consideration by the educator, curriculum developer, and the environment

that hosts the learner. The goal is to meet the academic standards (CAEP, InTASC, and VDOE) and socio-emotional needs of students, promoting recognition of marginalized people in a manner that infuses their cultural perspectives and realities that foster awareness, tolerance, and advocacy of justice for those in the aforementioned populations. This expanded version of the concept utilized at a top 20 HBCU rests upon the research of Geneva Gay's [14] perspective on Culturally Responsive teaching and Aronson and Laughter's [15] research on culturally relevant education in terms of emancipatory pedagogies, as described by Joyce King in Michelle Foster's [16] *Compilation on Readings for Equal Education*. The expanded version of the concept also includes understanding the impact of cultural conflict on negating cultural relevancy in the classroom [17], and all of these ideas are incapsulated in the study of multicultural education [18].

6. Competencies to be addressed for cultural responsiveness

Culturally Responsive Education has its foundation with researchers, teachers, and advocates within the social, educational, and global realm of policymakers. The evolution of the concept of CRE evolved from a more simplistic understanding of best practices for diverse learners. In the late 1980s and early 1990s, multicultural goals identified by Gollnick and Chinn [19] characterized the EPPs. Candidates were prepared to help all students to: 1) learn basic skills; 2) acquire knowledge of the historical and social background of society to understand racism, sexism, and poverty; 3) overcome their fear of differences that lead to cultural misunderstandings and intercultural conflicts; 4) function effectively in their own cultural and other cultural situations; 5) value cultural differences among people and to view differences in an egalitarian mode rather than in an inferior superior mode; and 6) understand the multicultural nation and interdependent global society in which they live. To this current date, the text *Multicultural Education in a Pluralistic Society* by Gollnick and Chinn [19] is still used to examine socioeconomic and cultural conditions that impact educational achievement of diverse learners. They are reflected in the revised course syllabi in varied courses to support the infusion of multicultural education. CRE is not only crucial to educational preparation programs but is also supported by current research and resources and assessed through a variety of methods from case study assignments to quantifiable field experiences during preservice field teaching placements. **Table 1** depicts the standards that infuse the concept of cultural responsiveness.

Developing a culturally diverse training curriculum includes historical considerations as well as contemporary developments. Acknowledging past failures to provide teacher candidates quality education on how to work with children from diverse backgrounds is necessary as well as sharing how to correct these issues [20]. Through the years, updated perspectives on multicultural education have been developed with the ever-changing education population in mind. These updated perspectives on multiculturalism to include ethics have been reflected in universities and colleges' educational preparation program curricula [21].

With the current global events indicating an increase in racial assaults and discriminatory behaviors of non-Christian religions, and immigrants, universities need to stay in constant communication with teacher candidates and their cooperating teachers to explore the most relevant cultural practices for their given placements. For teacher candidates to understand its meaning at a top 20 HBCU using a digital platform, the

goal is for those teacher candidates to be able to: 1) demonstrate the knowledge of different value systems and the ability to analyze and evaluate their influence on behavior; 2) use relevant information and materials of various cultures for developing curriculum content; 3) understand different patterns of human growth and development within and between cultures, 4) recognize potential cultural and linguistic biases in the development, administration, and interpretation of assessment instruments; 5) demonstrate the ability to provide a learning environment that meets students' diverse needs; and 6) demonstrate knowledge of various cultures and philosophies and an interest in expanding one's knowledge. These attributes have been reviewed over the duration of the university's education preparation program and have remained relevant for more than a decade. To evaluate teacher candidates' present understanding of culturally responsive practices with national and state standards, their culturally responsive educational behaviors are assessed within the video-annotated system to note the progress in supporting their learning and modifications of their practices as needed. The notion that one-size-fits-all is inexplicable, given cultural relevance is a humane element relevant to the development of technologies and ethics in education and particularly the growing use of educational technologies. Thus, the use of technologies in education must be inclusive of cultural relevance, in that cultural relevance must be a fundamental element to identify and measure cultural relevance.

7. Methodology

Teaching standards from three sources were applied as guidelines to determine the use of culturally responsive teaching through GoReact Annotations. These standards included: 1) the Council for the Accreditation of Educator Preparation standards (CAEP), 2) the Interstate Teacher Assessment and Support Consortium standards (InTASC), and 3) the Virginia Department of Education standards (VDOE). Terms were pulled from these three standards to determine an alignment with culturally relevant statements found in GoReact. GoReact has a specific icon representing culturally responsive pedagogy, in which students, site or university supervisors may click to indicate culturally responsive teaching. There were four guiding questions. The findings indicated compliance with educational standards, term alignment, and indicated usage of GoReact.

Information from GoReact was accumulated from over the last four years (2019–2022) and included comments from 23 teacher candidates. These comments were originally color coded in GoReact and the color systems were removed to secure and ensure anonymity among the 118 responses over the time frame in GoReact particularly associated with cultural responsiveness. The comments were dissected, examining keywords that matched wording in the national and state education standards dealing with cultural responsiveness and ethics. Inferential statistics were used to produce percentages of how the responses aligned with the three educational standards that address cultural relevance. The highest percentage correlated to the most common and most used responses and the lowest percentage correlated to the least and less used response. **Table 2** shows the breakdown of responses by standard in GoReact.

GoReact reports on three responses: 1) cooperating teacher, 2) teacher candidate, and 3) university supervisor responses. Each response adheres to a color-coded system that allows for the categorization and subsequent separation of responses. Cooperating teachers and university supervisors have experience in culturally relevant education and ethics, making their positions ones of supervision meaning

Educational standard terms usage alignment				
Concepts/Terms from Educational Standards	Educational Standards	Usage	Correlated terms to concept terms within Educational Standards	Responses from GoReact entries
Community relevance	CAEP #1	18%	Community	Shared sense of community
	Intasc #2		Society	
	VDOE #6		Relationship	Shared connections of daily lives
			Related	
		Multicultural	Shared family lives	
Cultural references: racism, sexism, gender, religion, immigrant, abilities, and/or socioeconomic status	CAEP #1	17%	Non-typical	Funwa Ni Alaafia is a non-English phrase
	Intasc #2		Non-sexist	
	VDOE #6			Showed understanding of Title IX
			Respected differences	
				Shared and integrated People of Color (POC) in non-traditional roles
Value cultural differences	CAEP #1	15.95%	Different	Gestured satisfactory with the “Shaky thumb”
	Intasc #2		Difference	
	VDOE #6		Differences	Distinguished familiar and common in communities from differences
				Diverse
Responsive learning	CAEP #1	15.4%	Responsive learning	Created an inclusive learning environment
	Intasc #9			
	VDOE #6			Reflected upon personal cultural actions, remarks and asked how I (student) can improve
				Used videos, pictures, and books related to student populations
Inclusivity	CAEP #1	4.7%	Inclusion	Created an inclusive environment
	Intasc #2		Include	
	VDOE #6		Incorporate	Made connections
Content knowledge	CAEP #1	3.7%	Content	Respect how students’ culture reflects the way they learn content
	Intasc #5		Skills building	
	VDOE #6		Critical thinking	
				Content application

Educational standard terms usage alignment				
Concepts/Terms from Educational Standards	Educational Standards	Usage	Correlated terms to concept terms within Educational Standards	Responses from GoReact entries
Interdependent Global Society	CAEP #1	2.65%	Internet	Reviewed real-world connections
	Intasc #5		Real World	
	VDOE #6			Reviewed world experiences
				Reviewed global learning
Equity	CAEP #1	53%	Fair	
	Intasc #5			
	VDOE #6			

Table 2. National and state educational standards’ correlation to GoReact responses.

sponsorship, mentorship, coaching, observation, directorship, guidance and support, and facilitation or growth and development which makes their responses more supervisory commentary [22, 23]. Their responses in GoReact were identified as exclusionary, in that their responses were not those of teacher candidates in an education preparation program.

Responses from teacher candidates were collected from students who would receive their initial license to teach in United States public schools. The number of teacher candidates from a top 20 HBCU in Virginia varies from semester to semester, thus the number of responses changed per semester with course enrollment. However, the group size from 2019 to 2022 included 23 teacher candidates. All teacher candidates require a practicum/internship with at least three schools and each school representing diverse cultural and socioeconomic demographics. The practicum/internship experiences are recorded by teacher candidates in GoReact, and they have opportunities for self-reflection by clicking a corresponding icon. Site and university supervisors used the GoReact Rubric with four scoring levels: Distinguished-4 points, Proficient-3 points, Emerging-2 points, and Unsatisfactory-1 point to evaluate teacher candidate experiences. Teacher candidates who successfully completed practicum/internship receive their teaching license and start their professional careers as teachers.

8. Findings

The purposes of this study were to determine how GoReact culminated awareness in teachers to become culturally relevant and ethical in their teaching practices and responses. The data to answer these questions were gathered through an analysis of text from GoReact with a teacher candidate group from 2019 to 2022. During the year of Fall 2021, there were no teacher candidates. Data collected during the 4 years per semester indicated appropriate application of standards as presented in GoReact. The culmination of responses provided evidence of specific terms reoccurring within the text. Reoccurring terms represent both the understanding and the application of the digital

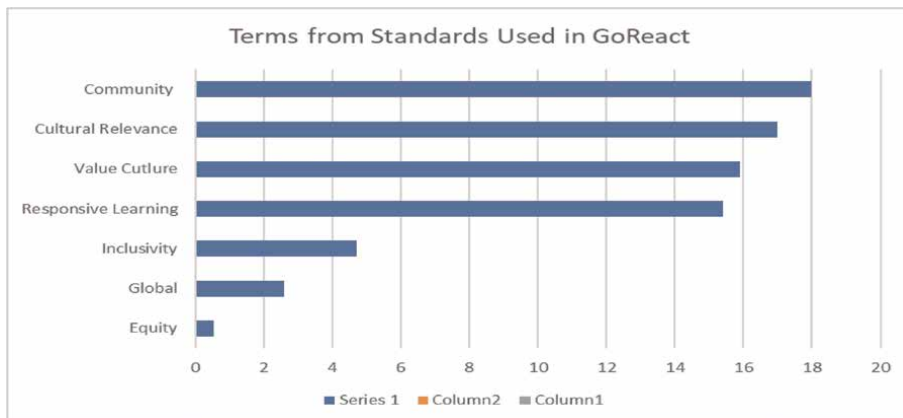


Figure 2.
Terms from standards used in GoReact.

performance of teacher candidates' usage of culturally relevant pedagogy and are displayed in **Figure 2**. Terms from Standards Used in GoReact, which shows the three standards (CAEP, InTASC, and VDOE), are presented in relation to terms in GoReact.

8.1 Standards and cultural relevance

The first priority of the study is to examine the three standards and concept alignment and then the recognition of cultural relevance as an examination in usage: cost, safety, of information, access, adaptability, and sustainability.

1. Equity is not equality. Equity introduced an interesting finding within the correlation between rules and fairness. Teacher candidate comments represented equality rather than equity. Teacher candidates made statements such as follow the rules. Although, rules imply fairness in its application; however, students of color have not consistently experienced fair and equal applications of rules. *E pluribus unum*, out of one many is one is the antithesis to equity. The word “rule, rules” was found at a rate of 2.1%, while equity was used at a rate less than 1%. When equity is the goal, the following rules may not be the best approach to ensure every student receives resources and support needed for success.
2. Interdependent Global Society as found in the GoReact text correlated with the terms such as real-world or global connections. Although the percentage rate was low for this term, it was an indicator that teacher candidates made efforts to connect lessons to international events and experiences. Most importantly, as more corporations realize that diversity and inclusion yield greater productivity and performance outcomes, teacher candidates are integrating life lessons on diversity and inclusion.
3. Content, although a specific icon in GoReact, and as described by the CAEP and InTASC standards, revealed the lowest percentage rate. Content was only searched through the Cultural Relevance icon, not the Knowledge Content icon. The references for this description within the narratives were used minimally, at

a rate of approximately 4% were terms referenced as content, content application, content knowledge, critical thinking, or skills building.

4. Responsive learning challenges teacher candidates to evaluate their behaviors and actions.
5. Value cultural differences were distinctively made in the comments teacher candidates made such as the gesture that suggested satisfactory with a “Shaky thumb.” This illustrates the intuitiveness of teacher candidates to be inclusive of body language as well as gestures which may have different meanings depending on location.
6. Cultural references (racism, sexism, gender, religion, immigrant, abilities, and/or socioeconomic status) were made to describe identities of geographic, language, and sex orientations.
7. Community relevance was consistently referenced by teacher candidates in the GoReact. Teacher candidates used terms such as: community, society, relationship, related, and multicultural. These terms were most frequently used to describe community relevance.

The three standards have overlapping terms as found in the descriptions of each standard; yet there are distinctive descriptions among the three standards CAEP, InTASC, and VDOE.

The common terms as written per standards are equity and inclusion, which are found within the descriptions of each standard, although equity is an embedded concept of InTASC. There were also common concepts found within the GoReact text provided by both teacher candidates and supervisors. One hundred eighty-eight statements were reviewed from the GoReact text. These terms were extrapolated from the text with direct reference to the three educational standards: CAEP, InTASC, and VDOE.

8.2 VAS alignment with how teacher candidates learn

GoReact aligns with how people learn particularly with content learned in classrooms. Teacher candidates’ average scores from the GoReact Rubric were Proficient as were the scores on the single category of Culturally Relevant. Over the 4 years, 2020 showed the best rating for Distinguished, earning a rating of 130%. During the same year in the category of Proficient, the rating was 86%, and there was an increase in this category in 2022, 165%. In the category of Emerging, teacher candidates demonstrated an ability to work closely with students but were not able to demonstrate culturally relevant lessons. Over the 4-year period, only 8% of the teacher candidates scored Unsatisfactory. The overall scores on the GoReact Rubric correlate with the single category of Culturally Relevant, with both scores indicating Proficient performance (see **Table 3**).

Teacher candidates’ performance from the rubric was consistent with the overall GoReact Evaluation and the GoReact Culturally Relevant Evaluation. Teacher candidates rated Proficient on the GoReact Rubric. The reflective statements by teacher candidates, such as respect for students’ culture, help the way they learn content suggest an awareness of the importance of aligning content with learning.

GoReact Rubric				
Culturally Relevant Icon Rating				
Distinguished 4 points Lesson fosters an inclusive environment planned with individual differences and community relevance. Lesson allows students to demonstrate diverse ways of learning.	Proficient 3 points Lesson is planned for individual differences that include multiple cultural components. Lesson is able to relate to personal or community concepts.	Emerging 2 points Lesson allows for working closely with students but is unable to address diversity in instruction with whole or small group. Lesson allows for cultural demonstration but is unable to demonstrate diverse cultural perspectives.	Unsatisfactory 1 point Lesson does not address individual differences nor includes multicultural perspectives. Lesson does not address diverse needs.	Dates
30%	47%	17%	0	2019
130%	86%	39%	0	2020
47%	78%	39%	0	2021
60%	165%	56%	8%	2022

Table 3.
GoReact rubric.

8.3 The educational quality of the technology

There were 188 entries in which teacher candidates and supervisors made responses beyond simply clicking an icon by offering an explanation. There were other icon clicks that were not included in the count, but it was Culturally Relevant that addresses the educational standards to include ethics. The annotated digital operations in GoReact allowed teacher candidates to move through each icon function with simplicity, ease, and accuracy.

8.4 The educational value of the technology

The cost and benefits are consistent with accessibility of teacher candidates. There is not any cost to the students to download and use the software, nor is there a cost to the site or university supervisors. The process to record is simple and the icons are not complicated with clear and a click to navigate through the process. Teacher candidates complete recording responses without time restrictions and they have a choice to write a response or not. Teacher candidates as well as site and university supervisors received training prior to the application of GoReact.

9. Implications and concluding thoughts

The findings implicate the value of VAS in developing cultural relevance and ethics in education during student teaching for teacher candidates in an educational preparation program at a HBCU. Equity, ethics, and cultural relevance are key to any

technology use for teacher candidates in an educational preparation program. However, there are limitations in the current report of findings. First, the responses from the teacher candidate category were limited in number, meaning equivalent to a sample size. As more responses from teacher candidates concerning cultural relevant education are collected in GoReact, more research is needed to prove the need for cultural relevance across the board in educational preparation programs. Second, the findings are localized to a top 20 HBCU in Virginia and cannot necessarily be generalized to other HBCUs or other colleges and universities. In other collegiate settings, the findings may yield varied results. Finally, the findings were influenced by the curriculum design of the top 20 HBCUs' educational preparation programs with multiculturalism and ethics being implied. The findings can only be comparable to other college and universities if their educational preparation program's curriculum aligns or is similar in design. Only then can these findings be considered as a resource for program curriculum necessary for teacher candidates in an educational preparation program.

The findings suggest that students are engaged in software that is interactive, evaluative and provides for self-reflection. Most importantly, teacher candidate engagement with GoReact suggests their usage and good performance rates, which is contrary to Doug Lederman's findings. Doug Lederman [24] argues with some reservations of the Duha T. Altindag study that online technology does not improve student performance nor engagement. Additionally, GoReact provides teacher candidates with resource limitations an opportunity to complete course requirements without regard to finances and transportation difficulties. Thus, accessibilities and finances are challenging issues for marginalized groups with those concerns. GoReact is an inclusive software in which inclusion and culturally relevant pedagogy are fundamental to its design. Thus, the added benefits of GoReact rebuke notions of poor student performance in relation to online learning. GoReact provided students with convenience and access, interactive support from site and university supervisors, and the opportunity to self-reflection.

10. Conclusions

This chapter covers the application of a digital tool used in student teaching with teacher education candidates in an educational preparation program at a top 20 HBCU. The HBCU chose the digital tool of video annotation software (VAS) program that permits its users to provide feedback from cooperating teachers, university supervisors, and other students on a digital platform to student teachers. GoReact (VAS) program used in the educational preparation program allowed for the monitoring of responses as related to cultural relevance and ethics. The findings showed that teacher candidates recognized cultural relevance as related to the National Standards of Council for the Accreditation of Educator Preparation (CAEP) and the Interstate New Teacher Assessment and Support Consortium (InTASC) as well as those provided by the State of Virginia Department of Education (VDOE). As cultural relevance in education is acknowledged by the teacher candidates as well as the educational preparation program, that cultural relevance sponsors encompassing ethical aspirations. The findings also showed that the VAS program of GoReact aligns with how the teacher candidates learn and educational quality of the technology is of value. While the findings were empirical, they also showed noted limitations that included the number of responses, localization, and curriculum variation. The

findings supported that the educational preparation program saw students engaging in software that is interactive, evaluative, accessible, and convenient as long as cooperating teachers onsite and university supervisors collaborated with students and used the platform for feedback as for opportunity to teacher candidate self-reflection. This use of GoReact in a student teaching experience opens countless opportunities for the future of teacher candidates as they embark on a career in education.

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Teachers' Ethical Professional Practices in Higher Education Institutions: An Instrumental Case Study

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Abstract

The purpose of this study was to explore teachers' ethical professional practices in the College of Education and Behavioral Sciences in Haramaya University. Instrumental case study design was employed because such design is used when the researcher focuses on one case to understand other similar cases. Fifteen, information-rich study participants were selected purposively. In-depth interviews, FGD, and document analyses were used for collecting data. Data were analyzed thematically. The study revealed that ethical professional practices of teachers are important for upholding respect and prestige in the teaching profession. Despite this, however, the ethical professional practices in the College were deteriorating and deserve attention. The study showed particularly that many unethical professional practices of teachers were exhibited in the college such as lack of transparency in relation to the assessment of students' achievements, coming late and absence from class, threatening students for the teacher's own fault, lack of communication with students, and ignoring students' problems. It is concluded that the status of ethical professional practices in the College deserves close attention. It is recommended that there should be close supervision, professional support, and training on ethical professional practice by the College and other concerned entities of the university.

Keywords: ethics, teachers' professional practice, case study, higher education institution, duties and responsibilities of teachers

1. Introduction

1.1 Background of the study

Ethical professional practice in teaching is about professionalism, responsibility, justice, equity, ensuring a healthy and safe environment for students, avoiding corruption, honesty-truthfulness and trust, impartiality, professional commitment, continuous improvement, respect, and the effective use of resources [1]. Moral questions of good or bad in human behavior have been posed since ancient times [2]. There is a growing interest in the past two decades on the moral essence of teaching and ethical

professionalism by researchers such as David Carr, Gary Fenstermacher, David Hansen, Philip Jackson, Robert Nash, Hugh Sockett, Jonas Soltis, Kenneth Strike, and Alan Tom. Moreover, in many studies, it is emphasized that teachers should be given ethical education before their employment and assigned to provide services to students and other people. It is accepted that ethical education is important for ethical attitudes, behavior, and decisions.

Yildirim and Simsek [3] state that teachers should have the ethical knowledge and skills required by their profession. According to Campbell [4], the moral and ethical principles that teachers undertake in the way they interact with their students and other people, and in the handling of their professional responsibilities form the basis for one aspect of their moral institution. Teachers have the obligation to comply with a set of principles that define professional behavior after getting involved in the profession. These principles are reflected in the codes of ethics that serve as the standards of professional conduct and practice procedures set out for the education profession and the public [5]. Ensuring the physical and emotional safety of students constitutes one of the prime ethical responsibilities of teachers [6].

