

# Athens Journal of Education

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## Front Pages

*SOFIA ZOUPA & GEORGE KARLIS*

[The Administration of Heritage Language Schools in Multicultural Societies: The Case of the Hellenic School of Ottawa, Canada](#)

*SERWAN M J BABAN*

[A Strategic Approach for Making Higher Education Institutions Relevant and Viable through Engaged Learning and Teaching based upon Graduate Employability Profiles](#)

*MOHAMMAD A. TASHTOUSH, NAWAL SHIRAWIA & NOHA M. RASHEED*

[Scoring Rubrics Method in Performance Assessment and its effect of Mathematical Achievement](#)

*SIBEL TELLI*

[Exploring the Preservice Teachers' Work to Label the Plants in the Faculty Garden](#)

*ORHE AREK-BAWA & SARASVATHIE REDDY*

[Preparing Pre-Service Teachers for Teaching in the Digital Age](#)

*OMOTAYO ADEWALE AWODIJI & SURAIYA RATHANKOOMAR NAICKER*

[Basic School Leaders' Continuous Professional Development for the 4IR: A Systematic Literature Review across Africa](#)

*KR GEETHA & FATHIMA M. PARIMALA*

[Emotion Regulation and Social Adjustment of Student Teachers](#)

*ALESSIO DI PAOLO & EMANUELA ZAPPALÀ*

[Fostering Reading Skills through Simplex Didactics and Music: Creation of an Inclusive Tool for Pupils with Dyslexia](#)

*FLAVIA CAPODANNO, EMANUELA ZAPPALÀ & PAOLA AIELLO*

[Appreciative Inquiry for Inclusive Schools: Preliminary Results from a Scoping Review on Virtual Learning Environment \(VLE\)](#)

*FATBARDHA OSMANAGA & KILDA GUSHA*

[Nursing Students' Perceptions about Perinatal Mental Health Issues](#)

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Download the entire issue ([PDF](#))

<b><u>Front Pages</u></b>	i-viii
<a href="#">The Administration of Heritage Language Schools in Multicultural Societies: The Case of the Hellenic School of Ottawa, Canada</a> <i>Sofia Zoupa &amp; George Karlis</i>	9
<a href="#">A Strategic Approach for Making Higher Education Institutions Relevant and Viable through Engaged Learning and Teaching based upon Graduate Employability Profiles</a> <i>Serwan M J Baban</i>	23
<a href="#">Scoring Rubrics Method in Performance Assessment and its effect of Mathematical Achievement</a> <i>Mohammad A. Tashtoush, Nawal Shirawia &amp; Noha M. Rasheed</i>	39
<a href="#">Exploring the Preservice Teachers' Work to Label the Plants in the Faculty Garden</a> <i>Sibel Telli</i>	61
<a href="#">Preparing Pre-Service Teachers for Teaching in the Digital Age</a> <i>Orhe Arek-Bawa &amp; Sarasvathie Reddy</i>	77
<a href="#">Basic School Leaders' Continuous Professional Development for the 4IR: A Systematic Literature Review across Africa</a> <i>Omotayo Adewale Awodiji &amp; Suraiya Rathankoomar Naicker</i>	99
<a href="#">Emotion Regulation and Social Adjustment of Student Teachers</a> <i>KR Geetha &amp; Fathima M. Parimala</i>	121
<a href="#">Fostering Reading Skills through Simplex Didactics and Music: Creation of an Inclusive Tool for Pupils with Dyslexia</a> <i>Alessio Di Paolo &amp; Emanuela Zappalà</i>	137
<a href="#">Appreciative Inquiry for Inclusive Schools: Preliminary Results from a Scoping Review on Virtual Learning Environment (VLE)</a> <i>Flavia Capodanno, Emanuela Zappalà &amp; Paola Aiello</i>	151
<a href="#">Nursing Students' Perceptions about Perinatal Mental Health Issues</a> <i>Fatbardha Osmanaga &amp; Kilda Gusha</i>	165

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The current issue is the first of the twelfth volume of the *Athens Journal of Education (AJE)*, published by the [Education Unit](#) of Athens Institute.

Gregory T. Papanikos  
President  
Athens Institute



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#### **Important Dates**

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- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **21 April 2025**

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*A World Association of Academics and Researchers*

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## **The Administration of Heritage Language Schools in Multicultural Societies: The Case of the Hellenic School of Ottawa, Canada**