Unlike the aforementioned studies, there are studies that draw attention to unethical behaviors in the relationship between teachers and other stakeholders. For instance, in the findings of a study by Yıldırım et al. [7] students revealed that their teachers display negative behaviors, including physical and psychological violence, communication barriers, and injustice. Similarly, the study carried out by Dilekmen [8] found that teachers exhibit undesirable behaviors in the classroom environment. Furthermore, a study conducted by Çetin and Demirkasimoglu [9] indicated that the unethical behaviors of teachers include harassment, and physical and psychological violence against students.

Teachers' ought to show respect and common courtesy for students both during interpersonal interactions and in responding promptly to students' need for guidance and feedback. Caetano and Silva [10] explained in their finding that ethical dimensions are important in our education system and are specified in several legislative documents, not only in relation to students and teachers but also in terms of their significance for professional performance. John [11] claims that teachers as professionals are responsible in one of the most ethically demanding jobs, to provide education to the young generation.

According to the Connecticut Code of Professional Responsibility for Teachers Connecticut State Department of Education [12], there are three types of responsibilities bestowed on teachers: responsibility to the student, to the profession, and to the community. Moreover, the Ontario College of Teacher's Ethical Professional Standards Ontario College of Teachers [13] for the teaching profession aims to inspire members to reflect and uphold the honor and dignity of the teaching profession, identify the ethical responsibilities and commitments in the teaching profession, and promote public trust and confidence in the teaching profession. Accordingly, there are four main professional ethical standards in teaching. Care: members express their commitment to students' well-being and learning through positive influence, professional judgment, and empathy in practice; Respect: members honor human dignity emotional wellness and cognitive development. Trust: members' professional relationships with students, colleagues, parents, guardians, and the public are based on trust. Integrity: continual reflection assists members in exercising integrity in their professional commitments and responsibilities.

According to the Ethiopian Ministry of Education [14], there are three domains of teaching with their standards and performance indicators. These are professional

knowledge, professional practice, and professional engagement. Professional knowledge includes knowing the students and how they learn as its standard. Professional practice consists of planning for and implementing effective teaching-learning, creating and maintaining supportive and safe learning environments, and assessing and providing and reporting on student learning. Professional engagement incorporates standards, such as engagement in professional learning, and collaborating professionally with colleagues, parents/caregivers, and the community. With respect to this, the Education and Training Policy [15] of Ethiopia, under paragraphs 3.4.3. and 3.4.6., states that teacher education and teaching components will emphasize basic knowledge, professional codes of ethics, methodology, and practical training. Moreover, it states that the criterion for professional development of teachers is based on continuous education and training on professional ethics and teaching performance.

The Senate legislation of Haramaya University [16] outlines duties and responsibilities expected from an academic staff of the university. These include preparing graduates who are competent in terms of knowledge and skills (38.3.2), refraining from discrimination against any individual or group on the basis of race, ethnicity, sex or creed, and religion (38.3.6), consulting and advising students (38.3.15), carrying out required tasks in an effective and efficient manner (38.3.24), informing students well in advance if and when he/she cannot be available for teaching (38.3.26), conducting class regularly without missing except for majeure reasons (38.3.27), avoiding acts and situations that are intimidating to students (38.3.29), and arranging make up for all missed classes due to involvement in other work (38.3.33).

The researchers were convinced to study the issue of teachers' ethical professional practices in the College of Education and Behavioral Sciences because despite all the aforementioned ethical standards specified in the guideline of the Ministry of Education, the Ethiopian Education and Training Policy, and the Senate Legislation of Haramaya University, there are reports of unethical professional practices and the inability of teachers to accomplish duties and obligations to the required level. There are exemplified by complaints lodged by students against their teachers. Moreover, teachers' behaviors were not evaluated. In addition, there is paucity of research studies conducted on ethical professional practices of teachers in the university that initiated me to carry out this study. The purpose of this study was to explore teachers' ethical professional practices and pinpoint the status of teaching profession in College of Education and Behavioral Science. Based on this, the following basic research questions were posed.

1. How do teachers explain the significance of ethical professional practices?
2. How do teachers put into practice their professional duties and responsibilities?
3. What are the major complaints lodged by the students related to teachers' unethical professional practices?
4. What are the possible mechanisms for upholding teachers' ethical practice?

1.2 Theoretical framework

The study is based on Piquemal [17] ethical framework that fits well to the ethical standards of professional teaching. According to this theoretical framework, there are

four underlying principles in the teaching profession. These are a commitment to difference or to the “relational other” [18]; respect for persons [19]; commitment to the reciprocity [20]; and a sense of care [21]. Through understanding the commitment to differences, teachers recognize their students’ irreducible otherness and develop a classroom environment that students could truly be who they are. Respect is crucial in teacher-student relationship. It should be mutual. The real respect generates from dedication to the profession and to their work [19]. Buber [20] suggests that teacher-student relationships ought to be characterized by a principle of reciprocity. Teaching academically is a primary responsibility of a teacher. Students’ well-being need be developed in a caring environment and guided by caring teachers. Noddings [21] states learning can be a lot more effective in caring environment. Sometimes, students’ affective needs require more attention than academic needs.

2. Research design

2.1 Description of the study area

The study was carried out in the College of Education and Behavioral Sciences, at Haramaya University, Ethiopia. In the college, there are four departments, namely the Department of Psychology, the Department of Educational Planning and Management, the Department of Special Needs and Inclusive Education, and the Department of Adult Education and Community Development. The study involved teachers, students, department heads, and the Academic Council (AC) of the college with a population of 4 department heads, 70 teachers, 1105 second- and third-year students, and 11 academic council members.

2.2 Research design

For this study, instrumental case study design was employed because such kind of design is used when the researcher focuses on one case to understand another similar case. It is used to accomplish something other than understanding a particular situation and it plays a supportive role, facilitating our understanding of something else [22].

2.3 Sources of data

Both primary and secondary sources of data were used in the study.

2.3.1 Primary sources of data

The primary sources of data were members of the college Academic Council and Department Council (DC), teachers, and second- and third-year undergraduate students in the college.

2.3.2 Secondary sources of data

The secondary sources of data were AC and DC minutes in the college and the departments, and the document from Quality Assurance Directorate Office on the teaching-learning performance in the college.

2.4 Sample and sampling technique

In this study, six students were selected for the focus group discussion, and four teachers and four department heads were selected for the in-depth interview purposively. Lodging complaints to the department was used as criteria for selecting the students. Department heads were included into the study because they were the ones who handle complaints against teachers brought to their respective departments, and members of Academic Council were included because complaints were seen for further deliberation and decisions at this stage. In this study, purposive sampling technique was employed for the reason that this sampling design enables the researchers to get information-rich study participants (**Table 1**) [23].

No.	Source of data	Target population	Sample size	Sampling technique
1	AC	11	1	Purposive
2	DC	4	4	Purposive
3	Teachers	70	4	Purposive
4	Students	1105	6	Purposive

Table 1.
Sample and sampling technique.

2.5 Instruments of data collection

In-depth interview, focus group discussion, and documents analysis were used to collect data. An in-depth interview was employed because it enables to explore in-depth a respondent's point of view, experiences, feelings, and detailed personal information [24]. Document analysis was carried out because it was used as a means of triangulation to provide a confluence of evidence that breeds credibility [25]. Focus group discussion was employed because it helps to probe deeper into certain things have or not have occurred, and to explore unanticipated issues [26].

2.6 Method of data analysis

The analysis of data was carried out as follows. First, transcriptions of data collected through in-depth interview and focus group discussion were read and re-read several times. Then, data were coded and categorized into their similarities, and eventually, themes were formed, and finally, thick description of the data was done.

3. Results and discussion

The role of a teacher nowadays is no longer the same as it was before. At school, teachers are challenged academically, professionally, and ethically. Today, their duty is not only transferring knowledge to students, but they also have to behave extremely professional to avoid unethical practices. Teachers need to behave as professional teachers, rather than as ordinary individual. There are ethical standards for teaching profession. The ethical standards for teachers, based on a set of principles, detail the ethical responsibilities and serve to guide ethical problems. Teaching profession has ethical standards such as responsibility to the student, responsibility to the profession,

and responsibility to the community. The major themes and sub-themes of the study are presented in **Table 2**.

3.1 Professional ethics in teaching

The study revealed that ethical professional practices of teachers have several significances. As the study indicated, it enables teachers to become model for their students, it enhances teachers to respect and like their profession, and it makes them become disciplined in their day-to-day activities. During the interview, one of the informants from the department heads described the importance of ethical professional practice for teachers as follows:

The advantages of ethical professional practice for a teacher extend beyond the classroom teaching learning process. In the classroom, during the teaching learning process, a teacher applies ethical professional practices in that it enables him/her to recognize students' learning differences, to become aware of students' diversity in the classroom, to become aware of what to teach and how to teach and to come prepared for the classroom instruction, and at outside of the classroom, the teacher is initiated to provide advice and counseling for his/her students. (D2).

The finding supports the study of Campbell [4] that states the moral and ethical principles that teachers undertake in the way they interact with their students and other people, and in the handling of their professional responsibilities form the basis of their moral institution.

The study also found that ethical professional practice has some other importance for teachers. These include it makes teachers have good communication with their students, it forces teachers to manage the classroom teaching-learning

No	Major themes	Sub-themes
1	Professional ethics in teaching	1.1. Professional principles 1.2. Advantages of ethical practices
2	Ethical and professional standards in teaching	2.1. Ethical principles in teaching 2.2. Domains in teaching
3	Duties and responsibilities of teachers	3.1. Dedication in teaching 3.2. Openness in teaching 3.3. Good student-teacher relation
4	Unethical practices in teaching profession	4.1. Improper assessment and grading 4.2. Misconducts in teaching 4.3. Threatening students
5	Mismanaged classroom instruction	5.1. Wastage of time in teaching 5.2. Improper classroom instruction
6	Enhancing ethical professional practices	6.1. Training of ethical profession 6.1. Experience sharing in teaching

Table 2.
Major themes and sub-themes of the study.

process in a disciplined manner, and it enables them to deliver good knowledge and skills to their students. It also makes them become aware of diversity in the classroom and respect differences and enforces them to make close communication with students, understand students' problems, and arouse them to provide advice and counseling for their students. They also become committed and honest to their responsibility and students' learning. One of the students in the focus group discussion said: "*Ethical professional practice enforces teachers to get punctual for classes and to teach us in responsible way, and not to intimidate us.*" This finding supports the study by Board of Teacher Registration in Queensland [27] that states one of teaching ethical standards is responsibility to students to make the foremost responsibility to the education and welfare of all students in care, and respect the uniqueness and dignity of each student.

This study also revealed that there are teachers who do not care and pay little attention to their ethical professional practices. They lacked awareness about ethical professional practice, and they were less honest, little dedicated to their profession, and were careless about the students' learning. They became absent from classroom instruction without informing students. Moreover, they did not do proper assessment of their students' work and did not consider diversities among students. One of the informants from the department heads in the interview stated the following:

Teacher's ethical professional practices are known only in theory in our college. There are teachers who never consider that they are teachers. They do not provide any feedback to their students, they give exaggerated grade to students without teaching them properly, and they are not transparent to their students and have less or no communication with students. (D1).

This finding coincides with the study of Staratt [28], which indicated that there has been a significant increase in the deterioration of ethical behaviors in recent years both at home and in public institutions, including educational institutions.

The study also indicated that there were teachers who did not consider the existence of differences in ethnicity, learning style, economic and social background, religious, and cultural differences of students in the classroom. Concerning diversity among students in the classroom, one of the informants in focus group discussion revealed the following: "*Students in a classroom have different names based on their culture. There are teachers who ask our names, and who ask the meaning of that name and laugh at us in front of our classmates, and as a result, we become irritated although we do not do anything. This is not considering students' differences in culture.*" (S5).

3.2 Duties and responsibilities of teachers

The Senate Legislation of Haramaya University [16] stipulates under Articles 38.3.10, 38.3.15, 38.3.29, 38.3.33, 38.3.20, and 38.3.26 duties and responsibilities of teachers. Although the Senate legislation suggests training on duties and responsibilities of teachers, the study showed that there was no training and awareness given for teachers in relation to ethical professional practices at the college level. One of the department heads puts his opinion about the training of teachers on ethical professional practices as: "*I think teachers got ethical professional awareness when they attended induction training organized by Higher Diploma Program at the university training center and no other training was provided for teachers.*" (D1) In addition to this, the study revealed that no classroom supervision was carried out by the department heads. However, the study indicated, the department heads used an indirect method of getting information about

teachers' ethical professional practices from students' representatives. This contrasts with Article 85.3.1. of the Senate legislation of Haramaya University, which states that one of the duties of the department head is to properly direct the teaching-learning process of the department.

The study discloses that there were teachers who accomplished their duties and responsibilities properly. They were punctual, knew how to assess and provide timely feedback to students, accomplished the teaching-learning processes appropriately, and help students to solve their problems. Contrary to this, the study also disclosed there were teachers who were not punctual for class, who even did not know that they have class unless they were told by their students. During the interview with teachers, one of the informants among teachers described his opinion as follows: *"There are teachers who do not accomplish their duties properly. They go to class after 30 minutes of the starting teaching-learning process. Then, if students go back to their dormitory after 30', they come back to office."*(T3) However, the finding of Ontario College of Teachers Professional Standards Ontario College of Teachers [13] states teachers' commitment to students' well-being and learning through positive influence, professional judgment, and empathy in practice.

In the focus group discussion, one student stated her view as follows:

Some teachers know their duties. But there are teachers who do not come to class unless called by students from their office. Some other teachers come very late and when students go back to dormitory, he/she comes, and during the next period, he/she threatens students for his/her own faults. She further stated that there are teachers who come to class without preparation and such teachers ask students what they taught before. (S1).

3.3 Unethical practices of teachers in teaching profession

According to Noddings [21], learning can be a lot more effective in a caring environment. Sometimes, affective needs require more attention than academic needs. Students' well-being includes every aspect. Contrary to this, there are unethical conducts in teaching such as having inappropriate relations with students, failing to perform duties, invading students' privacy, engaging students in unethical behavior, improper grading, partiality, and lack of fairness. Based on this concept, the findings of this subtitle were presented as follows.

The study revealed that there were teachers who did their work ethically and professionally. On the opposite, there were also teachers who were unethical in their practices. According to the findings, the unethical practices of teachers included inappropriate assessment practices of students' work, improper grading, lack of timely feedback on students' assessment, and threatening students by their grades. One of the department heads during the interview expressed:

There are teachers who do not teach the course to which he/she is assigned, but who give exaggerated grade for students. These teachers do not tell students' achievements openly and in transparent way and as a result, complaints raised against them by the students. They call students into their office show them their grades secretly. When a student raises complaint against him/her in the office, he/she adds mark and change the grade that the student should not have been given. (D4).

This study finding concurs with the findings of Çetin and Demirkasimoglu [9] that indicated the unethical behaviors of teachers, which state harassment, physical and psychological violence made against students.

No	Month	Dates	No of courses not conducted and wastage in time	
1	May	May 2/2022–30/2022	51	51 hours
2	April	April 11/2022–29/2022	22	22 hours

Table 3.
Courses not delivered and time wastage.

Moreover, the study indicated there were also unethical practices of teachers, including inappropriate relations with students, harassment, unfairness in assessment practices, practice of discrimination among students, and intimidation. This finding asserted the study finding by Dilekmen [8], which revealed that teachers exhibit undesirable behaviors in the classroom environment.

One of the students in the informant group expressed his opinion during the focus group discussion as follows:

Some teachers practice their duties in an unfair way. They tell exam answers before the administration of that exam. Some provide the same exam items that students took last year. Some others simply give exaggerated grade for fearing students' complaints because such teachers do not deliver the course in an appropriate way. (S6).

This practice contradicts the Senate Legislation of Haramaya University [16], Article 38.3.2, which states that one of the duties and responsibilities of a teacher is to refrain himself/herself from any act of discrimination against any individual or group on the basis of ethnicity, sex, creed, race, economic status, age, physical conditions, disability.

In addition to this, document analysis was carried out at the Office of Quality Assurance Directorate to scrutinize time wasted in relation to the classroom teaching-learning process, and the result is indicated in **Table 3**.

As can be seen from **Table 3** above, in a period of only two months, there were 73 hours of time wastage that should have been used in the teaching-learning process in the College of Education and Behavioral Sciences due to different reasons, which was one of the sources of complaints of students against their teachers.

3.4 Enhancing ethical practices in teaching

The study revealed that there are different methods to enhance ethical professional practices. These include providing training for teachers on ethical professional practices and creating awareness of ethical professional practices, creating environment for teachers to do peer observation, and providing professional experience to each other. Moreover, there should be a commitment from teachers to improve their professional practices both ethically and professionally.

4. Conclusion and recommendations

4.1 Conclusion

Ethical professional practice has tremendous significance for organizations like educational institutions that deal with students. Through ethical professional practice,

teachers become models for their students in their day-to-day activities. Teachers recognize students' learning differences and their diversity in the classroom. Teachers respect their profession and increase their commitment to their work. Moreover, ethical professional practice also has an influence on local community. Therefore, from this, it is possible to conclude that ethical professional practices extend to the extent that it encourages teachers and maximizes teaching profession to get respect and prestige.

Teachers have many duties and responsibilities such as responsibility to their students, responsibility to their profession, and responsibility to their local community. However, there are some teachers who do not accomplish their duties and responsibilities to the level expected. This is due to lack of training and awareness of teachers' ethical professional practices. On the other hand, there are teachers who accomplish their professional duties and responsibilities to the level expected of them. Therefore, it is possible to conclude that there are teachers who practice their duties and responsibilities recklessly on one hand, and on the other hand, there are teachers who respect and accomplish their professional duties and responsibilities in careful manner.

This study also disclosed that there are unethical practices of some teachers in the College of Education and Behavioral Sciences that become the cause for complaints lodged by the students. The major complaints lodged by the students include lack of getting proper classroom instruction due to absence of teacher from class, inappropriate assessment of students' work, lack of transparency of the teacher for their students and improper grading of students' work, lack of providing timely feedback of students' assessment, and threatening students by grade point when students ask their rights. Therefore, it is possible to conclude that there are inappropriate practices of some teachers that become the source of complaints by the students.

Last but not least, from the results of the finding, it is possible to conclude that providing training for teachers on ethical professional practices is essential to minimize and gradually avoid students' complaints.

4.2 Recommendations

Ethical professional practice is very important to enhance the status of teaching-learning process and for upholding the status and prestige of teaching profession in College of Education and Behavioral Sciences. Therefore, College of Education and Behavioral Sciences shall provide trainings for teachers on ethical professional practices and their related standards.

Supervision and follow-up are important to improve the limitations that a teacher has. It is professional support. Therefore, the heads of each department shall provide professional support through supervision for teachers by observing classroom teaching-learning process provided by teachers and other professional activities that teachers accomplish in relation to their profession.

Peer and students' evaluation of their teachers is also a means by which teachers can improve their professional practices. Therefore, teachers in the College of Education and Behavioral Sciences shall practice proper peer evaluation practices and the heads of each department should enforce students to evaluate their teachers correctly about their professional practices so that they can reveal their limitations and work on it to improve their weaknesses.

Appendix

Interview Guide for Teachers in the College of Education and Behavioral Sciences

The purpose of this interview guide is to get information regarding teachers' work ethics and ethical professional practices towards their students. Your reliable responses are highly important for the success of the research. You are cordially requested to supply your genuine responses.

I. Demographic characteristics of the respondent

- a. Sex: _____
- b. Department: _____
- c. Educational qualification: _____
- d. Years of experience in teaching profession: _____
- e. Subject you teach: _____

II. Interview questions

1. How do teachers explain the importance of ethical professional practices?
 - How do you explain your duties and responsibilities of teaching and learning?
 - How much do you explain your honesty and dedication to the teaching profession?
 - Tell me how much do you care for students' learning.
2. How do teachers put their professional duties and responsibilities into practice?
 - How much are you punctual in classroom teaching learning process?
 - How well are you prepared and come to the classroom for the teaching-learning process?
 - Tell me about the techniques you use and rules that you follow in assessing students?
 - Tell me how you provide feedback to your students based on assessments.

3. What are the unethical professional practices of teachers that caused complaints against them?

- How do you maintain fairness in assessing students?
- How do you explain your transparency in disclosing student assessment results openly?
- Have you ever held accountable for unethical professional practices?

4. What are the possible mechanisms for minimizing students' complaints against their teachers?

Thank you in advance for your cooperation!

Focus Group Discussion Guide for Students in the College of Education and Behavioral Science

The purpose of this Focus Group Discussion is to get information regarding teachers' work ethics and ethical professional practices towards students in the College of Education and Behavioral Sciences. Your reliable responses are very important for the success of the research. You are cordially requested to provide you genuine responses.

I. Demographic characteristics of the respondents:

- a. Sex: _____
- b. Age: _____
- c. Year: _____

II. Questions for Focus Group Discussion

1. How do you explain the significance of ethical professional practices of teachers?

- How much do teachers committed to fulfill the needs of the students to learn?
- How often are teachers demonstrating respect for students' diversity?
- How transparent are teachers about students' assessment results?
- How fair are teachers to their students in their duties and responsibilities?

2. In your opinion, how much do teachers put their professional duties and responsibilities into practice?

- How often do teachers get punctually into classroom to teach students?

- How well are teachers prepared and come to the classroom for the teaching-learning process?
- How appropriate are teachers in applying proper assessment methods as per the rules?
- How often do teachers provide timely feedback for students about their assessments?

3. In your opinion, what are the unethical professional practices of teachers that caused complaints against them?

- How much fair are teachers in using appropriate assessments methods to assess students?
- How much transparent are teachers in disclosing students' assessment results openly?
- How ethical are teachers' relationship with their students?

4. In your opinion, what possible solutions do you forward to minimize complaints between teachers and students?

Thank you in advance for your cooperation!

Interview guide for Members of the Department Council in the College of Education and Behavioral Sciences

The purpose of this interview guide is to get information regarding teachers' work ethics and ethical professional practices towards their students. Your reliable responses are highly important for the success of the research. You are cordially requested to supply your genuine responses.

I. Demographic characteristics of the respondent

- a. Sex: _____
- b. Educational qualification: _____
- c. Years of experience in teaching profession: _____
- d. Year of service in the current position _____

II. Interview questions

1. How do you explain the importance of ethical professional practices of teachers?

- How much do teachers well aware of their ethical professional duties and responsibilities?

- How much are teachers honest and dedicated to their profession?
 - How often do teachers care for students learning?
2. How often do you provide awareness on ethical professional practices for your department teachers?
- How often do you practice supervisory work on teaching learning processes?
 - How much do you provide professional help for teachers?
 - How often do you provide training for teachers concerning their professional duties and responsibilities?
3. What are the major unethical professional practices of teachers that caused complaints against them?
- How often do teachers get punctually into classroom to teach students?
 - How well are teachers prepared and come to class for the teaching-learning process?
 - How often do teachers provide timely feedback for students about their assessments?
4. What are the possible mechanisms for minimizing students' complaints against their teachers?

Thank you in advance for your cooperation!

Interview Guide for AC Member(s) of the College of Education and Behavioral Sciences

The purpose of this interview guide is to get information regarding teachers' ethical professional practices towards their students. Your reliable responses are highly important for the success of the research. You are cordially requested to supply your genuine responses.

1. How do you explain the significance of ethical professional practices?
2. What are the duties and responsibilities of AC to enhance teachers' ethical professional practices?
3. How often do you provide awareness for teachers on ethical professional practices?
4. What mechanisms are there that the AC use to attend the ethical professional practices of teachers?

5. What complaints lodges by the students related to unethical professional practices of teachers?
6. What are the possible mechanisms for minimizing students' complaints against their teachers?

Thank you in advance for your cooperation!

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The Influence of Undergraduate Preparation on Professional Beginnings in School Practice of Novice Teachers

Ina Rajsiglová and Kateřina Mihulová

Abstract

The aim of the chapter is to present how the monitored beginning teachers perceive the influence of undergraduate training on their first years of teaching and what possibilities can be traced based on this to improve the quality of the undergraduate training of future teachers. Thirteen beginning biology teachers with experience ranging from 1 to 5 years were followed. For data triangulation, an elementary school teacher with a completed sixth year in practice without approval with biology and student teachers as part of the focus group were interviewed additionally. Data were obtained through in-depth semi-structured interviews and were analysed using grounded theory. The results show that teaching practices are considered the most valuable component of undergraduate training preparing for a future profession; however, pedagogical practices are included late in undergraduate training and therefore cannot effectively help reduce the “theory-practice” gap in teacher education. Linked to this is the proposal to experience university teaching, for example, through micro-teaching or discussions of real school situations. Thus, they can help to meet the needs of beginning teachers with different experiences, and by mitigating the shock of practice, accelerate the professional teacher development, as was graphically represented by means of intersecting triangles.

Keywords: novice teachers, undergraduate training, professional development of (future), “theory-practice” gap, evaluation of undergraduate training, school reality

1. Introduction

Beginnings in a new job are challenging for all professions, and the teaching profession is no different. A beginning teacher enters his new job with certain ideas and expectations. He has plans, goals and dream goals that he would like to achieve. However, it is not always possible to fulfil them, which novice teachers perceive as a difficulty. The nature of difficulties can be different, just as their causes are different. Although the causes of difficulties cannot always be clearly identified, it is possible to

divide them into two main categories. According to Johnson et al. [1], the first of them can be classified as inappropriate or insufficient support from the management and staff of the school. The second category includes undergraduate training that does not provide novice teachers with all the necessary skills, see, for example, Jensen et al. [2], which gives rise to distorted ideas about the functioning of the school; this can lead to reality shock and dropping out of school [1, 3]. This text discusses the second category of causes.

The topic of novice teachers is widely discussed in the literature (e.g. [4–7]); however, in the context of a certain rate of departure of (not only) novice teachers to other professional spheres, we consider research in this area still relevant. This study therefore addresses the question of how well novice teachers are prepared to manage teaching in the context of undergraduate training. Our goal is to reveal and explore those places of undergraduate training that show problematic aspects, and at the same time to present proposals of novice teachers to support such undergraduate training that allows novice teachers to more smoothly influence and integrate with the school reality.

2. Theoretical background

2.1 The novice teacher in the context of professional development and the difficulties associated with it

The period when a teacher is considered a novice is not precisely defined and may vary among individuals due to different factors influencing their professional development [8–11]. The period from 1 to 5 years is commonly mentioned in the literature, when, according to Feiman-Nemser [12], novice teachers try to achieve the required professional competence during the first 3 to 4 years. In addition, beginning teachers are most vulnerable to practice shock in their first 3 years [13], which typically manifests as emotional strain. For these reasons, novice teachers are more at risk of leaving the school area throughout this 5-year period than in subsequent years [14]. It is for this reason that it is necessary to understand the problems that novice teachers face in order to make the transition to school practice more effective through undergraduate training [15, 16].

Many studies [16–26] indicate that the majority of novice teachers do not feel fully prepared for their profession, and their statements show that the causes of unpreparedness can be found in all components of undergraduate training: didactic, pedagogical-psychological and pedagogical practices, but least of all in terms of professional expertise.

The last statement is based on the work of Rajsiglová and Příbylová [10], which resulted in the creation of a theory, graphically represented through a dynamic scheme of the tetrahedron model (see **Figure 1**). Based on the results, the authors defined three groups of novice teachers. The respondents in the groups were united by a common view of the evaluation of undergraduate training. The groups then differed in how they coped with teaching after entering practice. Novice teachers who encountered a lack of discipline in their pupils, which they were unable to resolve optimally, developed a feeling of failure and subsequently assessed undergraduate preparation, in relation to the pedagogic-psychological component (**Figure 1-I**), negatively. For this reason, the corners of the tetrahedron representing the pedagogical-psychological component of training were accented upwards within the terms of the

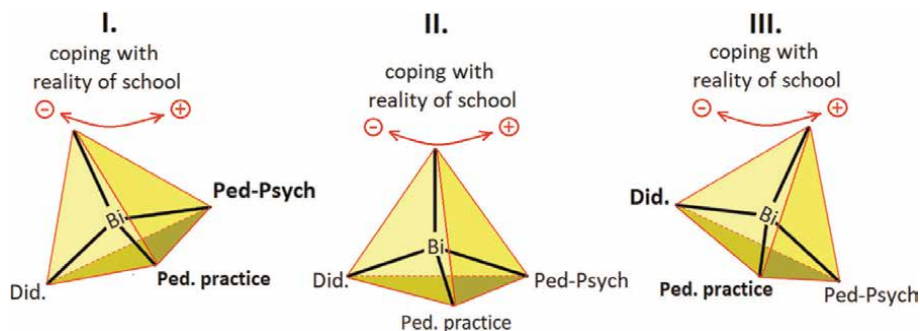


Figure 1. Evaluation of undergraduate education components by novice teachers –tetrahedral visualisation. Did. – Didactic training of biology, Ped. Practice – Pedagogical practice, Ped-psych – Pedagogical-psychological training.

tetrahedron’s graphic appearance. This indicated the novice teachers’ increased attention and criticism of this component of undergraduate preparation. Gradually, as the novice teacher improved in managing the pupils’ lack of discipline, the teacher’s opinion of his ability to cope with the reality of school shifted to more positive values. As a result, the opposite side of the tetrahedron representing the didactic component of preparation rose, and the attention was focused on this point at this time (Figure 1-III). There was an oscillating interim state between these two points (Figure 1-II), where novice teachers sought and focused on aspects of both the pedagogical-psychological component and the didactic component (lack of time needed for preparation, inability to fulfil the lesson plan, time-consuming administration, non-functional technology, etc.).

From the above, the main research question emerged: “How prepared are beginning teachers to manage teaching in real school practice in the context of undergraduate training?”. This broad question, which is characteristic of qualitative research, is divided into two specific research questions, see below.

2.2 Anchoring the issue and research questions

It follows from the literature that novice teachers encountered only a fraction of unexpected situations during their undergraduate training, which they then had to deal with in actual practice, and they were usually not provided with relevant advice or tips for solving them, even within the theoretical teaching [25].

As stated by Fantilli and McDougall [14], novice teachers are the group mostly at risk of leaving the job early. According to Darling-Hammond [4], among other things, the quality of undergraduate training has an effect on the turnover rate of novice teachers.

It follows from the work of Šimoník [7] that there is a positive correlation between perceived difficulties and a worse perceived level of preparation for them. Searching for ways to overcome the isolation of undergraduate preparation from school reality is a trend that we note in the publications of a number of authors (cf. [27–29], etc.). With this text, we are trying to support this trend and suggest a possible direction, as we consider the issue of the difficulties of beginning teachers in relation to undergraduate training and school practice to be still current and to discuss it as necessary.

With regard to the above considerations and for the needs of this work, two specific research questions were established:

1. What opinions and attitudes are formulated by beginning teachers in relation to the completed undergraduate training with regard to facilitating the beginnings in school practice.
2. What form of undergraduate training could bridge the barriers between academically led undergraduate training and real school practice?

Qualitative research described in the following chapter was chosen to answer the research questions.

3. Influence of undergraduate preparation: Research part

3.1 Research methodology

An in-depth semi-structured interview was chosen as the method of data collection, which was created by developing research questions. This is how the scheme of the first set of questions was created, which consisted of 14 open questions that related to a broadly defined research question with a content focus on: motivation to study teaching, the benefit of undergraduate training in relation to real school practice, perceived support from university teachers, perceived support from the workplace, primary or secondary schools, additional educational needs, etc. The questions were tested as part of a pre-research investigation on two respondents. The aim of the pre-research investigation was to check the clarity of the questions and to find out whether some topics needed to answer the research questions had not been omitted. New information that naturally emerged from the interviews after their initial analysis served to modify the questions of the first version of the interview and led to the final set of questions. Interviews with teachers were conducted at the schools where they worked, and were recorded on a dictaphone and transcribed into text. The teachers' anonymousness was guaranteed by assigning randomly chosen pseudonyms. The average duration of the interviews was 76 min, the transcript of one interview had an average of 40 pages of text: the total data file had 438 pages of text.

During the summer semesters of 2021 and 2022, within the framework of triangulation, student teachers, i.e. those with a biology approval, were also questioned on the subject of didactic biology exercises. However, these students are not included in the sample of respondents, because they did not have a university education, they were part of the so-called focus group and their statements were feedback and verified the analysed data.

In August 2020, a primary school teacher with approval subjects of Czech language and music was also used for triangulation, i.e. a respondent with already completed university education, but with a different approval subject than the monitored subject, whose statements strongly confirmed the emerging theory. No other teachers were invited to the research.

The grounded theory method [30] was used to analyse the data that resulted from the conducted interviews. We chose the principle of grounded theory because it is a method focused on the study of interactions and processes. We strove to complexly

map the respondents' viewpoint of the difficulties they experienced in everyday school situations and their attempts to resolve the specific difficulties in connection with the influence of undergraduate training.

In the first step, the authors independently analysed the first three interviews using the inductive open coding method. The codes were subsequently compared and discussed and a unified categorial system was created, which we used to subsequently analyse data. With regard to gradual supplementation of the data file, we subjected the entire resulting file of 13 interviews to independent coding by the authors. In conclusion, we repeatedly subjected the data files to re-analysis on the basis of reformulation of the analysed problem into the topic of reducing reality shock and focusing on teaching experience, whereby we reached the final set of categories. Our coding is based on the deductive-inductive nature of coding.

We followed open coding with axial coding, during which time we created a paradigmatic model (see **Figure 2**), which served as a tool for creating a link between individual (sub)categories and as a means to classify data. Subsequent selective coding led to a key category, which is "assessment of teaching experience and observation of lessons" in our case (see **Figure 3**). The results of selective coding followed onto the results of axial coding, which allowed us to abandon the paradigmatic model and create a subsequent causal model of the impact of perception of one's own success in coping with school reality in relation to assessment of the monitored component of undergraduate preparation (see **Figures 2 and 3**).

The step-by-step process of coding described above resulted in an analytical narrative, which will be described below.

3.2 Retrospective grounding of the theory and other techniques for research quality control

For the requirements of this research, we list the techniques that we used to guarantee the quality of the executed research.

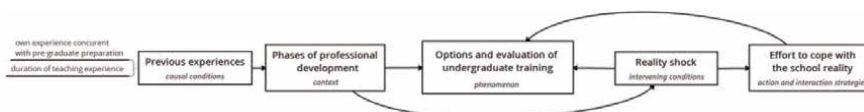


Figure 2.
 Paradigmatic model – Perception of undergraduate training.

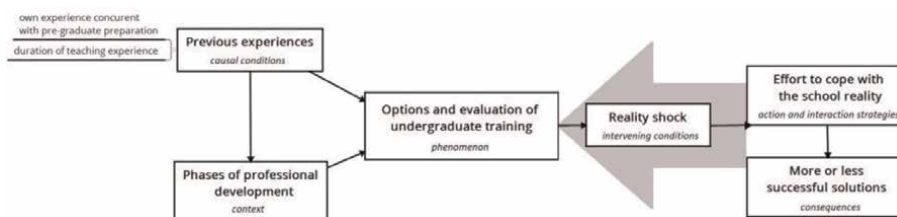


Figure 3.
 Causal model.

Credibility, which replaces reliability in qualitative research, was fed in the form of triangulation using focus groups with teacher students and a teacher with a different approval than the monitored respondents, who was no longer a beginning teacher. Next, we coded the entire data corpus independently and, following a consensus approach, created individual categories. Conducting interviews, in which both authors participated from the beginning, included internal triangulation mechanisms, which were represented in the form of returnable questions and their variations, in order to treat possible inconsistencies in the respondents' statements.

In accordance with the requirements of Strauss and Corbin [30], in the final phase of the research, we proceeded to reverse anchoring of the theory, which contributed to the additional adjustments of the resulting diagram describing the investigated reality and at the same time assured us of the appropriateness of classifying the respondents' typology with regard to their optimal classification into one of the methods of viewing the monitored component of undergraduate preparation. For key characteristics and dimensions observed in the respondents for the needs of the emerging grounded theory and its back-grounding, see **Table A1**.

3.3 Research sample

The research sample for our work was 13 novice teachers who had 1 to 5 years of teaching. This time period was established based on an effort to achieve consistency among authors who specify the beginning teacher period by length of practice (e.g., [31]).

During the first wave of acquisition of respondents, criteria for their selection were chosen, which should guarantee that the respondents would be novice teachers of biology with the corresponding qualifications. These criteria were at least 1 year and a maximum of 5 years of experience at a primary or a secondary school teaching biology and also completion of a master's degree in the field of pedagogy specialising in biology and any other qualification subject. The condition of the diversity of the sample was also kept in mind, as this results in data saturation [32], which is why the intention was that the teachers came from various universities and therefore also from various regions in the Czech Republic.

In order for the diversity of the data to be determined not only by the number of universities where the respondents came from, but also by differently experienced teachers, we tried to ensure that their representation was evenly distributed across the sample in these respects. The resulting research sample contained 16 novice teachers, with whom research interviews were gradually realised. With regard to the fact that the data began to be repeated with the ninth to tenth respondent, data collection was terminated with the thirteenth teacher.

The complete list of all respondents and their brief characteristics is given in **Table 1**.

Years of teaching experience	Name (pseudonym)	Graduated from university / collecting wave	The type of school where novice teacher worked
1	Radek	PřF UPOL / 1.	Elementary school
	Pavla	PF JU / 1.	Elementary school
	Jakub	PF JU / 1.	Elementary school
	Marie	PřF UK / 1.	Grammar school

Years of teaching experience	Name (pseudonym)	Graduated from university / collecting wave	The type of school where novice teacher worked
2-3	Julie	PF JU / 1.	Grammar school
	Karolína	PřF MU / 1.	Grammar school
	Martina	FPE ZČU / 1.	Elementary school
	Kristýna	PřF UK / 1.	Elementary school
	Jitka	PřF UK / 1.	Elementary school
4-5	Monika	PedF UK / 2.	Secondary Vocational School of Health
			Elementary school
	Renata	PedF UK / 2.	Elementary school
	Klára	FPE ZČU / 2.	Elementary school
	Marek	PřF UK / 1.	Elementary school
			Grammar school
			Private grammar school
triangulation			
6	Anna	PedF UHK Secondary Pedagogical School	Elementary school

PřF/PF = Faculty of Science, PedF/FPE = Faculty of Education, UPOL = Palacký University Olomouc, JU = University of South Bohemia, UK = Charles University, MU = Masaryk University, ZČU = University of West Bohemia, UHK = University of Hradec Králové.

Table 1.
 Characteristics of interviewed novice teachers.

4. Results of the research investigation

A paradigmatic model (**Figure 2**) was drawn up on the basis of the analysis described above, which indicates that the way novice teachers viewed teaching experience and observation of lessons established the degree of shock arising from encountering the reality of school. Reality shock therefore became the integrating element of the entire research project in the form of intervening conditions, on the basis of which it was possible to identify additional variables in addition to teaching experience, which could increase or, vice versa, suppress this reality shock. The paradigmatic model (**Figure 2**) arising from the above data subsequently became a basis for creating the framework of the analytical narrative.

Subsequently, the paradigmatic model was reconstructed, in accordance with the qualitative methodology according to [32], into a causal model. It reflects the categories of the paradigmatic model, in particular, the influence of shock from reality and professional level on more or less successful coping with school reality and the views of the observed beginning teachers on undergraduate training shaping their identity.

The respondents were distinguished by different amounts of experience. The majority of them had taught before finishing their degree, which means that not all of them had the same conditions when they began work, as indicated by Marek for example. *“The way my other classmates had no idea what they were doing when encountering practical work for the first time, that was me about three years earlier But they*

had no idea, just like I didn't at the time! This means that they did not progress at all in the three years they studied at universityBecause, what do we learn for the first three years? Specialised subjects. There may be some didactics included, I don't want to wound anyone, but not enough to help with practical work." All the teachers who had experience in education before completing their degrees identified with the opinion that actual teaching experience outside undergraduate preparation or practical work that the student of pedagogy organises himself in addition to undergraduate preparation and teaching experience, at his own initiative, gave the teachers more than the pedagogic practice organised within the terms of undergraduate preparation.

Differing amounts of experience predetermined individual teachers to be in different initial phases of professional development and possibly predetermined the various speeds of professional growth. At the same time, experience indirectly affected the expectations of novice teachers compared to reality and resulted in reality shock in the event of divergence between expectation and reality. The most frequent and most serious cause of reality shock was the lack of discipline in pupils, particularly at primary schools. *"I basically thought that I would start working at school, and everyone would be happy that there was someone thereto pass on knowledge, skillsBut they don't want that, they test you, to see what you can stand, what you will permit, how strict you are ... "* (Klára); *"...you somehow manage to teach and I am not prepared for situations when someone suddenly starts shouting and fuming"* (Kristýna); *"And just keeping the children's attention, it is more about bringing them up than educating sometimes."* (Jitka).

Assessment of the importance of teaching experience and observation of lessons is therefore the result of the ability of novice teachers to come to terms with potential reality shock, with regard to skills (not) learned during teaching experience (see **Figure 3**).

Reality shock and phases of professional development are therefore the main factors forming the framework of our analysis.

It emerged from the analysis of the above that the common cause of this failure/success was the more or less (un)realistic expectations of novice teachers in relation to school practice, and thereby the degree of reality shock, or big/middle/low "theory – practice" gap. This was based on the form of undergraduate preparation and also any other teaching experience novice teachers obtained outside undergraduate preparation. It was this experience that was the reason why teachers of the same professional age found themselves in different phases of professional development, which subsequently resulted in different opinions of assessment of undergraduate preparation, including teaching experience.

The more professionally experienced novice teachers were, the more confident they were in teaching and the more critical towards the method of teaching, the less they were interested in the pedagogic-psychological importance of teaching experience and the more important they considered improvement of didactic skills.

From the above, it is evident that the views of beginning teachers on undergraduate training are influenced by the experiences they have or do not have in addition to teaching practices provided by the university. This knowledge should be taken into account, especially when evaluating the quality of the training of future teachers at individual universities.

4.1 Analytical narrative and the validity of the presented results

As stated previously, the expectations of novice teachers are formed on the basis of their own experience with the reality of school and presentation of school reality

during their university education during undergraduate preparation. Some novice teachers also contribute to their “portfolio of situations in school practice,” which they use to synchronise their expectations to reality, they also contribute with their experience outside undergraduate preparation, by teaching at primary or secondary schools while still studying at university. Depending on the form of education and the range of additional experience obtained outside it, a larger or smaller gap is created between expectation and the actual reality of school after completing undergraduate preparation, which is also reflected in a larger or smaller “theory-practice” gap.