*By Sofia Zoupa\* & George Karlis<sup>‡</sup>*

Many ethnic communities living in multicultural societies have established Heritage Language Schools (HLS) to transmit ethnic language and preserve ethnic culture. The administration of these HLS is no easy task however (Arvanitis, 2004; Pu, 2012; Tamis, 2010). Research is needed to help better understand how HLS programs, such as the Hellenic School of Ottawa (HSO), are administered and what can help enhance administration practices and the sustainment of these schools (Zoupa & Karlis, 2015). The purpose of this paper is to examine the perceptions of administration towards the administrative practices of the HSO. Specifically, the objectives of this study are to present the perceptions of HCO administrators toward: (1) the structure and objectives of the HSO, (2) the strengths and weaknesses of the administration of the HSO, and (3) suggestions for the enhancement of the administration of the HSO. Semi-structured interviews were conducted on ten former administrators of the HSO who have been responsible for operation of the HSO. It was found that the structure of the HSO focused on the instruction of the Greek language, including the four language skills- listening, speaking, reading, and writing; whereas, the objectives of the HSO focused on instilling a love for the Greek language. Moreover, administrators presented two strengths of the administration of HSO - (1) support from the HCO, and (2) people involvement as well as three weaknesses - (1) support from the HCO, and (2) people involvement. Further, the administrators presented ten suggestions for the enhancement of the operation of the HSO - (1) teachers of higher qualifications, (2) addition of more Greek-content activities, (3) time-frame expansion, (4) resources, (5) teacher support, (6) summer camps in Greece, (7) create school partnerships, (8) Webinars and seminars, (9) trips to Greece, and (10) engagement in Greek-content activities.

*Keywords:* heritage language schools, Hellenic School of Ottawa, administration, ethnic language, ethnic culture

### **Introduction**

The successful transmission of ethnic cultural identity is the goal of many immigrants in multicultural society. An attachment to the ethnic homeland of many immigrants comes with them during their travels to their new host society, and tends to stay with them during the acculturation period. Transmitting ethnic heritage to their descendants, including ethnic language, is of utmost importance for many immigrants (Tamis & Gavaki, 2002). In terms of assisting ethnic groups in preserving their ethnic culture and language, a plethora of ethnic families, under the

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administration and supervision of their ethnic communities, attempt to help their children preserve and develop their ethnic language and culture by attending ethnic schools (Arvanitis, 2004) or community-based HLS (Pu, 2012; Tamis, 2010). HLS are operated in order to teach the ethnic language and culture, hence, for cultural preservation (Arvanitis, 2004).

Specifically, according to Pu (2012), HLS are operated by ethnic groups to develop cultural knowledge and linguistic skills related with their ethnic languages. These HLS usually operate on weekends or after the everyday school, in locations rented by the community, church or public or private schools (Pu, 2012). The curriculum of those schools usually focuses on language skills and culture (Pu, 2012; Tamis, 2010).

The main objective of HLS includes the learning and maintenance of the ethnic language, as well as learning of school subjects, such as literature, history, geography, and crafts and arts related to the culture of the country of origin, so that cultural awareness can be developed and cultural cohesion and ethnic identity can be supported (Hellenic School of Ottawa, n.d.; Pu, 2012; Tamis, 2010). The educational activities applied in cultural-ethnic schools focus on the preservation of the mother language and the cultural heritage of immigrants and their descendants.

The Hellenic School of Ottawa (HSO), Canada is an example of an HLS. The HSO was established in the late 1930's and has since then undergone many changes and adjustments (Hellenic School of Ottawa, n.d.). Today, the HSO offers classes and ethno-cultural leisure activities only once a week, that is, on Saturdays. The objective of the HSO is the development and maintenance of the Hellenic language and culture (Hellenic School of Ottawa, n.d.).

Just like all HLS, the administration of the HSO is not an easy task. Research is needed to help better understand how HLS programs, such as the HSO are administered, and what can help enhance administration practices and the sustainment of these schools (Zoupa & Karlis, 2015). The purpose of this paper is to examine the perceptions of administration towards the administrative practices of the HSO. Specifically, the objectives of this study are to present the perceptions of HCO administrators toward: (1) the structure and objectives of the HSO, (2) the strengths and weaknesses of the administration of the HSO, and (3) suggestions for the enhancement of the administration of the HSO.

## **Literature Review**

### **The Heritage Language Programs of Ontario, Canada**

Ethnic schools, or else community-based HLS can be classified into: weekend schools, after-schools, as well as summer schools, yet most of them are delivered during weekends for two or three hours per week. Classes are organized into language acquisition, culture, as well as music and art (Arvanitis, 2004; Cheng, 2012; Pu, 2012). As Pu (2012) posits, community-based HLS are administered by community members. Specifically, Cheng (2012) states that "community-based heritage language schools, are generally funded by religious groups, local civic

groups, and group of parents" (pp. 119-120) and the administration of these schools is carried out by school administrators and instructors who generally volunteer and have a background in curriculum and teaching in the ethnic heritage language.

One of the most important factors for the quality in education is sound school administration (Chiaha, Ogakwu, & Amaefula, 2014). Little (1999) pointed out that the areas of administration that have to be adjusted to serve a cultural-maintaining purpose are the organization of the school and the school's policies and procedures. The organization of ethnic cultural schools is culturally orientated and includes cultural practices (e.g., customs, rituals, festivals) (Callins, 2006; Pu, 2012). More specifically, the resources, i.e., the materials in general, the curriculum, and the textbooks have to focus on the particularities of the culture. In addition, numerous cultural norms exist in these schools such as the fusion of academic and leisure activities for the attainment of educational goals (Chiaha, Ogakwu, & Amaefula, 2014).

The HLS programs of Ontario, Canada are administered by both the School Board- appointed by the Ministry of Education - and ethnic communities (Canadian Education Association, 1991). In 1991 it was reported that most of the School Boards in Ontario were in communication with ethnic communities. Specifically, they were in constant cooperation with representatives from ethnic communities, such as Parents Associations, other informal parent groups, as well as cross-cultural coordinators and school liaison committees (Canadian Education Association, 1991). Additionally, many of Ontario's school boards were financed by the Ministry of Education and were also financially supported by ethnic community groups in regard to resource materials and cultural activities (Canadian Education Association, 1991).

There are many HLS programs in the province of Ontario that reported to have gained great contribution from the input of ethnic community members (Canadian Education Association, 1991). Particularly, parents' associations and ethnic community organizations provide financial aid, consultation on human resources issues and more broadly on the delivery of the program, as well as input into the classes' curriculum and on educational materials. Moreover, school liaison committees deal with heritage program issues (Canadian Education Association, 1991). Besides these, the involvement of parents or grandparents as classroom assistant volunteers, as well as teachers from parents associations assist in a variety of events, such as plays, concerts, etc., while also providing input into the delivery of heritage language programs (Canadian Education Association, 1991).

Most of the HLS programs of Ontario were ascertained to include cultural components in their programs (Canadian Education Association, 1991). HLS programs offer activities such as Christmas concerts, celebration of cultural holidays, concerts, trips, dance, drama, songs, poems, arts and crafts, cooking, as well as religious festivities. Activities such as these are deemed to be "the basis for communicative development of language" by the Canadian Education Association (1991, p. 30).

## **The Hellenic School of Ottawa**

The HSO is co-operated by the Ottawa-Carleton District School Board (OCDSB), which is under the supervision of the Ministry of Education of Ontario, as well as the Hellenic Community of Ottawa (HCO) (Hellenic School of Ottawa, n.d.). The HSO is comprised of the language program, the *International Language Program* (ILP), which is under the direction of the Ottawa Carleton District School Board and runs from 9:00am to 11:30am every Saturday. Also, the HSO consists of the cultural program, which is directed by the HCO and runs from 11:30am to 12:30pm every Saturday (Hellenic School of Ottawa, n.d.).

The administration of the cultural program of the HSO is under the direction of the HCO. The administrators responsible for the delivery of this program are the following: The School Director, the Parents and Guardians Association, and the School Liaison. A detailed description of the administrative tasks of each administrator follows, based on participants' descriptions.

The Director of the HSO is responsible for communicating and cooperating with the School Liaison, the HCO, the HSO Parents and Guardian Association (PGA), as well as the Site Administrator appointed by the Ottawa-Carleton District School Board. Specifically, the responsibilities of the Director include informing and giving report to the School Liaison about events and incidents that take place at the school. Also, the Director works with the lead teacher of the school in order to develop the curriculum (textbooks, school subjects, etc.). Moreover, the Director constantly works with the PGA and the HCO for financial matters of events and discusses with them ideas on how to best accommodate students' needs. Furthermore, the Director is responsible for the hiring process of instructors on behalf of the HCO; the instructors' performance evaluations, which has to report them to the HCO; the organization of monthly meetings with the instructors, as well as professional development events; the preparation of the instructors' payroll; as well as the preparation of the school calendar and the monthly newsletter to the parents, making announcements or informing them about upcoming events and the cultural theme of the month.

The PGA is the parent council of the HSO and it is consisted of the President, the Vice-president, the Treasurer, and members of the council. The PGA cooperates with the HSO Director and the HCO School Liaison in order to provide support to teachers and students by assisting them in organizing cultural events, extracurricular activities with a cultural content and by providing financial support by raising money to purchase school equipment, resources, and school material. Finally, the PGA is responsible for recruiting each Saturday's hall monitors of the HSO, who are responsible for assisting in students' supervision throughout the school day.

As far as the HCO School Liaison is concerned, he/she is the person who makes ties between the HSO and the HCO. The school liaison is responsible for advising the school on certain matters (e.g., hiring teachers), as well as guiding the teachers by providing teaching support, training or continuing education. Moreover, the school liaison is, among others, responsible for funding and budget issues, and human resources issues. Finally, the HCO School Liaison attends regular meetings

with the HSO Director and the PGA, discussing any type of issues and incidents there may be, as well as ideas on how to best advance students' learning.

The HSO is administered using the Management by Objectives (MBO) approach. MBO is a management model designed to focus on setting particular objectives and goals to be accomplished through joint collaboration of managers and subordinates. It involves establishing goals and selecting an effective mix of method and means to implement them (Elvik, 2008; Karlis, 1989). Hence, given the goals of an organization that need to be achieved, organizational objectives are put forward, discussed, agreed on, and aimed at in accordance with the purpose of the organization. The MBO approach involves discussion for the transfer of objectives between the different levels of the organization.