This fact is graphically depicted by the diagram in **Figure 4**, where these two areas represent two opposite and mutually overlapping triangles. The range of mutual overlap corresponds to the amount of experience that the novice teacher has before completing undergraduate preparation, which reflects the actual reality of school. The greater this overlap, the smaller the reality shock from reality that the teacher can experience when he begins actual school practice.

In **Figure 4**, we can compare two marginal situations – A and B. Situation A can depict tuition reflecting school reality to a lesser degree and also the absence of experience outside this preparation. On the contrary, the amount of experience increases in situation B, either as a result of tuition offering more realistic school situations, more own experience outside education or a combination of both. In situation B, area III, depicting the degree of reality shock after starting work is less than in situation A. In addition to this, we can also observe the different starting positions of teachers in situations A and B in school practice (II) after starting work, when novice teacher A has farther to reach the teacher standard than teacher B.

The validity of this general diagram can be proven by means of specific examples on the basis of four mutually interconnected indicators—the degree of previous experience corresponding to school practice, which indicates the degree of different expectations determining the degree of reality shock and the estimated professional maturity. Unrealistic expectations and the highest degree of practice shock were described by students of pedagogy from the first group, whose only experience in teaching was teaching experience organised within the terms of undergraduate preparation. Problems, such as lack of discipline in pupils and lack of time for preparation, which they described after starting work, are typical problems experienced by

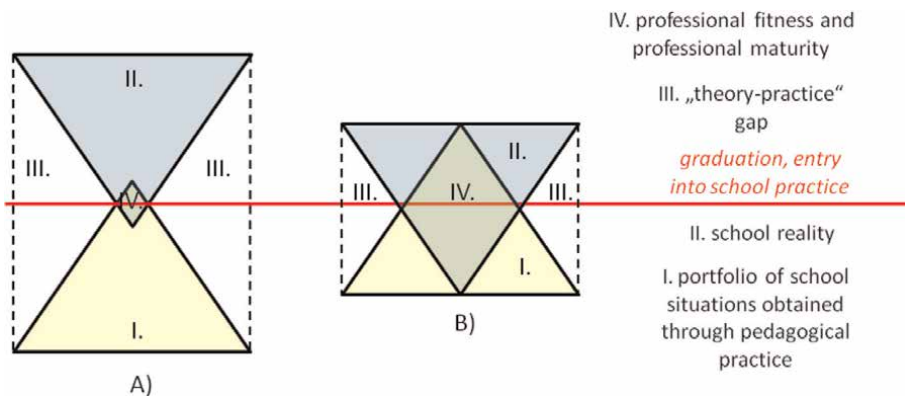


Figure 4. Scheme modelling the clash of school reality with undergraduate training. The difference in the size of area I. is based either on the different degrees of reflection upon of school situations during university studies or on the different amounts of experience of students of pedagogy from parallel teaching experience, obtained at their own initiative while studying.

teachers at the beginning of their career. A clear similarity with diagram A can be seen on the basis of the above.

If we summarise the above, then novice teachers who were employed part-time as teachers while studying or who described their undergraduate preparation as practical and striving to describe the actual reality of school as complexly as possible, either by simulation, micro-teaching or in-depth reflection of school situations seen at schools within the terms of teaching experience, stated that they entered employment with fairly realistic expectations and without being seriously shocked by anything. These teachers appeared professionally more mature and although they doubted their skills, their problems consisting of correct realisation and selection of teaching methods and forms corresponded to later phases of development, as diagram B also shows.

5. Discussion

The research described above indicates that the portfolio of situations from school practice, which intersect with real school situations, may prevent development of reality shock. This may indirectly support earlier and also better-quality development of teacher skills in actual school practice according to [33].

With regard to the fact that normal school situations cannot be resolved on just the basis of skills from the pedagogic-psychological component or only the didactic component of undergraduate preparation, it seems best to interconnect these two areas with pedagogical practice.

Novice teachers realise that it is not possible to experience all pedagogical situations only in the later stages of their professional development, as can also be seen from the study by [10]. Novice teachers therefore propose an increase in subsidies for pedagogic practices, or such university teaching, for example, through experiential methods (see experiential education), micro-teaching and discussions on real school situations, or linking theory and practice through stories and instructions, especially on how to deal with unruly pupils, is a description of the proposals for the updated undergraduate training can also be derived from the literature, see the introductory part of the text.

However, from the statements and analysis of the research, we deduce a deeper confrontation of the undergraduate teaching of beginning teachers in relation to the smooth beginning of novice teachers in real practice. It is necessary to emphasise that the effort to make the transition as smooth as possible between undergraduate training and school practice is all the more difficult because, although there are standards describing the binding structure of teacher study programmes [34], there is no binding standard of competences of teacher graduates, with the help of which it would be possible to direct the teaching of future teachers and at the end of the preparation to assess the extent to which the given competencies have been acquired by the teacher student [35].

This will be verified only in the first years in the school practice of novice teachers. Competencies should correspond to the skills and knowledge that will help the beginning teacher to successfully overcome the shock of reality after his entry into practice, which will allow for a faster establishment of effective teaching in his classes.

6. Conclusion

In this chapter, we dealt with the question of how novice teachers perceive the influence of undergraduate training on the course of their first years in real school

practice. The results of this work show that pedagogical practices are considered by beginning teachers to be one of the most beneficial areas of their training.

Novice teachers therefore suggested increasing pedagogical practices, possibly lesson observations [17], and at the same time called for their inclusion in undergraduate training as soon as possible, ideally from the first years of study. They also suggested more frequent inclusions of effective tips and ideas for action in certain situations, which they could be inspired by [10, 25] and which they could follow up in their own school practice.

Although there are many systemic obstacles that can complicate the reform of the education of future teachers, based on the results of the presented study, we find it relevant to bring the preparation closer to the needs of teacher students, even with minor changes within individual educational areas. The aim should be to present school reality to teacher students as faithfully as possible, to support reflective teaching wherever possible and to strengthen autonomy in viewing, evaluating and choosing the optimal solution to school situations, which should reduce the shock of reality, speed up the process of professional growth, thus supporting the effectiveness of teaching or eliminating the “theory-practice” gap.

Although we are aware that a teacher’s professional growth does not end with graduating from university, due to the already extensive coverage of the topic, we deliberately omitted the issue of support for beginning teachers within the schools that the observed beginning teachers joined after completing their training. However, we are aware that this can be considered a limitation of the research. The data thus remain a stimulus for further studies, in which it would be possible to unravel the influence of support on the smooth start of teachers in school practice.

Acknowledgements

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Conflict of interest

The authors declare no conflict of interest.

A. Appendix

G	ZU	Career choice	Expectation	Reality shock	Way of solving	evaluation previews of UP	Characteristics of the group of NT
BIG „THEORY- PRACTISE“GAP	Radek	teaching subject	as we were taught	indiscipline of P	- advice of colleagues, trial and error	<p>Suggestions for change</p> <p>- T of Ped-Psych do not know real school practice</p> <p>-----</p> <p>analysis of the situation from pedagog. Practices</p> <p>- Ped psych without exercises</p> <p>-----</p> <p>observations; longer pedagog. Practice to fasten skills</p>	<p>These teachers, who were particularly shocked by the indiscipline of pupils in the classroom, would most appreciate the mediation of the school reality, especially through regular observations, or to acquire some skills of maintaining discipline as part of longer teaching practices. In addition, according to them, the fault lies in the overly theoretical way of teaching pedagogic-psychological subjects, which does not provide them with opportunities to practice some situations practically.</p>
	Klára	teaching subject, children	+ enthusiastic P	the only T, indiscipline of P	leisure activities, - advice of colleagues	<p>+ materials</p> <p>- Ped Psych without practice impact</p> <p>-----</p> <p>analysis of the situation from pedagog. Practices, observations</p> <p>- Ped psych without exercises</p> <p>-----</p> <p>analysis of the situation from pedagog. Practices, observations</p>	
	Pavla	teaching subject, change children	- ♀ collective	timing, indiscipline of P	- theorems from UP, - advice of colleagues, trial and error		
	Martina	dream job, maternity	+ level of P	the only T, timing, thematic plan, parents and P	+ advice of colleagues, maternal experience, trial and error		
MIDDLE „THEORY- PRACTISE“GAP	Julie	teaching subject, children	+ initiative support at school	establishing a relationship with P, thematic plan	teaching reflection	<p>- Ped psych without exercise,</p> <p>- T of Ped-Psych do not know real practice</p> <p>-----</p> <p>Pd-Ps teorie z náslechů, materials</p>	<p>These novice teachers did not face more serious educational difficulties, but they nevertheless realised that they were not prepared to establish an initial relationship with pupils and create an atmosphere in the classroom and had to figure</p>

G	ZU	Career choice	Expectation	Reality shock	Way of solving	evaluation previews of UP	Characteristics of the group of NT
	Marie	teaching subject, T role model, development of P	+ good background at school	establishing a relationship with P, technika	+ advice of colleagues, trial and error	Suggestions for change + materials, +microteaching, - Ped psych without exercise	everything out on their own. For these reasons, this group also returned with their memories of the pedagogical-psychological training, which, according to them, was too theoretical without practical overlap, and they requested an increase in the practical component, either as part of academic training or observations. However, the main thing that surprised this group of novice teachers were mostly activities that were not directly related to the teaching process, but preparations for it, whether it was preparation of materials, fulfilment of the thematic plan, administration or knowledge of the level of pupils. It was for these reasons that the novice teachers valued the prepared materials from the university and some of them demanded that the shock that was present for the reasons mentioned above be limited by increasing the time allocation for teaching practices and closer cooperation between the university and other schools.
	Kristýna	children	+ enthusiastic P	administration, the only T, timing, P with special needs	+ advice of colleagues	+ materials ----- analysis of the situation from pedagog. Practices	
	Jitka	children, development of P	+ enthusiastic P	administration, P with special needs	+ advice of colleagues	+ microteaching ----- administrative activities, analysis of the situation from pedagog. Practices	
	Karolina	scouting	+ úroveň Ž	timing, level of thinking of P, how to exam	observation of colleagues, self-focus	- Ped Psych lessons distant reality, - T of didactics do not know real practice ----- materials, longer Ped Practice connected with school reality	
	Jakub	scouting, development of P	- přijmutí Ž a kolegy	level of thinking of P, parents and P, P with special needs	observation of colleagues	- Ped Psych without practice impact, - T of Ped-Psych do not know real school practice, - microteaching ----- analysis of the situation from pedagog. Practices,	

G	ZU	Career choice	Expectation	Reality shock	Way of solving	evaluation previews of UP	Characteristics of the group of NT
						Suggestions for change	
						cooperation between primary/secondary schools and universities	
LOW/ZERO „THEORY-PRACTISE“GAP	Monika	teaching subject, children	- problem P	indiscipline of P, scope of teaching	- advice of colleagues, trial and error	- Ped psych without exercises, + V did. Znaří praxe ----- cooperation between primary/secondary schools and universities	These teachers faced the shock of the initial unruliness of the pupils a few years ago, and since then they have learned to set up a classroom atmosphere suitable for teaching. Nevertheless, they have not forgotten this phase of their beginnings, which is why they refer to insufficient pedagogical and psychological training, which they would like to supplement with at least practical exercises. They strive for teaching that would make the learning process easier for pupils, and in connection with this they talk about teachers from didactic training who were not able to convey the essence of quality and adequate teaching to them, due to the lack of personal experience from a real school environment. Therefore, they suggest more frequent inclusion of micro-teaching led by teachers with experience in teaching at primary or secondary schools, more intensive cooperation between higher education institutions and primary and secondary schools, or longer ped. Practice or observations, thanks to which they would gain a better awareness of effective methods and forms of teaching.
	Renata	teaching subject, children	+ level of P	indiscipline of P, scope of teaching	teaching reflection	- Ped Psych without practice impact, analysis of the situation from pedagog. Practices, microteaching, T of Didactics KNOW real school practice,	
	Marek	teaching subject	- level of P	the only T, scope of teaching, missing feedback, setting tasks	observation of colleagues	+ materials, - T of Didactics do not know real school practice ----- microteaching, longer Ped Practice to fasten school reality	

G	ZU	Career choice	Expectation	Reality shock	Way of solving	evaluation previews of UP	Characteristics of the group of NT
	TRIANGULACE Anna	children	I will enjoy it	scope of teaching, non-connectedness with the regular life of P	portfolio of solutions already from the Pedagogical High School	<p>Suggestions for change</p> <p>University UP: - Ped-Psych very theoretic, + T of Didactics KNOW real school practice, ----- lack of cooperation between primary/secondary schools and universities</p> <p>Pedagogic Secondary school: Ped-Psych lot of practice, visiting schools + reflection of observed school situations;</p> <p>Creating a portfolio of methods, practical examples can be used in future practice</p>	<p>She does not remember the shock of the practice, everything went smoothly thanks to the many visits to schools as part of the secondary school, when they were accompanied by a secondary school teacher. A lot of reflection and analysis of situations she saw in schools. The shock as such was rather caused by the university teaching. A critical view is then focused on the preparation of future teachers at the university, which was mostly theoretical, without extending into practice. She often drew on what she had acquired in secondary school, which gave her more in her future professional life. She recommends getting used to the practice as soon as possible, talking about it with someone who is passionate and has a sincere interest in children's education; this deepens the strong motivation to endure even unpleasant moments in future real practice.</p>

NT – novice teachers, G – group of NT, UP – undergraduate preparation, P – pupil/pupils, T – teacher.


Table A1. Retrospective grounding of three groups of novice teachers with regard to how they deal with reality shock.

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What Predictors Explain Holocaust and Human Rights Education in Spain? A Study with in-Service Secondary School Teachers

Delfín Ortega-Sánchez and César Barba-Alonso

Abstract

From the perspective of the pedagogy of teaching collective trauma, and the educational dialogue between historical memory and contemporary social responsibility, this research seeks to determine the socio-demographic, formative and didactic factors that explain the teaching of the Holocaust and Human Rights education in a sample of Spanish secondary school teachers ($n = 1125$). Through a non-experimental, cross-sectional, explanatory and predictive design, and the application of the instrument *Teaching the Holocaust and Human Rights Education* (THRE), the results obtained show that the initial and on-going training of teachers is one of the explanatory axes of the curricular inclusion of the Holocaust and Human Rights as specific contents of education for democratic citizenship. Age, gender and level of teacher education, on the other hand, are not proposed as explanatory factors for the inclusion of Holocaust and human rights as specific content in education for democratic citizenship.

Keywords: holocaust teaching, human rights education, secondary education, in-service teachers, secondary school teachers

1. Introduction

1.1 Why teach the holocaust?

The importance of establishing a set of formative foundations to guide the selection of strategies and content on the Holocaust has been one of the most evident findings of educational research. The answers to the question *why teach the Holocaust* have been manifold. According to Totten et al. [1], some of them could be specified as why, how, what, when and where the Holocaust took place; examining the nature, purpose and structure of governments; studying human behaviour; and developing awareness of the value of pluralism and diversity in pluralistic societies. The extreme human rights violations of the Jewish Holocaust constitute a central focus for the defence and treatment of democratic principles, and the prevention and peaceful resolution of conflict. The rationality of these justifications or aims lies, in part, in the

simplicity of the processes, the geographical reductionism and mono-cultural perspectives perceived by students about the Holocaust [2], or in the general weakness of their knowledge [3].

This multiplicity of responses and the objectives of their teaching have presented divergences between the educational appropriateness of their historical disciplinary purposes, and the emphasis on their readings in the field of citizenship and moral education. Both didactic positions result, consequently, in the division between those who defend the historical disciplinary approach to Holocaust education and those who advocate, as a priority, its moral, civic-social and emotional educational purposes. From this perspective, there seems to be a concern in certain geographical contexts, such as the UK, that 'the Holocaust is regularly identified for its *cross-curricular* potential and/or commonly approached by teachers with reference to *trans-disciplinary* teaching aims' ([4], p. 266) with 'present-oriented' or 'instrumentalising the past' educational consequences.

1.2 Teachers' conceptions of the holocaust and holocaust education

Secondary school teachers' conceptions of the Holocaust and its teaching have recently been analysed in politically conflictual contexts such as Greek Cypriot [5]. Their results report the presence of both moral and historical orientations in teachers' discourses on Holocaust education. However, 'it is shown that teachers often oscillate between these two orientations rather than 'choosing' one or the other. In other words, one orientation may be foregrounded, while the other is backgrounded and vice versa' (p. 20).

In this vein, Gross's research [6] on the treatment of the traumatic war confrontation in Poland revealed moral, historical and professional motivating factors for teaching and learning about the Holocaust. Similarly, Mann's study [7] addressed French teachers' intergenerational memories of the Holocaust and the Second World War as an influential personal factor in their classroom approach to these contents.

1.3 Students' conceptions of the holocaust and learning about it

Students' attitudes and behavioural, cognitive and emotional engagement with Holocaust-related content, particularly refugee students, have been explored by Kempner [8] for the British case. His results show higher levels of understanding among refugee students and the identification of anti-Semitic manifestations in their contemporary form.

Flennegård's [9] research on Swedish field trips to Holocaust memorial sites has reported their usefulness for the acquisition of Holocaust-related learning content and purposes. Measurement of historical knowledge and understanding of the Holocaust and, specifically, the significance of Auschwitz and the general camp system among British students ($n = 8000$) also show the existence of misinterpretations and misrepresentations around their narratives [10].

Despite its educational recognition and curricular significance, and the presence of not very encouraging educational indicators in the Anglo-Saxon sphere, studies and research from the Ibero-American sphere are non-existent. From the perspective of the pedagogy of teaching collective traumas, and the educational dialogue between historical memory and contemporary social responsibility [11], this research formulates the following research question: What socio-demographic, formative and didactic causes explain the justification of Holocaust and human rights education as an intrinsic part of the curriculum of education for democratic citizenship in Spain?

2. Method

2.1 Participants

Based on a non-probabilistic convenience sample, 1125 Spanish secondary school teachers with the following socio-demographic characteristics agreed to participate (Table 1).

2.2 Instrument

The research applies the instrument *Holocaust Education and Human Rights Education* (THRE) [12]. This instrument is constructed on the basis of a statement on the relevance of teaching about the Holocaust and human rights education as a specific curricular part of education for democratic citizenship, and is accompanied by four socio-demographic variables (age, educational level [undergraduate-postgraduate], gender [female-male] and existence-inexistence of previous initial and/or on-going training in the field of human rights education). It also includes a variable linked to the teachers' didactic positions on controversial issues in the social sciences classroom as an effective part of their teaching programmes or, failing that, not relevant in these programmes. The six variables assume a dichotomous nominal nature.

2.3 Design and procedure

This study is developed in non-experimental designs of a cross-sectional nature and at the explanatory and predictive levels of research, insofar as it seeks to reveal the socio-demographic, formative and didactic causes of the phenomenon or event of interest, and its level of occurrence.

The questionnaire was administered by email and hosted on the free *Google Forms* application. Teachers received the questionnaire in their institutional email, and were informed of the purpose of the research study and the confidentiality with which the answers would be treated. They were also asked for their consent to use their answers in the study. The questionnaire was administered from December 2020 to January 2023.

2.4 Data analysis

In order to identify causal relationships between the independent variables (age, educational level, gender, previous training and didactic positioning of teachers in relation to controversial issues), and the relevance of Holocaust and human rights education in education for democratic citizenship, we conducted a binary logistic regression analysis. Once the assumptions of logistic regression (absence of the

	Women	Men	Total
	$f_i (p_i)$	$f_i (p_i)$	$f_i (p_i)$
Under or equal to 45 years of age	314 (27.9)	163 (14.5)	477 (42.4)
46 years of age or older	403 (35.8)	245 (21.8)	648 (57.6)
Total	717 (63.7)	408 (36.3)	1125 (100)

Table 1.
Socio-demographic characteristics.

linearity principle, independence of error and non-existence of multicollinearity among the variables) are verified, we seek to reveal the predictive capacity of the socio-demographic variables and of the didactic stances on the relevance of teaching the Holocaust and its specific link to human rights education.

3. Results

The omnibus test reports a Chi-square significance of less than .05 ($\chi^2_{(5, n = 1125)} = 386.845, p = <.001$), evidence that the model constructed can explain the relevance of Holocaust and human rights education. Regarding the assessment of the model's usefulness, Cox-Snell's and Nagelkerke's R^2 account for the extent to which socio-demographic variables and didactic positioning predict this knowledge by 0.291 (29.1%) and 0.391 (39.1%), respectively. The coefficients of determination R^2 are close to the one given by Cohen's Kappa index, obtained from the ratio between the real response values (variable to be predicted) and the values corresponding to its prediction = .37 ($p < .001$) (37%). The evaluation of the model's usefulness was completed with its predictive ability, whose values were as follows: accuracy = 71.4%, error = 28.6%. The percentage of the number of cases that the model is able to predict correctly or the overall percentage correctly classified exceeds 50% of the cases (71.4%), a circumstance that proves an optimal explanatory capacity of the model and, therefore, its acceptance.