It is customarily known that there is no administrative manual on how the HSO should be administered. It is operated according to the MBO model and for the most part this is the procedure that has been followed. Specifically, it seems that according to the objectives of the HSO, its main body of administration, that is, the HSO Director, the HCO Liaison, and the PGA collaborate and jointly formulate a group of specific goals, expected achievements, as well as timeframes for the accomplishment of goals while establishing individual responsibilities.

## **Method**

### **Participants**

Ten administrators of the HSO were recruited and self-selected from a contact provided by the HSO. The size of the participants was a result of the small size of HSO administrators and their availability. As the phenomenological approach was deemed to be most suited for identifying the perceptions of administrators, the small sample size was deemed to be appropriate. As Higginbottom (2004) postulates, small sample sizes are utilized in phenomenological research, because of the in-depth nature of the interviewing.

### **Data Collection**

In order to capture the experiences of the HSO administrators, a phenomenological qualitative approach, using semi-structured, face-to-face interviews was the means used to collect data. The interview questions focused on three main areas: (1) the structure and objectives of the HSO, (2) strengths and weaknesses of the administration of the HSO, and (3) suggestions for the enhancement of operation of the HSO.

## Results

### Structure and Objectives of the Hellenic School of Ottawa

All ten participants described the structure of the school as focusing on both the instruction of the Greek language, including the four language skills- listening, speaking, reading, and writing- and identification and familiarization with the Greek culture. The appreciation of the Hellenic culture is targeted through cultural activities, such as songs, poems, theatrical plays, festivities, as well as through the instruction of Hellenic history, mythology, geography, and religion. As one participant described:

It consists of the language program that accommodates all levels of learning [...]. It also consists of the cultural component: History, geography of the country, cultural customs.

Another participant stated that: "It is not only learning the Greek language. It is also learning a little more history, geography and through all the different phases of Greek religion [...]". Thus the ethno-cultural and ethno-religious values seem to predominate in the structure of the operation of the HSO.

As far as the objectives of the school are concerned, all participants agreed that the school's objectives can be summarized into instilling love for the Greek language, promotion of the Greek heritage, along with encouragement of social identification- i.e., students' interaction with other children with Greek background. For example, one participant noted:

I think it's to introduce 2nd, 3rd, 4th generation students to aspects of Greek culture and Greek language that they wouldn't have the opportunity to experience anywhere else; learning a play, learning a song, going to a museum, doing something that exposes them to Hellenic culture and Hellenic language.

Moreover, another participant stated that: "The general objective is to instil love for the Greek language [...]. Also, to instil an appreciation for the culture and the history of Greece [...]. There is the social part too: Getting to know kids with Greek background". The objective of the HSO was thus deemed to build a love and closeness for Greek culture.

### Strengths and Weaknesses of the Administration of the HSO

#### *Strengths of the HSO Administration*

When asked to identify the strengths of the HSO administration of services two recurring themes were indicated by participants: (1) support from the HCO, and (2) people involvement. The results as presented below indicate that the greatest strengths of the HSO was deemed to be its people who administer the service – those within the HCO and those within the HSO.

### (1) Support from the HCO

Support was a recurring theme that appeared from seven of the participants. Support stemming from the HCO via different ways, such as offering financial assistance, paying the teachers for the additional hour that is meant for cultural engagement, providing venues for cultural events, as well as equipment and resources for carrying out cultural events, not only contributed to the promotion of culture, but also to the creation of sense of cultural belonging. As one participant explains, the contribution of the HCO: "It's the contact with the Hellenic Community of Ottawa. That enables the broader contact". A further participant highlighted the the major support of the HCO as:

The Hellenic Community helps a lot the Greek school. For example, there are some events that take place at the Hellenic Community and we use the space of the Hellenic centre and that means that all those costs are covered by the Hellenic Community [...]. Sometimes we use their microphones; we borrow them for events that take place. Of course, the Hellenic Community pays the teachers not only for the cultural program, but also one hour for preparation, one hour for the meeting that we do almost every month. The HCO supports the school financially and in many other ways.

### (2) People involvement

Another relevant theme that was mentioned by five participants stressed that the administration is run through capable administrators who are interested in the cause and are eager to ensure that the program is managed soundly. Administrators were not only limited to the Director, the PGA, and the HCO School Liaison, but also the instructors of the HSO were included. As one participant stated:

There are a few key people who are very experienced in all of these things and very willing to teach others [...] They are going to do things either on a personal level, or on a community level to promote that educational culture [...] you are going to find out that people are interested in promoting their culture and they're going to encourage you to do it too.

### ***Weaknesses of the Administration of the HSO***

Participants were also asked about their perceptions towards any weaknesses of the delivery of the program. Themes that were indicated by participants were: (1) funding, (2) lack of human resources, and (3) insufficient time.

#### (1) Funding

Interestingly enough, despite the fact that the HSO obtains financial support from both the HCO and the PGA, four participants stressed that there is need for additional funding in order to better administer the cultural program. One participant expressed "I wish we had more money to help out with more things". Another participant stated that "there's always an issue with the funding [...]. You need money to administer all these activities". Moreover, a further participant noted "we

do have the support from the HCO and the PGA, but there could be other stuff we could do if we had further financial assistance".

### (2) Lack of human resources

Four of the participants reported that the amount of people responsible for the administration of the cultural program is limited and that there is need for more people to get involved. Specifically, participants regarded that more parents should be involved in administrative tasks related to the PGA responsibilities. Further, a more direct participation on behalf of the parents in the administration of the school would motivate the students to be more willing to engage in the school program. As one participant indicates:

I think every PGA needs more parents involved. I think always the same group of people will get involved or help. I think if the children see their parents more involved in the Greek School, it will make them more to want to be there and participate in what is happening.

### (3) Insufficient time

The HSO was initially operated from 9:00am to 11:30am, yet the program was extended to an additional hour-up until 12:30pm every Saturday. Despite the expansion, some participants regarded that the time for cultural activities is still insufficient. Further, they did not consider that three and a half hours once a week is an adequate timeframe that could lead to the acquisition of knowledge on the Greek culture and maintenance of the cultural heritage. One participant mentioned that: "it would be surely better if we had more time". Whereas, another participant stated that:

The school is only every Saturday- once a week- and we don't have enough time. I have parents meeting with me and telling me "you are doing so wonderful job, but it should be twice a week". In the past it was twice a week, I think Wednesdays and Saturdays- two hours on Wednesdays and three hours on Saturdays. That would help the students with learning the Greek language and with getting them to understand the Greek culture.

## **Suggestions for the Enhancement of Operation of the Hellenic School**

This section provides the administrators' suggestions in order to ameliorate language services provided at the HSO, as well as suggestions to pass on Hellenic culture. These suggestions may aid in eliminating weaknesses of the HSO administration while contributing to the maintenance of the Hellenic heritage. Below are the suggestions presented by the participants: (1) teachers of higher qualifications, (2) addition of more Greek-content activities, (3) time-frame expansion, (4) resources, (5) teacher support, (6) summer camps in Greece, (7) create school partnerships, (8) Webinars and seminars, (9) trips to Greece, and (10) engagement in Greek-content activities.



### (1) Teachers of higher qualifications

According to five participants, in order for the HSO to best administer language services, it is necessary for the HSO to recruit instructors fluent in Greek- preferably native Greeks. If this is not an option, since most of the teachers' first language is English, the administration of the HSO could provide professional development opportunities and workshops for the teachers so that they can perfect their language skills and transmit them to students. As one participant stated:

I would love to have more professional development opportunities for the teachers themselves. I know that some of our teachers don't come from Greece and Greek is not their first language and that plays an important role in teaching Greek itself. I would love to have workshops for those teachers.

Another participant recommended that the HSO hire instructors proficient in Greek or train them to reach this level. This was articulated in the statement below:

The way to do it I think is to have teachers who can speak Greek well, if they are not teachers themselves provide them with some training and some techniques for helping them teach- because teaching is a skill- but I think, ultimately, you need people who can speak the language very well and are passionate about it [...] so that the students can hear what Greek should sound like.

### (2) Addition of more Greek-content activities

While five participants regarded that the HSO would need better qualified teachers, three of the participants suggested that the HSO includes more Greek oriented activities that can assist students in advancing their language level. As stated by one participant: "more Greek content teaching activities could be added". Such activities could include presentations to the public, theatrical plays, Greek movies, (Greek) music performances, and museum presentations.

### (3) Time-frame expansion

As aforementioned, one of the weaknesses of the administration of the HSO is related to the limited time of instruction. Related to this stated weakness, two administrators perceive that in order to best administer language services, the language instructional time should be increased. This is clearly articulated in the statement below made by one of the participants:

More teaching hours. In the older times they had lesson twice a week, Wednesday and Saturday. Later on it became once a week but only until 13:30 (from 9:00 to 13:30). Not all children stayed (until 13:30), but most of them did and better teaching work was done.

Another participant also presented the rationale for increased instruction time. This participant believed that it would be beneficial for language mastering if more time was added by stating:

I realize now that we don't have enough time. We have so many things to cover in terms of the curriculum and in terms of the events- we prepare four main events- but if we had more time, it would be something that would help the students to better acquire the Greek language.

#### (4) Resources

Lack of resources was also noted as a weakness of the administration. Hence, two administrators suggested that if the HSO could find the way and had more enriched resources, students would be provided with the opportunity to engage in more linguistic activities. This point was emphasized by one participant as follows: "having more resources is very important and creating opportunities for students to work on activities that would help in acquiring the language.