The relationship between socio-demographic variables and the didactic positioning of teachers in relation to controversial issues as an effective part of their teaching programmes, and the relevance of the specific teaching of the Holocaust and Human Rights education shows that initial and/or on-going training in Human Rights education and didactic positioning are two causal factors in this relationship ($0 \notin$ Wald statistic, $p = <.001$). Therefore, teacher training and its impact on teachers' didactic stances are proposed as two of the most significant factors in the inclusion of the Holocaust and human rights as specific curricular content in education for democratic citizenship. Age, gender and level of education, on the other hand, are not explanatory factors for this inclusion.

The established relationship is positive (sign + of β_i); that is, both factors motivate higher probabilities of considering these teachings. Likewise, in these variables, the $\exp.(\beta_i)$ is far from 1. Consequently, their strength in explaining the event of interest is adequate (Table 2).

4. Discussion and conclusions

We agree with Pettigrew [4] that there is no intrinsic reason why civic-social or moral educational approaches to Holocaust education should necessarily result in a distortion of the past, unless a clear positioning is defined in the historical disciplinary approach. Indeed, 'learning the history of the Holocaust and drawing moral [as well as civic, sociological, political and/or philosophical] lessons for today are mutually exclusive. History is the story of human experience and behaviour and, in studying the history in depth, we may yet learn more about ourselves' ([13], p. 268).

Although the Holocaust is often maintained as content associated with the World War II, recent research [14] shows the need and opportunity to define it more explicitly in the context of education for democratic citizenship. Along these lines,

	β_i	SE	Wald	gl	p	Exp(β_i)	95% CI for Exp(β_i)	
							Lower	Upper
Age	.149	.145	1.054	1	.305	1.160	.873	1.542
LE	-.146	.163	.803	1	.370	.864	.628	1.189
Gender	.123	.151	.662	1	.416	1.130	.841	1.519
PT	3.074	.254	146.074	1	.000	21.632	13.140	35.613
DP	-2.989	.256	135.945	1	.000	.050	.030	.083
Constant	-.028	.153	.033	1	.856	.973		

Equation of the constructed logistic regression model

$$y = \frac{1}{1 + e^{-(-.02 + .14\text{Gender} + -.14\text{LE} + .12\text{Gender} + 3.07\text{PT} + -2.98\text{DP})}}$$

$$f(x) = -.02 + .14\text{Age} + -.14\text{LE} + .12\text{Gender} + 3.07\text{pt} + -2.98\text{DP}$$

SE: Standard error. LE: Level of education. PT: Prior training. DP: Didactic positioning.

Table 2.
 Equation variables, regression coefficients, Wald statistic and OR value = Exp(β_i).

during the *Holocaust Education in Today's World*, a scientific meeting organised by the Holocaust Centre North and held on 9 March 2023, Andy Pearce, professor of history education at the Centre for Holocaust Education, stated that, despite the representation of this phenomenon in different subjects in the British curricula, it continues to be a priority in the history classroom. The potential of its transversality would therefore lie in the dangers of making this content independent as a 'unique phenomenon in history', a circumstance equivalent to its lack of contextual comparability or historical relationship. In addition, the curricula do not seem to stipulate the specific objectives, the time needed for teaching and the assessment of learning about Holocaust education, and this can be extended to other European curricula.

According to the results obtained in this first research, initial and in-service teacher training is one of the explanatory axes of the curricular inclusion of the Holocaust and human rights as specific contents of education for democratic citizenship. Finally, more data collection instruments with sufficient empirical evidence of validity and reliability are needed to ensure the accuracy of the analysis of the development and historical understanding of this phenomenon among students [15].

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Conflict of interest

The authors have not reported any potential conflicts of interest in relation to this chapter.

Data availability statement

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to reasons of personal privacy and to the application of ethical criteria in the processing of the data obtained.

Statement of ethical approval

The study was conducted according to the guidelines of the Declaration of Helsinki (Declaration of the World Medical Association), guaranteeing the ethical-philosophical commitment and unwavering respect for human dignity, privacy, physical and moral integrity, as well as the protection of personal data in the processing of the survey and throughout the research.


In the process of collecting the information, the schools confirmed their informed consent to the research, guaranteeing the anonymity and confidentiality of the students' answers, as well as their subsequent treatment. The study was also approved by the Ethics Committee of the University of Burgos (IR 15/2018).

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Section 2

Theoretical Foundations for
Research and Educational
Innovation

Perspective Chapter: Emotive Cognition Strategies on Enhancing Meaningful Learning among Undergraduate Student-Teachers

A. Ananda Kumar

Abstract

Learners are in need of knowledge and skill development in the global era to face competition in the challenging environment to sustain themselves. The Education commissions both National and International level emphasize on meaningful learning. The past two decades have seen the emergence of a global movement that calls for a new model of learning for the twenty-first century. The Delors Report also formulated four principles identified as the four pillars of education: Learning to Know, Learning to Do, Learning to Live Together and Learning to Be. In this regard, to develop these four pillars of learning and meaningful learning can be possible through the application of emotive cognition strategies among Bachelor of education (B.Ed.) student-teachers. The process of meaningful learning understood specifically on emotional aspect or cognitive aspect. There is a relationship between emotion and cognition in each and every action of an individual. Therefore, the aim of the study is to examine the effect of emotive cognition strategies on enhancing meaningful learning. The investigator has to employ an experimental research to find out the effect of the emotive cognition strategies on enhancing meaningful learning. This strategy design will channelize student-teachers' in the path of meaningful learning through emotive cognition process.

Keywords: emotive cognition, meaningful learning, strategies, teacher education, student-teachers

1. Introduction

Conventionally, emotion and cognition are understood to be independent system. Researches in the areas of cognition, emotion and neurobiological sciences have shown that the relationship between cognition and emotion is both interdependent and extensive. This close link between emotion and cognition leads to a number of insights that have the potential to inform and transform educational practices at all levels from the classroom to the curriculum to educational policy [1]. The application of emotive cognition strategies in teaching develop strong inter-relationship

between teachers and learners. It triggers cognitive functions on learning and creates conducive meaningful learning behavior among learners. Emotions play an important role in every cognitive function. The cognitive processes are sensitized, focused, energized, focused, broadened and sharpened by the emotions. Application of emotive cognition strategies in the classroom teaching and learning facilitate meaningful learning among learners. However, deeper understanding is needed in teacher education programme that how student-teachers' emotive cognition behavior enhance their meaningful learning.

A critical consideration of quality teacher education programme for 21st century requires vigorous practice of emotive cognition strategies application in teaching develops meaningful learning among student-teachers, and it also builds cognitive competencies such as perception and attention, memory and learning, knowledge, decision making, problem solving ability, inter-personal skills and intra-personal skills among the future teachers. So undergraduate teacher education programme required proper implementation of emotive cognition strategies on enhance meaningful learning behavior among student-teachers.

1.1 The regulation of emotions in learning

Emotions show a systematic function in learning and it directly influences the process of learning. For instance, emotions like joy, enthusiasm, and passion gives energy to learners to learn a new or difficult concept in a perfect manner; at the same time emotions like fear, stress, aggression and anxiety create discomfort to the learners. It also disturbs them mentally as well as physically.

In the center of the human brain, the limbic system is present. It consists of the amygdala and hippocampus, historically called the "emotional brain". Amygdala plays an important role in survival situations and those situations it alerts the body. It stores the primitive emotions of sadness, fear, aggression and joy. It is also associated with emotional memories storage. The hippocampus stores short-term memory as well as the long-term memory. The cognitive function of amygdala is due to the activation of emotional regulation. Hippocampus performs information storage and retrieval functions.

Some two thousand years back Plato pronounced "all learning has an emotional base", whereas, present facts whole together emphasize that each one's emotions do re-sculptour neural tissue, Organization for Economic Co-operation and Development (OECD) [2]. Both neurobiologists and educational experts identify learning as an amalgamation of psychological, and emotional cognitive process. All of these three elements are interdependent and inter laced in each of the experience concerning learning. It impacts the functioning of the brain function at the time of learning.

In the learning process, emotions are deemed to a strong as well as an integral part, in day-to-day life. A successful learning takes place when a learner handles his emotions during the learning process. Emotional regulation has an undeviating impact on the process of cognition like the capacity to focus attention, problem solving approach and recovery of memory [3]. Appropriate emotional regulation maintains the functions of cognition to accomplish the goals of the learning process.

The anxiety or stressful emotions make a huge impact both on memory as well as learning process. Studies conducted on brain implied that negative emotions form a sort of hurdle to learning. The parts of the brain such as amygdala, the hippocampus and stress hormones of glucocorticoids, epinephrine and norepinephrine play a vital

role in moderating the impact of negative emotions namely, fear and stress both on learning and memory [4]. Simultaneous bodily events such as increased heart rate, perspiration, and elevated adrenaline levels also occur [5, 6], and in turn influence cortical activity. Some level of stress is essential for optimal adaptation to face environmental challenges and lead better cognition and learning, but beyond this modicum it can be damaging, both physically and mentally. When students face negative situations in their teaching-learning process it triggers either fear or stress there by affecting their cognitive functions during their learning.

2. Emotion and cognition are inextricably linked in the brain

All human activities are influenced by emotion and cognition. Emotion and cognition are linked through feelings and thoughts and vice versa. Emotional experiences are also built into the architecture of the developing brain. In fact, emotion and cognition operate seamlessly in the brain [5, 7–9]. The brain is structured into associations of neurons with specialized properties and functions. Information stimulates the brain to connect the neural network to respond for the information. This actions produce a learning experience. Based on the particular component the learning experiences are labeled cognitive or emotional aspect, but the difference between the two is theoretical since they are integrated and inseparable in the brain.

Emotion and cognition work together to guide learning processes [10, 11]. Children and adolescents have emotionally charged goals, and cognitively appraise the degree to which a situation is hindering or promoting attainment of those goals, which leads to emotional reactions. We can learn to cognitively regulate emotional reactions as well as emotionally regulate the cognitive reactions. It triggers cognitive and affective domains at a time for proper meaning making. Neuro-scientific researches shows that emotional regulation process can reduce negative emotions, which is revealed in both reduced amygdala activation and more positive personal emotional experience [12]. Effective emotional regulation strategies include reinterpretation and depersonalisation. Reinterpretation involves reframing a situation in a more positive way while depersonalisation involves considering a situation objectively rather than taking it personally. Emotional regulation could be helpful for learner. Learner could cognitively regulate his emotional reaction: reinterpreting his past and present emotional and cognitive experience. These regulatory strategies activate in both cognitive and emotional regions of the brain. It reduce the amygdala response and concentrate on cognitive aspects of learning. These process create effective learning environment.

Neuroscience approves that the emotional and cognitive dimensions of learning are inextricably intertwined, the long-standing philosophical debate as to whether learning institutions should be involved in learners' emotional development becomes irrelevant if learning institutions are accountable for cognitive development, they are habitually involved in emotional development as well [10]. Therefore, educators should guide the development of emotional regulation skills just as they guide the development of meta-cognitive skills.

3. Emotional influence on cognitive functions

Cognitive performance is affected by a person's emotional status, and neural processing resources are preferentially allocated to events that have emotional

significance. Internally and externally triggered emotions modulate information processing in brain regions that mediate various cognitive functions, focusing on perception and attention, learning and memory, decision making and social cognition. From an evolutionary standpoint, neural systems that support thinking developed in part to solve problems that were made salient by emotional considerations, so it is not surprising that emotions are intimately intertwined with higher cortical functions. Thus, information processing always occurs amid a backdrop of emotional states, social goals and motivational incentives. Understanding, in neural terms, how cognitive processes are shaped by these influences will greatly broaden thinking about how the brain works.

4. The integrative and iterative nature of emotional processing

Emotional feelings arise from internal sources as well as from external sources. The limbic regions of the forebrain are in an anatomical position to integrate information from both the internal milieu and the external world and indeed these structures combine information from parallel cortical and subcortical processing pathways. Subcortical afferent pathways that carry information about sensory features of the world and visceral activity can rapidly initiate emotional reactions. Cortical pathways simultaneously elaborate the meaning of such input and compare it to stored knowledge and prior experiences with similar behavioral significance. Afferent sensory pathways converge on particular forebrain structures—including the amygdala, insula, anterior cingulate cortex, and orbitofrontal cortex—and the processing in these regions integrates the relevant information and signals the executive control and premotor regions of the brain to select appropriate behavioral responses. These forebrain structures also send projections back to the sensory and associations cortices involved in pertinent cognitive functions. This interplay between cognitive and emotional-motivational functions is thus a dynamic process [13].

4.1 The central role of the amygdala

Among the key forebrain structures that mediate emotions, the amygdala has been given a special focus of research on emotion-cognition interactions because of its widespread anatomical connections to subcortical structures that control autonomic functions and to cortical areas involved in processing cognitive and emotional information. The amygdala also has extensive interconnections with medial temporal and ventral frontal lobe structures that provide a substrate for emotional enhancement of memory and indirect connections with the dorsal frontoparietal attentional control network via prefrontal cortex (PFC) interfaces, including the anterior cingulate, ventrolateral PFC, and orbitofrontal cortex. The amygdala can thus be thought of as center shuttles information back and forth from subcortical and cortical pathways to initiate and coordinate emotional reactions, including output to the hypothalamus and brainstem autonomic control centers that modulate the visceral changes accompanying various emotional states. The amygdala modulates activity in specific sensory and higher-order cognitive sectors of the cortex in response to biologically significant events that often have emotional consequences. The following paragraphs describe how emotion influences several domains of cognition such as perception, attention, memory, learning, decision making and social cognition [14, 15].

4.2 Emotional influences on perception

Processing sensory information that has potential emotional significance take priority over processing inconsequential sensory information. Such emotional prioritization is accomplished either by automatic (involuntary) or by a voluntary attentional bias. The involuntary perception occurs when information positively or negatively affects the individual. Voluntary attention towards the perception happen according to individuals' need and interest. The negative emotion such as anxiety, nervousness, fright and panic influence the perception negatively. Positive emotions such as joy, thrill, enjoyment and gratification influence the perception positively. The amygdala obviously overrides a capacity-limited perceptual encoding mechanism that allow emotional stimuli to reach awareness more readily. The anatomical connections between the amygdala and sensory cortices provide one avenue by which emotion might influence perception [16].

4.3 Emotional influence on attention

A first step in the allocation of attention is to alert and orient an individual to the emotional trigger. Emotions arrest ongoing behavior by engaging the autonomic nervous system. Attention of visual and auditory influenced by emotions. For example, in crowded visual scenes or when multiple visual stimuli compete for attention, emotional stimuli bias both the initial direction of eye movement (overt attentional orienting) and the distribution of eye movements over time (sustained attention). These changes in visuospatial exploration ensure that the stimuli of greatest importance at any particular time are preferentially processed. Dichotic listening studies have shown similar effects of emotion on attention in the auditory domain. In these studies, emotional words or words associated with aversive outcomes presented in an unattended audio stream triggers autonomic responses.

4.4 Emotional influence on memory

When we reflect on our lives, we tend to recall that are personally meaningful and emotionally salient. Emotions associated with events or circumstances may have different consequences at different stages of memory processing, including encoding, consolidation and retrieval. Each emotional dimension or emotion category can drive distinct aspects of memory processing. Most research on emotional memory emphasize the transient influence of emotional stimulus content on autonomic physiology, brain activity and behavior that has consequences on memory performance. Two related concepts that are relevant for understanding mood effects on memory are mood-congruent memory and mood-dependent memory. Mood-congruent memory refers to the phenomenon whereby one's current mood biases the encoding and retrieval of events according to the valence of the mood. Mood-dependence memory refers to the phenomenon whereby material is remembered better when there is a match between the mood at encoding and the mood at retrieval than when mood differs across these two memory stage [17, 18]. All memories have an emotional component associated with them. Consequently almost all thoughts are emotionally based and when we recall them, we are also associating the emotions stored with them. As we recollect our combined memories related to people, place, things, time and events each with its own emotional association [19]. Emotions stimulates every thought process and it also plays an important role in association of memory.

4.5 Emotional influence on learning

Learning from emotional experiences is fundamental to well-being and survival. It is important not only to retain information about emotional events themselves but also to determine which features of the environment predict desired emotional outcome [15]. Emotional states induced by fear or stress directly affect learning and memory. Feelings and emotions have a strong influence on learning [20]. Positive emotions in learning makes the neural network stronger, thicker, faster and more stable. Negative emotions in learning makes the neural network feebler, slow and unstable. The amygdala is an emotional maker of the contents on their way to long-term memory and it has essential functions with anxiety, fear, and joy. It plays a role in recognizing emotional signals in mimic expressions [20] and it also influences learning process of the learner.

4.6 Emotional influence on decision making

Essentially, a decision is a choice among possibilities. It involves deep thinking and actions towards selecting or choosing needed one and neglecting or avoiding unwanted matters. A “good” decision is one that leads to the outcome that best satisfies the decision maker’s goals at the time the decision was made. The central role of emotions in decision making is doubtless in the valuation process, when we evaluate how much we want a consequence to occur. Three categories of emotions-anticipatory, expected and immediate can act on decision making. Anticipatory emotions occur prior to the decision and can help guide decision making by influencing risk and reward valuation. In contrast, expected emotions results from the outcome of decisions, leading to future expectations of feelings based on responses to similar outcomes. Immediate emotions influence decision making simply because they occur at the same time the objective perspective [15].

4.7 Emotional influence on social cognition

Emotions serve important social functions. Indeed, emotions evident in facial expressions, body language and by which we interpret the actions of others. Successful social interactions require that individual map perception to action in order to interpret and predict the behavior of others and respond appropriately. Empathy and sympathy play an important role in social cognition. A better descriptor of emotion understanding is empathy. Empathy is the ability to understand and resonate with another individual’s emotional experiences, which leads to a sharing of that person’s feelings. Once an empathetic feeling arises, individual distinguishing their own emotional response from that of the other individual and regulate their responses accordingly [15].

Empathy has both automatic and controlled components and builds on basic social cognitive and emotional processing mechanism. Recognizing emotions in others generates empathy to others. It is a kind of self-regulation process to realize and recognize others feelings and moods. This understanding makes interpersonal relationship with others. “You need to understand your own feelings to understand the feelings of others,” [21]. This emotional behavior important for social cognition. Sympathy is the feelings of pity or concern for another individual’s plight [15]. Sympathy creates to understand another person difficulties but it not give the other person actual emotional feelings.

5. Emotive cognition strategies

The skill of teaching and learning required appropriate usage of emotive cognition strategies. Purves et al. says “Emotive cognition refers to emotions modulate information processing in brain regions that mediate various cognitive functions, focusing on perception and attention, learning and memory, and decision making” [15]. Emotive cognition strategies stimulates joy, hope and pride as well as cognition of the learner. In same way cognition have strong influence on emotional functions. Application of these strategies in classroom teaching and learning reduce the students’ negative emotions and increase positive emotions. This process canalize cognitive functions to achieve the goal. Systematic interaction and connections of affective and cognitive domains while teaching produce high quality of teaching and learning among learns.

Usually, cognition and emotion are understood to be independent systems; however, research in the cognitive and neurobiological sciences has shown that the relationship between cognition and emotion is both interdependent and extensive [1]. Recent advances in neuroscience suggest that attention and memory, the two important cognitive components of learning, are profoundly affected by emotions [22]. The balanced emotional state of the mind concentrate on cognitive aspects of thinking and actions. This condition cognitive scientists call “working memory”. It enables the mind to a particular task to be proficient. It also functions quality in mental life, effort in intellectual activity and logical plan [23]. Working memory interacts closely with cognitive functions; for instance, it is intimately linked to perception and long term memory, which provide most of its input and content [15]. In this way the strategies of emotive cognition function while teaching and learning. Moreover, it enhances the teaching methods of the teacher and learning behaviors of the learner.

6. Cognitive functions in meaningful learning

Learning is the process of acquiring knowledge, skill and behavior modification of the individual according to the environment. The world in the 21st century insists that teaching and learning should be modified according to the need of the society. In these circumstances the learners have to practice their learning strategies like, higher-order thinking skills, deeper learning habits, complex thinking, emotive cognition, metacognition, communication skills and creative thinking in the learning of every concept. The teacher and the student have to understand the learning concepts in a scientific way. The science behind these concepts is that how learning occurs meaningfully.

Scientist Koizumi defines learning as a “process by which the brain reacts to stimuli by making neuronal connections that act as an information processing circuit and provide information storage” [24]. The meaningful learning process consists of cognitive functions such as perception, attention, learning, memory, problem solving and social cognition. The teacher as well as the leaners have to follow all these steps in their learning both inside as well as outside the classroom. If the teaching-learning process fulfills all the necessary steps in learning, then the learning will become meaningful.

6.1 Cognitive functions

Cognition plays a vital role in processing the information network function in the brain. Information is received and attended by our five senses. Depending

upon the nature of information it is transmitted to visual, auditory, smell, taste and somatic-sensory organs for recognition. It is processed for cognition, then it is stored in short-term or long-term memory. This process is significantly required in every learning activity. The cognitive perspective on learning is based on the assumption that knowledge acquisition lies at the very heart of learning. Once learners acquire new information in learning environments, they are supposed to use that information in completely different situations later in life. This is only possible if they have understood it correctly and stored it in a well-organized manner in their long-term memory (OECD) [25]. Cognitive functions such as decision making, problem solving ability, inductive and deductive reasoning and social cognition enhance learning ability.

Cognition encompasses the individual to sense himself and the world, through mental actions and language. Meaningful learning is a systematic cognitive process to understand the difficult concept for mental execution and representation, rather than storage and retrieval of information. Thinking, language (verbal or sign) and doing things are thus intimately inter-twined National Council of Educational Training and Research (NCERT) [26].

7. Meaningful learning

Today's field of education includes the relevant concept of "meaningful learning", which, for all aspects of learning, requires a different attitude than the traditional educational thought patterns. Through meaningful learning, the education system faces not only a challenge and an opportunity, but possesses the practical means to realize its commitment to the appropriate growth and empowerment of future generations [27]. Generally, meaningful learning refers to the intentional effort involved in relating new information to prior knowledge, especially new knowledge that is relevant to or experiential for the individual [28]. Meaningful learning were classified based on three criteria: (1) relevant prior knowledge of the student, (2) meaningful material organized by the teacher to connect to this prior knowledge, and (3) the conscious choice of the student to make connections between the prior knowledge and the new meaningful material. Integration between achievements of cognitive, affective and psychomotor domains can lead to meaningful learning [29, 30]. When a student is engaged in a learning activity and attempting to make sense of a new experience, the brain is inherently recalling previous feelings as well as previous thoughts and actions [31].

Meaningful learning connect the old information to the new information for understanding the difficult concept. It makes the learner in active and constrictive practices, which allow students to develop knowledge, reflects on the activities and articulates the information that are gained in a project [32–35]. It is also intentional and authentic by whom students are motivated towards a goal. Meanwhile, educators should plan their lessons and specify the outcomes that the students need to achieve. According to Meyers, there are three strategies for creating meaningful learning experiences such as (i) assessing early and often, (ii) letting the students get their feet wet, and (iii) welcoming student input in assignment and content [36]. There are five attributes of meaningful learning which are (i) cooperative learning, (ii) active learning, (iii) constructive learning, (iv) authentic learning and (v). Implementation these attributes with emotive cognition strategies in undergraduate teacher education programme enhance their meaningful learning behavior.

8. Meaningful learning in teacher education

Teacher education and teachers' professional development have regularly raised the problems of teacher education preparing teachers for delivering a predetermined curriculum instead of supporting their critical reflection and thinking skills [37, 38].

Meaningful learning practices in teacher education induce student-teachers to think logically, critical enquiry skills, individual and social understanding, solve problem and higher level cognitive functions. However, deeper understanding is needed for teacher education students' perception of meaningful learning. Student-teachers may construct their identity as teachers based on their processes of meaning making [39, 40]. Thus, the quality of their learning is an important element in their development as teachers and their teacher identity, as individual learning is naturally linked with changes in social role and identity. Meaningful learning occurs through learning habit, inside the classroom, outside the classroom and metacognitive behavior in learning. Undergraduate teacher education programme need to train their student-teachers meaningful learning behavior on above mentioned dimensions. It is explained in the following sections.

8.1 Learning habit

Learners have their own way of learning methods and techniques. These strategies develops the learning habit among learner. Every learner differ in their learning habit as well as their nature of learning preferences. The job of a teacher to cultivate the habit of new learning behavior, experience and ability to connect learned information with new information for meaningful learning. Developing appropriate leaning habit among learners enrich their knowledge, skills and behavior. Layng defines learning habits as the convergence of competencies in patterns of behavior aimed at learning [41]. The individual's learning habit is interrelated to cognitive, metacognitive, motivational, and social/emotional behavior. Building these behaviors enhance individual learning habit.

8.2 Learning inside the classroom

In classroom learners acquire knowledge and skills through cognitive and emotional involvement. The cognitive and motivational quality of classroom instruction is extremely important for students' learning. Well-structured, clear instruction and use of moderately challenging tasks promotes students understanding. As a result, students' experience influences on increase of self-confidence and enjoyment, and a reeducation of boredom and anxiety. The motivational quality of instruction influences the perceived value of learning, thereby promoting enjoyment and reducing boredom. Motivational quality involves meaningful tasks that catch and hold students' interest and attention towards their attainment of learning goal. Teacher emotions influence students' learning. Teachers' positive emotions can promote students' enjoyment of learning within the classroom and can have long-lasting effects on the value of learning perceived by students, United Nations Educational, Scientific and Cultural Organization (UNESCO) [42]. Therefore, appropriate cognitive and emotional applications in classroom teaching can enhance students' meaningful learning.

8.3 Learning outside the classroom

Learning takes place outside the classroom also. Learning outside the classroom is the use of places other than the classroom for teaching and learning. Learners

observe, practice and get experience outside the classroom based on what they have learned inside the classroom. Learners can learn outside the class room. Some learners feel hard to engage inside the classroom environment. They learn freely or interestingly with their peer group outside the classroom. They interact, discuss, collaborate, argue and express positive and negative feelings and engage the self-learning behavior while learning outside the classroom. Learning outside the classroom can happen at almost any time and almost anywhere – outdoors or indoors: in the institutional grounds, in museums and art galleries, field trip or elsewhere in the world. Students can participate in debates even outside the class. They also participate in writing and oratory competition, inter and intra cultural events and active role in team projects outside the class. Learning outside the classroom creates progressive experiences and it develops knowledge and skills among learners. It is a powerful tool that is proven to raise attainment, strengthen social, emotional and personal development and contributes to the health and wellbeing of the learners.

8.4 Metacognitive behavior in learning

Metacognition is defined as individuals' knowledge about their cognitive behaviors or arranging these behaviors through the learning process [43, 44]. Metacognitive knowledge and skills are essential in effective learning. Metacognitive knowledge can be described as the knowledge, awareness, and deeper understanding of one's own cognitive processes and products [45]. Metacognitive skills can be defined as learning how to learn [46]. Metacognition refers to the knowledge one possesses about cognitive processes, monitoring and regulating these cognitive processes in order to serve a concrete goal [47]. With more detailed expression, it can be said that metacognition involves knowledge about cognitive process, and monitoring and controlling of this process [48, 49]. It plays important role in process of learning. Learners' metacognitive behavior in learning enables their regulation in cognitive process, monitoring, understanding ability and problem solving skills. It generates meaningful learning among learners.

8.5 Meaningful internship and school experience

Pre-service teacher education programme should provide and engage meaningful learning internship and school experience. During the internship training programme pre-service teachers need to understand the curriculum, pedagogical practice, classroom climate and appropriate usage of teaching and learning aids. They should understand the cognitive, emotional, social and physiological aspects of learners and teaching-learning environment. Through internship student-teachers train to design, organize, and conduct meaningful classroom activities, critically reflect upon their own practices through observations, record keeping and evaluation of students and evaluation himself. Pre-service teachers should get meaningful school experience through observing the in-service teachers while teaching in their classroom. It create awareness among student-teachers regarding classroom management, learners cognitive engagement, in-service teacher emotional management and learners emotional expressions. These practices proved pre-service teachers to understand the school experience and it will helpful for regular teacher in a school. National Curriculum Framework for Teacher Education (NCFTE) [50].

To enhance meaningful learning among undergraduate student-teachers, the teacher education programme should have proper emotive cognition strategies application in their programme. When the student-teachers get meaningful learning

experience during their pre-service training, definitely they will inculcate the behavior of meaningful learning in their learners.

9. Statement of the problem

Before being the ICSSR PDF Scholar in Pondicherry University, the teacher educator has worked as a school teacher for 2 years and teacher educator in college of education for 4 years. At those years, in his observation felt that in-service teachers as well as student-teachers were mechanical in their nature of work. Moreover, he observed the fact that the teachers and student-teachers were very less aware about the emotive cognition strategies in their teaching; the effect of emotions in cognitive functions and its influence on meaningful learning. They know little about state of emotions experienced by the students in the academic settings and their emotions in different academic situations such as learning in classroom, taking tests and exams, maintaining inter-personal relationship, completing assignments and projects. Positive activation emotions such as enjoyment, pride and hope, negative activation emotions of anger, shame and anxiety modulate the cognitive functions. Positive deactivating emotions such as relaxation, relief and contentment, negative deactivation emotions of boredom, disappointment and hopelessness also influence the cognitive functions. The effect of these four groups of emotions on teaching and students' meaningful learning have not been recognized in teacher education programme. In teacher education programme, understanding students' experiences in meaningful learning is essential for teacher educators to know how emotive cognition plays an impotent role in meaningful learning.

Teachers and student-teachers are emphasized to prepare teaching aids and design their teaching strategies to activate the cognitive domain of learners. They gave less importance or rather neglected in activating the affective domain while teaching and meaningful learning. As a consequence the researcher has realized the need for sensitizing these problems among student-teachers to think and reflect on the integration of affective and cognitive domains in their meaningful learning. The teacher education programme needs to implement the emotive cognition strategies among student-teachers. This application develops the empathy, interest, enjoyment, responsibility, problem solving ability, social cognition and meaningful learning among student-teachers. Teacher education institutions and the teacher educators are not much aware about emotive cognition strategies applications in their teaching. To understand the emotive cognition strategies on enhancing meaningful learning in teacher education programme is also a problem among teacher educators and student-teachers.

A critical consideration of quality teacher education programme for 21st century requires vigorous practice of emotive cognition strategies application in teaching develops meaningful learning among student-teachers, and it also builds cognitive competencies such as perception and attention, memory and learning, knowledge, decision making, problem solving ability, inter-personal skills and intra-personal skills among the future teachers [51].

10. Need for the study

Teaching is an art to impart knowledge skills and inculcate behavior among learners. It requires various tactics to enhance learning. More understanding is needed of

how learners personally construe and construct their learning experiences [40, 52]. Especially in teacher education programmes, the provision of meaningful learning experiences for students is considered critical for ensuring the student-teachers understand what is to be learned [53]. Teacher education programme required investigation on meaningful learning among student-teachers to gain proper understanding about how student-teachers construct their knowledge, skills and behavior. This understanding could help educational policy makers and teacher educator to develop courses and strategies to enables richer and more relevant learning among student-teachers [54]. Nowadays there is awareness and increasing usage of the term “emotional intelligence”. Emotional knowledge is an important part in teaching and so it is greatly needed to understand teaching and learning. Emotions have a profound influence on learners’ perception, attention, memory and learning.

Traditionally, cognition and emotion are believed to be independent systems; however, research in the cognitive and neurobiological sciences have shown that the relationship between cognition and emotion is both interdependent and extensive. This intimate connection between emotion and cognition leads to a number of insights that have the potential to inform and transform educational practices at all levels from the classroom to the curriculum to educational policy [1]. The application of emotive cognition strategies in teaching develops strong inter-relationship between teachers and learners. It triggers cognitive functions on learning and creates conducive meaningful learning behavior among learners. Emotions play an important role in every cognitive function. The cognitive processes are sensitized, focused, invigorated, directed, broadened and sharpened by the emotions. The application of emotive cognition strategies in the classroom teaching and learning triggers the learners’ feelings internally and externally towards various mental functions. Teachers also agree that students’ participation in the class to learn meaningfully when they feel good about themselves and their lives. Emotions act as filters to form learners’ desires, furnish learners capacities and to a large extent rule their immediate thoughts. However, deeper understanding is needed in teacher education programme that how student-teachers’ emotive cognition behavior enhances their meaningful learning. In the area of teaching and learning many researches have been conducted separately on emotions or cognition aspects. But, a few researches have been conducted in combination with affective and cognitive domains. In this research, undergraduate student-teachers’ affective and cognitive domains have been integrated to enhance their meaningful learning and it will produce a successful competent teacher with excellence for future learners.

11. Significance of the study

Students have to be prepared to solve the problems and skillfully to do their work towards fulfilling the 21st century requirement. Learners need to develop their own competencies to face any kind of difficult situations and they have to show their ability in all aspects how they are unique and competent from others. Developing competencies possible through meaningful learning application in every curriculum transaction. In this perspective undergraduate student-teachers have been trained through emotive cognition intervention programme on enhancing meaningful learning among future teachers. Cultivating meaningful learning create clear knowledge, skills and appropriate behavior modification to the learner. Meaningful learning develop proper understanding, experience and thinking ability among student-teachers. Understanding these concepts can help teacher educators to design a meaningful

instructional practices to make learning richer and relevant. In teacher education programme connecting cognitive and affective domains while teaching-learning facilitate student-teachers meaningful learning. In this prospect emotive cognition strategies plays vital role in student-teachers meaningful learning. The application of positive emotions such as hope, happiness, excitement, joy, thrill and amazement in teaching rises cognitive functions of perception, attention, learning, memory, decision making, problem solving ability and social cognition of the learners. Negative emotions declines cognitive functions.

In this study emotive cognition intervention programme contains full of positive emotional strategies to stimulate undergraduate student-teachers' cognitive functions on meaningful learning behavior on attention towards learning, consciousness in their thoughts and emotions, perception of self-awareness, self-reflection, self-contemplation and self-observation, ability of easy to memorize the new concepts, develop professional skills, inter-personal relationship ability, habits of acquire general knowledge, ability of decision making and attaining the ability in nature of survival. All these anticipated outcome can be achieved by employing emotive cognition intervention programme. This treatment programme promote teacher education programme in a significant way.

12. Objectives of the study

The following objectives for investigation.

- To find out the existing level of emotive cognition strategies application in teaching-learning in B.Ed. class.
- To find out the existing level of meaningful learning behavior among B.Ed. student-teachers of the sample.
- To find out the level of Emotive Cognition Strategies Application among B.Ed. student-teachers after implementing emotive cognition intervention programme.
- To find out the level of Meaningful Learning behavior among B.Ed. student-teachers after implementing emotive cognition intervention programme.
- To find out the relationship between Emotive Cognition Strategies Application and Meaningful Learning behavior of B.Ed. student-teachers.
- B.Ed. student-teachers' meaningful learning will be predicted through emotive cognition strategies application.

13. Assumptions of the study

- B.Ed. Programme incorporates strategy application in teacher preparation.
- Enhancement of meaningful learning could be possible through emotive cognition strategies application.
- It is possible to design and structure emotive cognition strategy application modeling to enhance meaningful learning.

14. Research method

Since experiment is considered to be the scientifically sophisticated research method, the teacher educator need to adopt experimental method to study the operationalizing emotive cognition strategies on enhancing meaningful learning among B.Ed. student -teachers.

The teacher educator has to enhance meaningful learning among B.Ed. student-teachers through the intervention of Emotive Cognition strategies Application in Teaching. Two groups needed, one as the Experimental and the other as the Control group that had been under the traditional way of teaching.

In this study the teacher educator has to adopt Experimental design – Pre test – Post test – Control group design [55].

15. Field implementation Programme

The teacher educator has to implement the designed treatment to the experimental group. During the treatment, emotive cognition strategies were applied in classroom teaching-learning process. The lesson plan includes emotive cognition strategies application in every classroom teaching. Interacting and collaborating with the learners enthusiastically create consciousness in learning it sustain the learner attentive towards the information. Asking learners past joyful learning experience triggers thinking about learned concept to facilitate link prior knowledge with new knowledge this process functioning towards meaningful learning. Training the learners on right decision making to schedule their learning programme formulates processing thinking for decision making. It empower the learner in decision making. Training students to help each other in their learning inculcates the behavior of understanding peers' thought. This process enrich inter-personal relationships among learners. Providing situations for learners to apply logic and solve problems induces problem solving ability in their learning as well as real life situations. Integrating students' joyful episodes in their learning to enhance their formation of concepts makes the memory and recognizing ability. These strategies triggers the positive emotions of enjoyment, pride, hope and happiness and it modulate cognitive functions of the learners' perception, attention, learning, memory, decision making and social cognition. Implementation of all these strategies enhance undergraduate student-teachers meaningful learning behavior (**Figure 1**).

16. Discussion

The purpose of the study is to find out the effect of emotive cognition strategies on enhancing meaningful learning among B.Ed. student-teachers. The application of emotive cognition strategies among B.Ed. student-teachers stimulated their emotive cognition towards the enhancement of meaningful learning behavior.

Emotions have strong influence on cognitive functions such as perception and attention, learning and memory, decision making and social cognition. The frequent interaction of affective and conative domains in teaching trigger's high cognitive ability on student's goal setting and their good academic achievement. From the perspective of constructivist theories, emotion results from learning assemblies of relevant perceptual, cognitive, interoceptive, and motor processes

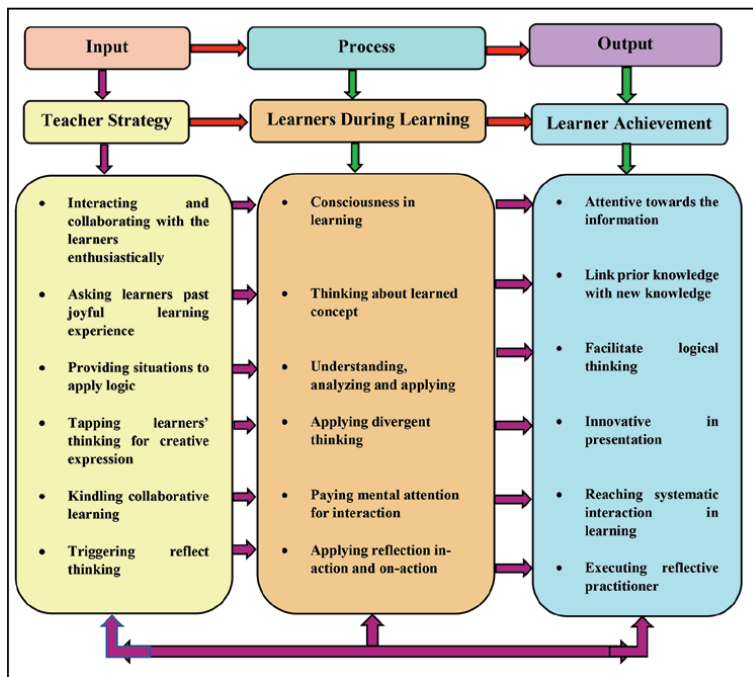


Figure 1.
 Ananda Kumar's model on operationalizing emotive cognition strategies on enhancing meaningful learning among undergraduate student-teachers.

in specific situations. Across emotional experiences over time, learned assemblies of processes accumulate in memory that later underlie emotional experiences in similar situations [56]. Matthius Laukenmann et al. who found that wellbeing and interest as cognitive emotional construct, play a significant role in achievement [57]. Allyson P. Mackey et al. who worked found that the Cognitive Skill Instruction (CSI) group improved significantly more than the control group on the cognitive composite [58].

Perception is the subjective awareness of any aspect of the external or internal environment. Positive emotions such as joy, thrill, enjoyment and gratification influence perception positively. Perception triggers cognitive function externally as well as internally in each of the learning process. It involves the analysis of sensory information. External perception occurs through five sensory organs and it transmits the information to the specific cortical region of the brain. Every new learning and understanding occurs through this sensory information processing. Perception plays a vital role in individual awareness on receiving and acquiring any new information. Maria Chiara Passolunghi who found that experienced emotional engagement in teacher–student and peer group relations had significant indirect effects on students' perceived cognitive engagement [59].

Attention is an essential neurobiological function that allows humans to continually and dynamically select the most important or interesting stimuli in the external or internal environment. A first step in the allocation of attention is to alert and orient an individual to emotional trigger. Emotions arrest ongoing behavior by engaging the autonomic nervous system. Attention to visual and auditory stimulus is influenced by emotions. When learners sustain their attention towards their learning, the information

will successfully be transmitted to brain and it will be received, recognized and analyzed for clarity, and then the information will be stored in the brain. It is concurred with the research findings of Luigina Mortari who worked on 'Emotion and Education: Reflecting on the Emotional Experience Emotion and Education.' They got students' reflections. A student reflected "First of all, I have learned to pay more attention to what happens to me every day" (Paying attention to oneself); "I have learned to pay more attention to what each emotion arouses in me" (Understanding the quality of one's emotional life) [60].

Memory is the process of recalling, remembering and retrieving the previously learned information by the learners. When we reflect on our lives, we tend to recall the events that are personally meaningful and emotionally salient. Emotions associated with events or circumstances may have different consequences at different stages of memory processing, including encoding, consolidation and retrieval. Each emotional dimension or emotion category can drive distinct aspects of memory processing. Emotions stimulates every thought process and it also plays an important role in association of memory. Memory regulates the mental process of the learners to achieve the learning goal for obtaining knowledge, developing skills and cultivating their memory processing behaviors. It is concurred with the research findings of Maria Chiara Passolunghi who found that a significant difference between groups was shown in correct recall of the target words and correct recall of the series [59].

Learning is the process of acquiring knowledge, skill and behavior modification of the individual according to the environment. Learning from emotional experiences is fundamental to well-being and survival. It is important not only to retain information about emotional events themselves but also to determine which features of the environment predict desired emotional outcome. Emotions strongly influence the learning process. Positive emotions such as enjoyment, pride, hope and happiness have positive effects on learners' cognitive function in meaningful learning. Negative emotions such as anxiety, anger, grief and shame can strongly inhibit on learners' cognitive process while learning. It is concurred with the research findings of Matthias Laukenmann et al. who found that the high achievers experience more joy and interest in physics than low achievers [57]. Karen C. H. Zhoca et al. found that Emotional Intelligence was significantly correlated with self-directed learning [61].