#### (5) Teaching support

While some participants' suggestions varied into teacher's professional development, time, and resources, an administrator, on the other hand, recommended that assistance could be offered to teachers in the classroom by either parents or volunteers who could help in the language learning process. This point was stated by the participant as follows:

What would actually help is to have an aid for the teachers, to help even the ones that do not understand what is going on in the class- whether it is a parent or somebody else or a volunteer. I think that would help the teachers a lot and the kids, so that the teacher can focus on teaching.

#### (6) Summer camps in Greece

It was suggested by one of the participant that the organization of summer camps to Greece be organized by the HSO. The argument that was presented was that summer camps would help the students familiarize themselves both with the language and the culture. This participant stated the following:

There are also summer camps in Greece and we informed the parents about this through the newsletter, however, those camps were cancelled [...]. If they are immersed into the Greek surrounding, they are in Greece and they talk to people in Greek, this is how they will learn the language for sure.

#### (7) Create school partnerships

It was also suggested that students of the HSO communicate regularly with students from Greece in order to enhance their knowledge of Greek language.

Besides students from Greece, they could be in touch with other students of Greek descent from all over Canada or the U.S. As the participant stated: "Something else that would be a wonderful idea is to create school partnerships- relationships with schools from Greece- and have students from Greece talk to our students here [..]. So, that would be something, but it requires a lot of organization".

#### (8) Webinars or seminars

Conversely, one of the participants suggested that the school could get involved with the Internet side of the education for the teachers and administrators to benefit. In other words, more on-line resources and opportunities need to be utilized by the HSO>

Maybe, I would like to see some webinars or seminars to introduce new techniques and show what we are aiming at, what we are planning of changing and hear what the teachers have to say and then be able to adjust the manuals. I think it would be necessary to have a connection-that's what's missing right now.

#### (9) Trips to Greece

All ten participants suggested that trips to Greece or even summer camps in Greece are the optimum way to pass on the Hellenic culture to students of Greek descent. All participants recognized that it may not be a recommendation that could be carried out easily, due to financial reasons; it is though the soundest way to integrate into Greek heritage. As one participant explained: "The best solution is a visit to Greece. We should encourage that and do what we can to do that. It's another thing to learn about this place far off away and another to experience it.

#### (10) Engagement in Greek-content activities

All of the participants indicated that participation into more Greek-oriented activities is a major contributor for maintaining the Hellenic heritage. Those activities are varied from watching Greek movies, reading Greek books, listening to Greek music, participating in theatrical plays, participating in Greek dancing, participating in religious events, getting involved with what the HCO has to offer, participating in the Greek festival and so on. As one participant noted:

Try and live it. So, whether it is watching Greek videos, going to museums, going when possible to Greece, having a community of people who are also Greek, reading stories about Greek history and Greek culture, going to church; Living it, identifying yourself as a Greek-Canadian; whether it's the food, the music, the language, having it as part of your life and your day-to-day existence.

## Conclusion

For HLS programs to operate successfully, a lot depends on the efforts put forth by administrators. As little research has been conducted on HLS programs and the perceptions of administrators, this study purported to contribute to this limited research by examining the perceptions of administrators of the HSO. The results present findings on the administrative structure and objectives of the HSO, the strength and weaknesses in the administration of the HSO, as well as suggestions for improvement for the administration of the HSO.

It was found that the structure of the HSO focused on the instruction of the Greek language, including the fourlanguage skills- listening, speaking, reading, and writing; whereas, the objectives of the HSO focused on instilling a love for the Greek language. Moreover, administrators presented two strengths of the administration of HSO - (1) support from the HCO, and (2) people involvement; as well as three weaknesses - (1) support from the HCO, and (2) people involvement. Further, the administrators presented ten suggestions for the enhancement of the operation of the HSO - (1) teachers of higher qualifications, (2) addition of more Greek-content activities, (3) time-frame expansion, (4) resources, (5) teacher support, (6) summer camps in Greece, (7) create school partnerships, (8) Webinars and seminars, (9) trips to Greece, and (10) engagement in Greek-content activities.

As these findings are relevant and particularly practical for the HCO, while also making a contribution to research, it is recommended that more research be conducted as administrators change and education continues to evolve. It is also recommended that more research be conducted examining ethnic groups involved in HLS programs to provide a more diverse perspective of findings.

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## **A Strategic Approach for Making Higher Education Institutions Relevant and Viable through Engaged Learning and Teaching based upon Graduate Employability Profiles**

*By Serwan M J Baban\**

HEI's attempt to stay relevant and viable through engaging effectively with society, government and the private sector at all levels. These objectives are achieved via renovating their vision, approaches to learning and teaching and developing relevant graduate profiles for employment in both public and private sectors. It has been recognised that these interrelated challenges can successfully be accomplished through effective management practices and resourceful planning to handle ongoing market influences, competition and fluctuations in student enrolments. Therefore, enabling the institution to align its decisions with its mission and goals, while addressing risk assessment and risk management and considering the needs and expectations of its internal and external constituents. This paper presents a collaborative process for developing learning and teaching strategic plans, with a focus on graduate employability profiles, to fulfil an institution's forethought for the future. The paper also proposes an implementation procedure to manage the successful delivery of declared learning and teaching priorities and objectives. In other words, enabling the organisation to remain relevant and competitive and on the path to realize this aspiration.