Decision making is the high level cognitive process. It contains higher-order thinking skills to solve the problem. It comprises conscious thought process for the purpose of selecting and acting on right path to attain the anticipated goal. A "good" decision is one that leads to the outcome that best satisfies the decision maker's goals at the time the decision was made. The central role of emotions in decision making is doubtless in the valuation process, when we evaluate how much we want a consequence to occur. Three categories of emotions-anticipatory, expected and immediate can act on decision making. It is concurred with the research findings of Maria Poulou & Brahm Norwich who worked on cognitive, emotional and behavioral responses to students with emotional and behavioral difficulties: a model of decision-making. The results revealed that causal attributions as predictors of emotional and cognitive responses to emotional and behavioral difficulties [62].

Social cognition is the process of interpersonal behavior of an individual where the individual understands his own thoughts and feelings and able to understand feelings and thoughts of others. This interpersonal behavior generates social cognition. Emotions serve important social functions. Indeed, emotions are evident in facial expressions, body language and by which we interpret the actions of others. Successful social interactions require individual map perception to action in order to interpret and predict the behavior of others and respond appropriately. It is concurred

with the research findings of Stare Kaviani & Zohre Saadatmand who found that the difference between interpersonal, adaptability, and general mood scores of emotional intelligence in control and experimental groups is statistically significant [63].

Today's field of education recognized the important of "meaningful learning" concept in all aspects of learning. Meaningful learning processed through several emotional and cognitive functions. It also required different teaching and learning strategies while transacting the curriculum. Teacher education and teachers' professional development have regularly raised the problems of teacher education preparing teachers for delivering a predetermined curriculum instead of supporting their critical reflection and thinking skills [37, 64]. Meaningful learning occurs through learning habit, both inside the classroom and outside the classroom and metacognitive behavior in learning. Therefore the researcher designed a 'Model on Emotive Cognition Strategy on Enhancing Meaningful Learning among B.Ed. Student-Teachers'. It is concurred with the research findings of Emma Kostianen et al. who found that necessary to generate meaningful learning experience in the context of teacher education: (1) Course design; (2) Gaining strong experience; and (3) Broad spectrum of emotions [65].

Each student have his own personal interest to decide what to learn, when to learn, what methods to apply, how to learn and how much effort to invest to learn a difficult concept. The learning habit differ from individual to individual. Therefore, the responsibility of a teacher is to help the student to develop appropriate learning a habit.

The individual's learning habit is interrelated to cognitive, metacognitive, motivational, and social/emotional behavior. Building these behaviors enhance individual learning habit. It is concurred with the research findings of Moises Esteban-Guitart et al. who found that 43 significant learning experiences were identified from four young students who recorded their specific learning experiences during a week by means of a significant learning experiences journal and photographs they took themselves [66].

In classroom learners acquire knowledge and skills through cognitive and emotional involvement. The cognitive and motivational quality of classroom instruction is extremely important for students' learning. Teacher emotions influence students' learning. Teachers' positive emotions can promote students' enjoyment of learning within the classroom and can have long-lasting effects on the value of learning perceived by students [42]. Therefore, appropriate cognitive and emotional applications in classroom teaching can enhance students' meaningful learning. It is concurred with the research findings of Tamara N. Hrin et al. (2016) who found that the effect of systemic synthesis questions [SSYNQS] on students' performance and meaningful learning in secondary organic chemistry teaching [67].

Learning takes place outside the classroom also. Learning outside the classroom is the use of places other than the classroom for teaching and learning. Learners observe, practice and get experience outside the classroom based on what they have learned inside the classroom. Learning outside the classroom creates progressive experiences and it develops knowledge and skills among learners. It is a powerful tool that is proven to raise attainment, strengthen social, emotional and personal development and contributes to the health and wellbeing of the learners. It is concurred with the research findings of Leena Aarto-Pesonen and Arja Piirainen (2020) who found that three major learning worlds. The first learning world, the professional awakening, consists of three categories: egocentric learner, expanding professionalism and responsibility for self-development. In the second learning world, transformative community, adult students experience how they are members of learning communities.

Metacognition is defined as individuals' knowledge about their cognitive behaviors or arranging these behaviors through the learning process [43, 44]. The application of metacognitive strategies in learning triggers higher-order thinking skills among learners. Through metacognition the learner can evaluate himself on what knowledge he has gained in every subject, knowing the present learning progress and experience on every learning process. The systematic practice of metacognition in teaching and learning enhance the learners' abilities in problem solving, and self-regulated learning. It is concurred with the research findings of Phyllis Baudoin Griffard and James H. Wandersee who found that without cognitive engagement, neither intentional, meaningful learning nor metacognitive awareness can develop [68].

17. Conclusion


Teacher education is a programme in which student-teachers are trained to perform well in their teaching career. In teaching and learning process both teachers and learners experience emotion and cognition enjoyment for meaningful learning. In teacher education important given for cognitive aspect of learning and neglected the emotional aspect of learning process. Therefore, teacher education program needs to integrate cognitive and affective domains in an appropriate way to enhance meaningful learning among student-teacher. Application of emotive cognition strategies in every classroom teaching-learning as well as in entire teacher education program create conducive learning environment. Appropriate emotive cognition strategies application in teaching among student-teachers positively interconnects emotion and cognitive functions in their learning. This process enhances meaningful learning. Therefore, undergraduate teacher education programme needs conscious awareness on emotive cognition strategies to train their student-teachers meaningful leaning behavior. It will also reflect their learners' to learn meaningfully.

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Perspective Chapter: English for Academic Purposes Teacher Education – Prerequisites, Predicaments, and Perquisites

Seyyed Hossein Kashef and Abdolreza Khalili

Abstract

A scrutiny of the factors which sway language instruction in the context of the classroom has made the researchers cognizant of the fact that teachers perform a pivotal role in the process of instructed Second Language Acquisition (SLA). The apprehension of this issue has prompted a large number of researchers to use *teacher education* as a surrogate for the traditional term *teacher training* in order to illustrate the multi-layered nature of the prospective teachers' preparation period. Meanwhile, SLA researchers have taken cognizance of the fact that even the state-of-the-art teacher education courses may not empower the language instructors, who teach English for Academic Purposes (EAP) courses, to fulfill their potential in the pertinent courses. Considering the above-mentioned issues, this chapter strives to review the recent research in order to: (a) expound on the essential prerequisites for the development of EAP teacher education courses; (b) determine the probable major hurdles in the teaching of these courses; and (c) extol the virtues of the relevant courses in different academic settings.

Keywords: EAP, general english courses, language teachers, teacher education, teacher educators

1. Introduction

In light of multitudinous studies [1–14] teacher education has attracted considerable attention in the field of SLA. This term has been used as a surrogate for the traditional term teacher training in recent decades in order to characterize the multi-layered nature of the language teachers' knowledge in the context of the classroom [15]. That is, it has been introduced into the field of instructed SLA to accentuate the fact that the traditional teacher training courses, which focused on the practical issues of language instruction, are not able to empower the teachers to deal with the multitudinous intervening factors which thwart the process of language instruction [16].

Furthermore, teacher education has substituted teacher training to draw attention to the complicated nature of language teaching and learning in academic settings [12]. More specifically, it intends to make teacher educators and teachers cognizant of the fact that the teachers' knowledge about the underlying principles of SLA enables them to take account of the diverse variables which are likely to mediate the impact of instructional approaches on the language learners' acquisition of the various aspects of the target language [17]. Considering these issues, language teacher education can be defined as the process in which the pre-service and in-service language teachers are provided with adequate information on the theoretical discussions and practical concerns in the field of SLA and are prompted to put the theory of SLA into practice by taking account of innumerable factors including the learners' individual differences, contextual variables, and cultural issues among others [18].

A close scrutiny of the relevant literature [19–21] indicates that teacher education has become a recurrent line of research in the field of EAP in second and foreign language learning contexts. EAP constitutes a sub-branch of English for Specific Purposes (ESP) which characterizes the courses that provide the language learners with information on certain vocabulary items, grammatical structures, discourse feature, and genre-based issues and empower them to perform particular functions which are prerequisite to their occupation [22, 23]. Considering this definition, ESP comprises a wide range of courses such as Business English, Aviation English, and Functional English among others [24]. Ha and Hyland [25] pointed out that EAP has emerged as a sub-branch of ESP in order to empower the higher-education students, who major in diverse subjects, to continue their studies in second language contexts in an effective way. Likewise, Hyland [26] stated that EAP courses strive to facilitate the students' development of language skills which are considered to be the *sine qua non* of their pertinent subject areas. As he explained, these courses apprise the students of the most frequent vocabulary items of their fields and inform them about the grammatical structures which are preferred in their pertinent disciplines. Moreover, they make the learners cognizant of the discourse-based and genre-based aspects of their majors and assist them to perform their educational tasks.

Notwithstanding, various issues are likely to complicate the teaching of EAP courses in the academic settings [3]. These issues encompass a wide range of problems which stem from the conceptualization of this sub-branch of ESP [23, 27, 28]. Bell [29] stated that a large number of EAP courses are developed in complete disregard of the theoretical foundations of this field and equate EAP with general English knowledge. He noted that, most of the aforementioned courses shrug off the peculiarities of EAP and use the Grammar-Translation Method to provide the EAP learners with their pertinent instruction. Likewise, Collins and Holliday [30] pointed out that EAP program developers do not take heed of the underlying principles of this field of study and assume that the learners' knowledge about the various aspects of the language of their major is a by-product of the teaching of various technical texts in their EAP classes. Considering these issues, Tardy [21] averred that there is a need to redress the EAP teacher education courses in order to empower the EAP instructors to deal with the thorny issues of instruction in these courses and to ensure their continuous professional development. On the basis of the above-mentioned discussions, this chapter intends to shed light on the current issues of EAP teacher education. To this end, first, it expounds on the prerequisites of EAP teacher education in various contexts. Second, it highlights the predicaments that complicate the education of EAP teachers. Finally, it elucidates the perks of EAP teachers' education in the academic settings.

2. Prerequisites of EAP teacher education

Parsons et al. [17] argued that the prospective teachers' knowledge of the theoretical discussions of the target language is the desideratum of effective language instruction in the context of the classroom. Likewise, Zou and Hyland [31] accentuated the fact that the EAP teachers need to form a clear conception of EAP in order to expedite their learners' development of their requisite skills. These issues highlight the fact that the first prerequisite of EAP teacher education is EAP course developers, teacher educators, and teachers' cognizance of the fact that EAP constitutes an independent field of study which has been developed based on a scientifically sound theory. The theory of EAP is formulated in light of the needs-based structure of its courses [21].

Moreover, as Paltridge et al. [19] pointed out, EAP constitutes a field of study which takes advantage of the results of research in the other disciplines and strives to utilize their efficacious research methods. Similarly, Zhao et al. [15] noted that this field draws on the underlying educational principles of various fields of knowledge due mainly to its multidisciplinary nature. Given this characteristic of EAP, it can be stated that the second prerequisite of EAP teacher education is EAP teacher educators and program developers' knowledge about the prominent research methods and techniques which extend its boundaries in the different academic settings.

Furthermore, Luzón and Pérez-Llantada [32] noted that EAP education has always been concerned with practical issues. According to them, these courses intend to facilitate their learners' development of their necessary skills and evaluate the degree to which the learners are able to use their skills in order to perform their tasks in academic settings. In a similar way, Luo and Hyland [33] stated that the distinguishing factor between EAP courses and general English courses is their focus on the learners' outcomes. They explained that, the performance of bone fide tasks such as writing technical reports and memos is the demarcation line between the EAP courses and the general English courses which mostly involve the educational tasks which are developed for language teaching purposes. Therefore, it can be averred that, EAP teacher educators, program developers, and teachers' awareness of the outcome-oriented nature of EAP courses constitutes the third prerequisite of EAP teacher education.

In addition, Johns [34] pointed out that EAP courses have to be developed on the basis of the language learners' academic needs. He explained that the efficacy of these courses depends on the degree to which they take account of the reasons behind the learners' language studies. Similarly, Liao et al. [35] noted that the language teacher education courses have to apprise the in-service and pre-service teachers of the fact that the congruence between the course objectives and learner needs deeply affects the effectiveness of EAP courses. Therefore, the fourth prerequisite of efficient EAP teacher education is EAP program developers, teacher educators, and teachers' knowledge about the consequential role of the needs analysis in the development of EAP courses. That is, they need to take heed of the fact that the EAP courses are not able to serve a different function from the general English courses unless they target their learners' academic language learning needs.

Additionally, Anthony [36] stated that EAP courses may not be uniform in terms of their content and methodology. As he explained, this issue stems from the fact that these courses strive to empower the learners to perform their major-specific tasks. That is, the difference between the academic requirements of the learners' majors is accompanied by the difference between the structures of the EAP courses. In a similar way, Basturkmen [37] noted that the EAP course developers must take heed

of the various skills and aspects of the language which are deemed essential in various disciplines. This issue underscores the fact that the fifth prerequisite of EAP teacher instruction is EAP syllabus designers, teacher educators, and instructors' understanding of the significance of the disparities among the different academic disciplines in the development and teaching of efficacious EAP courses.

Moreover, as Bocanegra-Valle [38] noted, EAP courses make an attempt to deal with the needs of the adult language learners during their secondary or tertiary education. As he noted, the language learners' age may preclude the use of specific teaching techniques and strategies which are implemented in the general English courses. In a similar way, Basturkmen, and Bocanegra-Valle [39] argued that EAP instructors should be able to deal with the affective factors which impede the adult EAP learners' language learning in the context of the classroom. Based on this issue, it can be argued that the sixth prerequisite of EAP teacher education is EAP syllabus designers, teacher educators, and instructors' recognition of the potential incongruity between the teaching strategies in the EAP courses and the general English courses and the role of the adult EAP learners' affective factors in the process of their language acquisition.

Furthermore, Guillén-Galve and Bocanegra-Valle [40] stated that EAP courses target intermediate-level or advanced-level language learners. That is, the learners' knowledge of fundamental aspects of the target language is a necessary precondition of their participation in these courses. Similarly, Ding and Evans [30] noted that the language content of the EAP courses has to build on the learners' language knowledge in order to ameliorate their development of the required skills of their majors. These issues foreground the pivotal role of appropriate learner placement in the EAP courses. Therefore, it can be stated that the seventh prerequisite of EAP teacher education in different academic settings is EAP program developers, teacher educators and teachers' understanding of the significance of learner placement in these courses.

Additionally, Freeman et al. [41] stated that the language teacher education courses have to exhort the prospective teachers to take advantage of the assistance of experts in the other disciplines to expedite the learners' language acquisition in the context of the classroom. In a similar way, Hyland [42] argued that EAP teachers have to acquaint themselves with the methodological features of the EAP learners' fields of study in order to ameliorate their language skill development. Likewise, Hyland and Jiang [43] pointed out that EAP teachers' collaboration with the experts of the learners' academic disciplines provides them with a better understanding of the underlying principles of the pertinent fields and empowers them to use their methodology in an efficacious way. These issues draw attention to the fact that the eighth prerequisite of effective EAP teacher education is the EAP syllabus designers, teacher educators, and teachers' cognizance of the utility of cooperation between the EAP teachers and field experts for teaching EAP courses in different academic settings.

Lastly, Pérez-Llantada and Swales [44] stated that redressing EAP teacher education courses depends on the education of the EAP teacher educators. According to them, the teacher educators' lack of knowledge regarding the theoretical and practical issues in EAP precludes them from providing the prospective teachers with viable solutions to the potential instructional problems which arise in the context of the classroom. Likewise, Woodrow [45] stated that there is a need to re-educate the EAP teacher educators in order to make them cognizant of the utility of theoretical considerations of this field along with its practical implications. Therefore, it can be noted that the ninth prerequisite of EAP teacher education is the EAP program developers' recognition of the need for redressed education courses to educate the EAP teacher educators. The above-mentioned prerequisites of the development of EAP teacher

education courses indicate that EAP teacher education course developers encounter various problems in the process of running these courses.

3. Predicaments in EAP teacher education

Tavakoli and Tavakol [46] pointed out that, EAP teacher educators are not able to provide the prospective EAP teachers with satisfactory education due largely to financial problems. According to them, the preponderance of the EAP courses is not funded by governmental grant in university settings. Moreover, the language institutes are not capable to fund appropriate EAP teacher education courses. Moreover, Taherkhani [47] pointed out that the current EAP teacher education courses are not able to furnish the pre-service and in-service EAP teachers with useful manuals which apprise them of the ways of putting the theory of EAP into practice in the context of the classroom.

Furthermore, Soodmand Afshar and Donyaie [48] noted that the lack of effective teacher education courses in second and foreign language learning contexts stems from the lack of access to erudite EAP teacher educators in these contexts. As they explained, most of the current EAP teacher educators are self-taught and have not attended specific education courses. According to them, this issue precludes them from providing the prospective EAP teachers with effective education regarding the theoretical and practical issues of this field of study.

Finally, Wichadee [49] argued that the EAP teacher education program developers and EAP teacher educators' reluctance to seek assistance from the field experts constitutes one of the major impediments to the development of effective EAP teacher education courses. He noted that, in most of these courses, program developers and teacher educators presume that their understanding of the technical jargon of the various fields of study ensures the sufficiency of their knowledge of the pertinent fields. Notwithstanding, as he pointed out, the collaboration between the EAP program developers and teacher educators and the experts of the relevant disciplines is the sine qua non of their acquaintance with the methodological features of the relevant fields. As he concluded, the development of efficacious EAP teacher education courses offers several advantages over the traditional EAP teacher training courses in second and foreign language learning contexts.

4. Perquisites of EAP teacher education

Tardy [21] argued that EAP teacher education is likely to have certain theoretical implications in various academic settings. As he explained, effective EAP teacher education courses heighten the pre-service and in-service EAP teachers' awareness of the research methodology of this field and exhort them to conduct action research on the various aspects of EAP in their classes. Likewise, Pérez-Llantada and Swales [44] pointed out that the EAP teachers' cognizance of the consequential role of research in their field is likely to prompt them to extend its boundaries by developing effective EAP instruments. As they explained, EAP teachers may focus on their peers and develop instruments for assessing their individual factors including their motivation, attitudes, and beliefs among others. Moreover, they can focus on different disciplines and develop certain instruments such as objective grading frameworks to evaluate the EAP learners' skills in the language tasks of their pertinent disciplines.

Moreover, Iranmehr et al. [50] stated that effective teacher education courses might have specific practical implications in both second and foreign language learning contexts. According to them, the preponderance of EAP teachers teach both EAP and EFL courses and are not able to focus on their EAP classes in a satisfactory way. As they explained, effective EAP teacher education courses are likely to encourage these teachers to develop critical expertise in the teaching of EAP courses and to perform the role of EAP teacher educators over the course of time. Finally, as Basturkmen, and Bocanegra-Valle [39] noted, effective EAP teachers education courses make the EAP teachers cognizant of the consequential role of EAP materials and exhort them to evaluate the current materials based on the pertinent criteria in this field of study. According to them, EAP program developers can take advantage of the EAP teachers' feedback to ameliorate the instructional materials of the EAP courses in different language learning contexts.

5. Conclusion


This chapter strived to expound on the prerequisites, predicaments, and perquisites of EAP teacher education by reviewing the recent studies of this field of study. It appears that a number of provisional conclusions can be drawn based on the above-mentioned discussions of the EAP teacher education courses. First, EAP teacher education program developers need to set up public funds in order to develop satisfactory EAP teacher education courses in both university and language institute settings. Second, they need to seek assistance from international EAP teacher educators in order to re-educate their EAP teacher educators and to provide them with state-of-the-art theoretical perspectives on the various aspects of this field of study. Third, they have to include certain modules in the EAP teacher education courses which provide the in-service and pre-service teachers with sufficient information on the theoretical discussions, research methodology, nature, objectives, and needs-analysis of EAP courses. Fourth, it is recommended that they make the EAP teachers cognizant of the EAP learners' characteristics and apprise them of the disparities between various EAP courses in terms of their content and methodology. Fifth, they should take advantage of the field experts' knowledge and expertise by asking them to collaborate with the EAP teacher educators in the EAP teacher education courses. Sixth, they have to furnish the in-service and pre-service EAP teachers with useful manuals in order to empower them to deal with the various instructional issues in their classes. Seventh, they should encourage the EAP teachers to conduct research on various aspects of EAP in their academic settings. Finally, they need to take advantage of the EAP teachers' feedback to ameliorate the current EAP teacher education courses in their relevant language learning contexts.

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Perspective Chapter: Reflective Coaching Framework – A Lead for Teacher Trainers in TEFL Context

Mübeher Ürün Göker

Abstract

Many research studies have emphasized the significance of reflection and reflective practice but few of them provide teacher trainers with specific guidelines about the method and process of reflective practices and a restricted number of them have analyzed the extent to which teacher trainers carry out the reflective process. However, teacher trainers often have difficulty preparing an effective program for in-service teachers, evaluating and giving feedback on their strong and weak parts aiming to improve their weak parts. Focusing on addressing those research gaps, this paper mainly aims to present a reflective coaching framework as a guide for teacher trainers to make them understand how to use reflective coaching with teachers in the teaching of English as a foreign language (TEFL) context. The framework developed and adapted by the researcher in 2017, is mainly based on the theoretical views and principles of reflection, self-analysis of strengths and weaknesses, the writing of personal statements, and reflective teaching. Employing a three-stage coaching cycle; (a) pre-conference as planning conversation, (b) observation, and (c) post-conference as reflecting conversation, it ultimately aims to serve as a professional development tool for teachers and teacher trainers in the form of self-analysis as part of reflective practice through the three-stage coaching cycle.