*Keywords:* Higher Education, Learning and Teaching, Strategic Plans, Relevance, Graduate Employability.

### **Introduction**

The purpose of an organization defines why it exists in a specific environment and what it is intended to do. Higher Education Institutions (HEIs) are the engines of social and economic development in their host communities. Hence, to become relevant HEIs need to evolve continuously and to operate in the context of serving their stakeholders, host environment and to contribute effectively towards national socio-economic development (Balderston, 1995; Baban, 2022, 2023).

Therefore, to fulfil their purpose HEIs are expected to provide academic leadership which involves producing high quality graduate education and selective undergraduate education. In addition to offering professional development and technological training which mostly deals with the preparation of students for potential specific job markets. Hence, these attributes known collectively as a graduate employability profile is a framework that a HEI/college uses to specify the cognitive, personal, and interpersonal competencies that students should have when they graduate.

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Developing these characteristics in graduates will require strong connections and communications with employers and the job market which in turn will lead to relevant curriculum development, optimal learning outcomes and the desired graduate employability profiles. They will also need to be determined at institutional level and then identified at a faculty, discipline, qualification and subject level through a range of approaches including consultations with employers, students and professional bodies (Baban, 2018a, 2023; Kirui and Sang, 2020; Hudson, 2023).

A review of the literature reveals that HEIs are facing challenges in producing graduates capable of responding to, and meeting evolving market needs, contributing to nation building, sustainable development and wealth creation (Moran and Stevanovic, 2009; Kirk, 2010, Baban2011a; Baban 2011b; Halbinger, 2020)

Furthermore, it is progressively becoming evident that higher education is not a luxury; in fact, the attainment of a higher education degree is becoming essential for survival in a competitive job market. Consequently, higher education is increasingly seen as a priority in the policies of international aid agencies such as the World Bank (World Bank, 1994, 2000).

Evidently, potential future changes in HEI's teaching and learning functions to increase their relevance and contribution to the economy, development and the society in general includes a serious focus on developing and implementing graduate employability profiles, making the learning and training more student centred in order to make the graduates aware of the developments in society and of what is required of them in the future including the necessary skill sets for future employability (Spring, 1998; Baban, 2017; Baban, 2022, 2023; Halbinger, 2020). Within this rapidly transforming world, HEI's attempt to stay relevant and competitive as well as engaging effectively with society, government and the private sector. However, due to multiple external and internal issues they often face significant challenges in attaining these aspirations (Keller, 1983; Baban, 2017, 2022). The challenges often include:

- i. Fluctuations in student enrolments, the change in student demographics and associated funding irregularities .
- ii. Market influences driven by the threat of competition has led to the emergence of higher education as a business. As a result, institutions have been under pressure to expand rapidly and redefine their roles and vision to match the new reality (Newman and Couturier 2002).
- iii. The pressures to meet public expectations and the obligations to become more transparent and accountable in the new competitive environment (Moja, 2007). Therefore, the "business as usual" approach became less and less acceptable from the public perspective (Taylor et al., 2008).
- iv. Meeting the demands made by accrediting bodies, these bodies, responding to external demands for accountability through the development of standards for assessment and learning outcomes, started to assert that HEIs should have a strategic plan and an assessment plan in order to meet accrediting requirements (Baban, 2018a).



These conditions have obliged HEI's to seek the means to manage these demands and pressures, determine what it intends to become in the future and at the same time, succeed in an evolving competitive environment (Baban, 2018a, 2023; Neumann and Guthrie, 2006; Hudson, 2023). As a consequence, strategic planning has emerged as an effective tool for developing and implementing a proactive and flexible stance whilst operating in a fluctuating environment (Keller, 1983, Baban 2017, 2018b, 2023). It follows that strategic plans were viewed as pathways for formulating institutional mission and vision, prioritising resources, and promoting organisational focus. Therefore, HEIs need to adopt their resources, activities, and knowledge so that the strategy can be seen as the direction and scope to achieve desired outcomes in a changing environment (Kettunen, 2008; Halbinger, 2020). Some even indicated that HEIs should undergo transformations to become initiators of change rather than just responding to external pressures and external needs (Moja, 2007).

This paper presents a strategic approach for making higher education institutions relevant and viable through developing learning and teaching strategic plans, with a focus on graduate employability profiles, to fulfil an institution's forethought for the future. The paper also proposes an implementation procedure to manage the successful delivery of declared learning and teaching priorities and objectives. Hence, enabling the organisation to remain relevant and competitive and on the path to realize this aspiration.