Keywords: reflection, reflective teaching, reflective coaching, in-service teacher practice, teacher evaluation

1. Introduction

Several studies and research studies put emphasis on the significance of reflection and reflective practice but few of them supply some important guidelines about the method and process of reflective practices to teacher trainers and a restricted number of research studies have analyzed the extent to which teacher trainers carry out the reflection process [1–4]. Although a few of them look suitable for encouraging reflective practice, this paper examined how a reflective coaching framework for in-service teachers facilitates their reflection during their teaching practice. It is expected to give critical perceptions to the teacher trainers and advocate the utilization of reflective coaching to ease reflective teaching and review among in-service teachers because the teacher trainers who want to refresh their program even though they have experience

through the years may have some difficulties finding an effective program for the in-service teachers from time to time. When it is thought about the workloads of the teacher trainers, it is not an easy job searching for something on the internet for hours and finding nothing or even finding something, it takes too much time to revise and adapt it according to the in-service teachers. In this sense, they need to find a guide including the answer to their question and summarizing the key points related to the needs of the in-service teachers to become a bridge to apply the theory and practice together in their classroom while teaching. From this perspective, it is important to have something with them like a guide that is used before by a lot of different pre-service and in-service teachers from different perspectives through the years.

In this sense, this paper aimed to be a guide with useful information for the teacher trainers to make them understand how to use reflective coaching in the in-service TEFL context and to show them its impact during the in-service teachers' teaching career.

2. Literature review

This section is based on the reflection, components of reflection, reflection on teaching, reflection on teacher education, and reflective coaching in the TEFL context and it will be briefly outlined the literature review and focus on the main topics of discussion.

2.1 Reflection

Dewey ([5], p.9) expressed that “active, persisting, and careful thought of any belief or assumed form of knowledge in the light of the reasons that support and the other consequences to which it tends, constitute reflective thinking”. On the other hand, Schön's [6, 7] principles on reflective practice have been recognized as the most widely accepted foundations of reflection in education since Dewey [8]. According to Schön ([7], p.30) practitioners “exhibit a kind of knowing-in-practice, most of which are tacit” and attend in reflection-in-action while reflecting on the process of practice and altering things during that practice. Practicians specifically engage in reflection-in-action, standing middle of the action making changes and if necessary adapting their approaches to improve their practice [6].

To have a better understanding of the context of reflective coaching, one should comprehend what is meant by reflection. Schön [7], in an endeavor, to show the difference between reflection-in-action and reflection-on-action, clearly states that the first one is when the experienced practitioner learns to think on his/her own and deal with the new information and on the other hand the second one is related to the practitioner engaging in detailed analysis for a better understanding of teacher's role in a learning context. Combining experience with theory by creating new opportunities to see weaknesses and to change, reflection is thought to improvise people's feelings, thoughts, and actions.

2.2 Components of reflection

In any interference of learning from experience, reflection can be useful. From this point of view, Schön [6, 7] drew attention to the valuation of reflection in supporting the professionals to understand and improve their practice. That is the reason

why, reflection has been a catchy subject for professionals in educational environments following Dewey's work, but educators were more concerned with being encouraged by Schön [6, 7]. There are two reasons for this: the first one is that Schön [7] claims that reflection is deeply related to action. The second one is that he deals with the entire professional's "doing" cycle combined with the reflective practice that leads to changes in actions. These two important topics have always been of interest to educators and are embedded in professional development programs. Because it is believed that professionals should learn how to deal with the complicated and uncertain problems often faced, try out different analysis ways, and then reconstruct their performance instead of trying to follow specific theoretical frameworks for specific situations. Some types of "technical reflection" [9, 10] seem to rely on reflection on competencies or skills to evaluate their effectiveness by changing behavior immediately after an action. It is also what Schön [7] asserts. He addresses "reflection-in-action" and "reflection-on-action", the first implying conscious thinking and modification while in practice. Besides, these two types of reflection require rational processes to make reasoned judgments about alternative forms of action because Schön's "reflection-in-action" [6, 7] implies incidental reflection and doing whereas other types of reflection [11, 12] require looking back on action after a specific time it has happened. In another saying, deliberation should be encouraged sometime after the action has happened so that other options can be explored later. In this sense, reflection can be regarded to find a solution to real problems [13, 14]. Actually, it is an essential thing that educators or professionals need. But this may mean getting information to develop insights and understand the relationships between processing while a particular action is taking place, or what actually happened after a particular experience, what goals were set, and what challenges arose between different professional or cultural perspectives [15].

The reflective framework designed by Dewey [5] for our assessment of critical reflection covers all three important elements. In this context, the first element requires a systematic aspect of thought besides an end product. The second one concretizes a specific reflective tendency using three basic attitudes: openmindedness as getting rid of prejudice, whole-heartedness as taking on a task with a whole heart, and responsibility as considering the consequences of targeted action. According to Dewey, these tendencies are not seen as passive attitudes, but a strong desire should be demonstrated by all people actively involved in the reflective process.

In another saying, all teachers will utilize these tendencies in a significant in case they believe that the reflective process requires acting efficiently both inside and outside the classroom. The final element suggests that any reflective thinking uses appropriate use of language. Considering these points, it is seen that Schön's framework includes all types and levels of critical reflection. His drafts including reflection-in-action and reflection-on-action include an epistemology of Professional practice based on knowledge-in-action and knowing-in-action [16, 17]. Because reflection-in-action as an element of knowing-in-action happens while individuals are attempting any action. For this reason, it can be considered the only tool that separates professional practice from non-professional practice. Thus, it is also considered part of the artistry or intuitive understanding gained through professional experience [18] including a reflective conversation with oneself that allows reframing the action by following holistic appraisal approaches [16].

It should be underlined that none of such reflections is increasingly seen as a desirable hierarchy because if reflection is considered as a learned process, it should be realized through encouragement, support, supervision, and practice. To that end,

a lot of methods including reflective writing, storytelling, diaries, lesson reports, portfolios, observation, action research, and emails have been used to assist teachers to improve their reflective teaching.

2.3 Reflection on teaching

It is quite obvious that the more teachers think about their teaching before the lesson, experience their implementation, and question it after each lesson, the more they learn about it. Briefly, each teacher learns more things about their teaching by implementing it and applying reflection-on-action. They think about their teaching in a critical way with each detail. They think about their presence, tone of voice, activities, time, passing, structure of the lesson, needs of the students, and more. After each lesson, they animate their teaching to understand their weak and strong parts, and this mirror effect is called reflection. As a result of this type of reflective thinking, they have a chance to admit what they have done or change it [19–21]. They think about values, beliefs, traditions...etc. targeted to hand in the students by being sensitive to the points in society. There are some important sample questions given below for each teacher to ask themselves after each lesson:

- How am I feeling after each lesson?/Am I happy or sad? Why?
- Am I aware of my strong and weak parts?
- How can I turn my weak parts into strong parts?
- What I aimed before the lesson and what my students learned after the lesson?
- Did I meet the need of the students during the lesson?
- Did I good at time management and classroom management? Why?
- Did I arrange the teacher-talking time and student-talking time equally?
- Did I manage the teacher-student interaction and student–student interaction during the lesson?
- Could I create an environment where each student participated in the lesson?
- Did I care about the action zone during the lesson?
- Do I have any action plan for my next lesson?

In this sense, the teacher trainers lead the teachers to ask some similar questions like above to themselves after each lesson with the help of keeping a diary and then talking about the details in the reflective conferences and self-evaluation sessions.

Improvement in instructional skills should be largely dependent on how much a teacher is concerned with a particular aspect of teaching. In other words, the larger their concern about a particular teaching component, the more attention, and attempt they should pay to improve that particular component. Through an RC program prepared according to the framework shared in this paper, teachers' concerns

are influenced by their perception of their failure or weakness and their conception of a certain teaching component. Furthermore, through the RC program, the teacher trainers help the teachers bring to bear their awareness and understanding about their teaching in order to move in a constructive direction is needed.

2.4 Reflection on teacher education

Paying regard to the opinions of Dewey [5] and Schön [6], the current literature gives us many fundamentals on why teachers' reflectivity needs strengthen. In another word, besides Dewey and Schön, other researchers have also noticed reflection as a critical skill for educators in different environments underlying the importance of strategies of reflective teaching for learning and instruction [22–29]. These and similar scholars maintain that strategies aiming to improve reflective skills must be implemented as reflection informs teaching practices. All of these scholars reach a consensus on the issue that teachers should be reflective teachers based on the view that teaching is a moral attempt and reflection ensures them new strategies to be aware of the moral values of what they do and why. Moreover, from the point of accrediting, certification and recognition bodies such as NCATE, NBPTS and CHEA counseled reflective thinking and teaching for the prospective teachers' professional development as it is a helpful tool. Reflection and reflective thinking are very essential for teachers to improve themselves because this type of thinking way brings them some solutions for certain dilemmas, ensuring doubt and puzzlement before prospective solutions could be achieved [30]. For the teachers to undergo reflective practice, they must undertake the process of learning through their own experiences to achieve new insights about themselves [7, 31–33]. This period involves their daily practice as well as the requirement for the teachers to be self-aware and skilled in critically evaluating their own answers to classroom situations and they gain a new understanding to improve future practice by doing this [34].

Atkins and Murphy [35] discussed that when people are aware of some uncomfortable feelings, they should analyze them critically with the experience in which they occurred. A change in practice can happen if they participate in this analytic process. According to Ratcliffe and Millar [36], the teachers' practices can be changed if the time and required backing on their pedagogy is provided. Unfortunately, many teachers have a settled viewpoint about teaching that they improve before participating in a program and block their critical thinking. Low self-esteem, childhood experiences, and cultural conditions might have a deep root in a teacher's soul and make them give up looking too closely at themselves or their work [37]. For this reason, to assist encourage effective reflection, teachers should be given time and opportunities to improve their reflective skills in a collaborative way. When reflectivity and collaboration are integrated with the interests and needs of participants involved in a professional development program, effective Professional development could be gained [38]. Collaborative reflection is a course of action during which participants are engaged in working collectively as a community of learners through classroom observations (live or video), discussions, workshops, and reflective writings on professional development [39]. The objectives in the reflective collaboration could be gained through the enhancement of teacher focus on teaching. According to Yoon and Kim [40], if the teachers share their teaching background with others through collaborative reflection, it will also be helpful for critical thinking and ease the duration of reflection and learning from past experience. It is important to create some opportunities for teachers by offering suggestions and support, critiquing ideas, analyzing each other's teaching, and specifying targets to help teachers improve their reflection and in turn, can have some changes in practice [41]. Teachers will learn from the other teachers who have

implemented a new type of instruction more effectively and then they will expand their assumptions and their use of inquiry in the classroom [3]. But it is not an easy process and guidance, and simplification is necessary. If informed trainers give teachers new opportunities for learning experiences such as group discussions focused on videos of other's teaching practices, this provides them with opportunities to analyze lessons that contain vital components of high-quality teaching. These discussions are likely to create more learning opportunities by guiding teachers in connecting the pedagogy observed in videos to their own practice [42].

2.5 Reflective coaching in TEFL context

Reflective coaching, as a formative approach, plays a key role in encouraging self-evaluation and helping teachers develop their own teaching skills. It has mainly been advocated in educational contexts focusing on teacher learning, teacher development, teacher change, and certain coaching stances and epistemologies. It also creates endeavors giving priority to collaboration serving as a feasible and potentially reusable supervision model in the in-service TEFL context.

Professional development needs to take place within the context of the classroom and everyday instructional practices for teachers to learn to employ new teaching strategies in hopes of meeting the current standards [43, 44]. Reflective coaching helps teachers in many ways; for instance, they can learn how to use time efficiently, how to deal with classroom management problems, how to implement lesson structure appropriately, and how to evaluate themselves according to post-reflection, etc.... Mraz, Algozinne and Kissel [45] claim that a typical coaching model comes out of teachers and coaches forming an observation, demonstration, and reflection cycle. That is to say, they join together for observation, evaluation, demonstration, and reflection on how different teaching environments affect learners. It is very important to understand the weak parts of teaching in the classroom to change them immediately. So it can be said that the teachers need to change themselves and they can make it real only by observing their teaching through reflection [46]. But some teachers are not aware of the reflection, they do not know how to apply it in their teaching environment so they need guidance. Any dialogs with a teacher trainer will help them to understand how to analyze their teaching, how to think critically, and how to apply the new attitudes and beliefs to their classroom. The teacher trainer will help them to change their thinking, belief, and attitude in a reflective cycle.

According to the research studies in the field of reflective practice, reflective coaching is a significant component in developing oneself as an expert and coaches engage in reflective practice continuously [1, 2, 47, 48]. In this sense, we can say that critical thinking also helps teacher trainers make some changes and apply new methods in different learning and teaching environments. And it is clear that this critical analysis ensures learners and teachers a new and deep way of understanding their classroom by bringing classroom experiences into the learning and teaching environment. That is to say, we can name critical analysis of any teaching environment as a reflective analysis of teaching, which is a strong way of advancing proper reflective practice culturally and developmentally [49–51].

3. Instruments for measuring the depth of reflection in reflective coaching

Reflection is a key component in the improvement of teaching, and it is not an easy process for the majority of teachers, thus they need to be guided. While the

teacher trainers examine the context of teaching and learning, they need to use some inquiry-based practices. During the daily analysis and examination of the context, teachers have a chance to gain a new understanding and they develop their implementation. Lesson reports, teaching journals, questionnaires, surveys, audio, and video recordings, observation, and action research have extensively been used in TEFL teacher education [24]. It is important for teachers to use them to develop a deeper understanding of their teaching. But to be able to do that it is needed to use a reflective framework. For this reason, different instruments have been designed to evaluate written reflection and to specify the reflective level, however, few of them have been designed to help teachers to reach a deeper level of reflection.

While the researchers and educators have stated the significance of developing the reflective practitioner in the field of education through the years, a few of them shows us how to measure its deep, support meaningful deliberation and how this reflection has happened. When it is searched for the instruments measuring or nurturing the reflection, it is clearly seen that many of them were designed for the field of nursing not for education. Besides a few studies looking at the analysis of the varying levels of reflection are different with their definitions of these levels and it causes further difficulty to determine which instrument is the best when it comes to decoding a teacher's level of reflectivity.

A lot of frameworks were evaluated for the content of this paper and to develop our framework. The framework is based on the five instruments below, as it is believed that they address nearly the same reflective thought as our reflective coaching framework. These five instruments given below are believed to supply us with ways to be able to create an appropriate measuring framework for the evaluation of the program:

- Framework for Reflective Thinking developed by [28] proposing a framework for reflective pedagogical thinking,
- Use of video in reflection,
- Hierarchy of Reflection created by [30],
- Reflective Evaluation Framework developed by [52],
- and finally written reflective journals, logs, diaries, and rating them based on the frameworks prepared by [53, 54].

Within the context of the reflective coaching program to be used by the teacher trainers, the framework including the seven main stages to evaluate and give feedback to the in-service teachers for the process of reflective practice is given below (**Table 1**):

As discussed before, reflection is a key component in the improvement of teaching, and by using it, teachers can develop a deeper understanding of their own teaching. For that purpose, the framework above is mainly based on principles of reflection and reflective teaching and it includes the three-stage coaching cycle; (a) pre-conference as planning conversation, (b) observation, and (c) post-conference as reflecting conversation. The ultimate goal of the framework is to show how to make teachers aware of their weaknesses and strengths in the form of self-analysis as part of reflective practice through the three-stage coaching cycle. In this sense, the teacher

Stage	Procedure	Source	Evaluation
1	To collect as much data as possible about what is actually happening in the class; use of materials, instructional skills targeted, classroom management, pacing of pre/while/post sessions of the lesson and learning environment	Video and audio recordings, reflective diary sheets, lesson reports, survey, and questionnaires etc.	Reflective conferences and self or collaborative evaluation sessions
2	Organize reflective conferences to analyze the data collected and discuss them with all the teachers.	Video and audio recordings, reflective diary sheets, lesson reports, survey, and questionnaires etc.	Reflective conferences and self or collaborative evaluation sessions
3	Teach them how to do self-evaluation and teacher evaluation specifically with the weak parts targeted to be improved.	Video and audio recordings, reflective diary sheets, lesson reports, survey, and questionnaires etc.	Reflective conferences and self or collaborative evaluation sessions
4	Teach them how to become aware of their weaknesses and strengths	Video and audio recordings, reflective diary sheets, lesson reports, survey, and questionnaires etc.	Reflective conferences and self or collaborative evaluation sessions
5	Let them discuss their weaknesses and strengths using a constructive and critical language	Video and audio recordings, reflective diary sheets, lesson reports, survey, and questionnaires etc.	Reflective conferences and self or collaborative evaluation sessions
6	Plan the way in which materials and activities are decided upon and what alternatives are available	Video and audio recordings, reflective diary sheets, lesson reports, survey, and questionnaires etc.	Reflective conferences and self or collaborative evaluation sessions
7	Evaluate the plan which will include a new perspective and perceptions leading to develop their teaching practices	Video and audio recordings, reflective diary sheets, lesson reports, survey, and questionnaires etc.	Reflective conferences and self or collaborative evaluation sessions

Table 1.
Reflective coaching framework.

trainers personalize their own teaching program according to the needs of the teachers by using the framework as a guide or template.

3.1 Impact of reflective coaching framework for the coaching conversations in the model

Teacher trainers should prepare their program through a three-stage cycle of (a) pre-conference as planning conversation, (b) observation, and (c) post-conference as reflecting conversation to guide the teachers. The teacher trainers should plan some beneficial questions to help and ease the way of reflective thinking and they aim to foster reflective growth with the answers of the teachers at the end. For this reason, during the reflective conversations, if the teachers have an opportunity to express themselves by self-monitoring, self-directing, and self-modifying their abilities, the possibility of any growth or improvement on the part of their implementation will be more.

3.1.1 Pre-conference as planning conversation

This cycle happens before a targeted lesson. During this stage, the teacher trainer should first help the teacher(s) clarify aims by identifying the expected outcome of the task or lesson targeted. Secondly, intending to reach the desired outcome, the teacher trainer should present some questions to specify the strategies to be followed. Thirdly, the teacher trainer plans new questions to present the evidence of the result of the lesson during the observation to find observable behaviors. The focus of the fourth part of the conversation is on the self-directed learning of the teachers. Lastly, the teacher trainer should demand the teachers' reflection on the coaching process by specifying the effect of the quality of the conversation in the sense of their thinking and decision-making. On the whole, encouraging the improvement of self-coaching skills and growing the instructional thought of the teachers is regarded to be the essential aim in the process of planning conversation. The teachers start to internalize the thinking process they experience during the process of planning conversation and start to think of each aimed lesson, activity, or task automatically, after the reflective conversations.

3.1.2 Observation

During this cycle, the teacher trainer should collect data about how effective the targeted task, lesson, or activity outlined by the teacher(s) is. In principle, the teacher(s) is expected to identify the data collection process qualities. Doing so, this process would assist them in gaining an awareness of their own actions or inactions. The content and processes will be discussed throughout the following part explaining the reflecting conversation.

3.1.3 Post-conference as reflecting conversation

This cycle comes out after the observed lesson or activity. Firstly, the teacher trainer should draft questions to help the teacher(s) to understand the things happening in the targeted class by reevaluating their implementation. Secondly, the questions presented by the teacher trainer are anticipated to help them to compare and contrast the planned lesson or activity with the things happening in their class. Thirdly, any possible personal acquaintance with the task or lesson targeted is analyzed by the teacher(s). Fourthly, they implement any new principles for the lesson or activity to be targeted. Lastly, the questions of the teacher trainer are expected to assist the teachers aware of the effect of reflecting conversation on decision-making and thinking processes. It is a necessity for the teacher trainers to show and share the data collected with the teachers to make them have some conclusions about the lesson during the reflecting conversation.

4. Conclusion and recommendations

The evaluation and assessment of any programs and models for in-service teachers still look to be problematic. Hence studies similar to this one that focuses on a specific framework or model of coaching are needed in order to help teacher trainers to develop a better comprehension of what other types of coaching framework could be

more influential in terms of meeting different needs and goals of coaching in various educational contexts.

All the things summarized in the paper are based on personal studies with the pre-service and in-service teachers from different contexts during the years except for the research on literature review. And the framework was created according to observation and studies with the pre-service and in-service teachers during the years.

From this point of view, this paper aimed to show how RC can be conducted and implemented with the in-service teachers in the TEFL context and how it improves the weak parts of teachers in their teaching careers. Since it emphasizes the importance of reflection and reflective teaching, it also aimed to provide useful information to pre-service teachers in this sense. It is also expected to provide EFL instructors, mentors, and curriculum designers with recommendations and new insights on coaching implementations.

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Educational research and innovation are directed towards defining, implementing, and evaluating the principles guiding teaching and educational practices, with the fundamental purpose of improvement. The chapters comprising this monographic volume constitute valuable contributions to this objective, adopting an inter and transdisciplinary perspective, a particularly sought-after aspect in the field of international educational studies. They address issues that, transcending their curricular context, delve into broader frameworks and contribute to addressing current educational challenges. Ultimately, this volume focuses on new curricular, methodological, and resource evaluation orientations and developments. It aims to provide responses that foster the development of critical and creative thinking skills, competency-based learning, informed decision-making, and the promotion of quality teacher training. These perspectives draw from the most recent international scientific literature, solidifying their rigor and ensuring their scientific value.

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