### **Graduate Employability Profiles**

The world's economy is changing as knowledge becomes more important. Therefore, the quality of graduates developed by higher educational institutions, and their suitability to employment is becoming increasingly critical to national competitiveness. In fact, employers and professional bodies have acknowledged the need for graduates who are responsive to economic, social, cultural, technical and environmental change and can work flexibly and intelligently across business contexts. Furthermore, they signified that graduates are expected to understand the part they play in building their organizations, and have the practical skills to work effectively in their roles.

Various authors have offered definitions for employability, Griesel and Parker (2009) highlighted the main categories of skills and attributes that employees look out for when recruiting graduates. These are; basic skills, intellectual ability, workplace skills, applied knowledge and interactive skills, these are collectively referred to as the 'Graduate Employability Profiles'. Whist, Weligamage (2009) and Sha (2006) indicated that employability relates to the skills and attributes needed to gain employment and progress in an industry. Another relevant definition of employability is: a set of achievements, skills, understandings and personal attributes that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy (Yorke, 2004).

In practical terms this endeavour will require HEI's to focus on developing graduates with the expertise and intellectual capacity and curiosity required to meet arising local, regional and national challenges facing the country. Consequently, the graduates should leave the institution with specific knowledge and expertise in their chosen discipline as well as the necessary skills to succeed in a competitive environment and to make tangible contributions to the development process. Furthermore, HEI's should aim to prepare their graduates to become active global citizens and leaders, attuned to the development process and cultural diversity to benefit from employment opportunism locally, nationally and internationally (Oliver, 2004; Baban, 2011, 2017).

Higher Education institutions worldwide make an effort to inculcate and develop graduate employability skills in their students by providing academic staff with a clear framework and the necessary relevant support and resources to integrate these skills into the curriculum, course design and assessment, provide students with work placements and exposure to professional settings and offer advice and guidance through career services. Moreover, some higher educational institutions tend to offer their students opportunities for developing the required skills through participation in clubs, societies and work placements.

### **Strategic Planning and Higher Education Institutions**

Strategic planning in higher education emerged in the 1970's and 1980's and has been steadily evolving since as a response to various external and internal challenges facing higher education intuitions (Chaffee, 1984; Gumpert and Sporn, 1999; Hinton, 2012). Chandler (1962) defined strategic planning as "the determination of the long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals". Crisp (1991) defines strategic planning in higher education as "the set of activities designed to identify the appropriate future direction of a college and includes specifying the steps to move in that direction". Whilst, Johnson, et.al, (2008) defines it as the direction and scope of an organisation over the long term, which achieves advantage for the organisation through its configuration of resources within a changing environment, to meet the needs of markets and to fulfil stakeholder expectations .

Essentially, strategy involves setting the future plans of the Institution, but it requires a comprehensive understanding of the Institution's resources (such as cash, assets and employees), it's environment (such as markets, political and economic issues, customers and competitors) and exactly what the Institution's stakeholders (anyone with an interest in the business, such as shareholders, staff, customers, government, etc.) expect of the Institution. Furthermore, strategic planning assumes that specific aspects of the future can be created or influenced by the organisation. Consequently, there is wide consensus that strategic planning, if developed and implemented properly, will offer HEIs a solid road map to progress and to successfully serve the community (Hinton, 2012; Baban, 2017). More specifically, having an effective a strategic plan will

- i. Provide direction: One of a strategy's main advantages is the direction it provides for the Institution. By laying out a well-thought-out plan, the institution will be sure that everyone is working toward the same objectives and will give staff members a sense of shared responsibility.
- ii. Establishes a measure for success: by enabling organisations to compare their growth and performance to predetermined objectives.
- iii. Increases adaptability: In the current innovation-focused society, Institutions need to be responsive to change. An effective business strategy will allow Institutions to predict and meet the changing demands of the current market.
- iv. Enhances adaptability: Institutions must be flexible to change in the modern, innovation-focused society. Institutions will be able to anticipate and meet the shifting demands of the present environment with the help of an effective business plan.

Strategic planning in higher education emerged in the 1970's and 1980's and has been steadily evolving since as a response to various external and internal challenges facing higher education intuitions (Chaffee, 1984; Gumport and Sporn, 1999; Hinton, 2012).

Contemporary strategic plans have multiple components and each component serves a specific purpose. These components are planning tools used either separately or in groups; the planning process is tasked with ensuring that these individual components are aligned with each other and mutually supportive. Strategic planning can be developed with two focuses, first a focus on internal pressures, bases strategic planning on institutional values, and is purely practical, seeking to assist the HEI to run efficiently and effectively (West-Burnham, 1994; Larsen and Langfeldt, 2005; Hinton, 2012). The other focus is related to positioning the HEI in relation to its external environment, emphasising planning in response to financial changes, government regulations, changes in the student market, competition from other HEI's, emerging technologies, or international pressures (Gumport and Sporn, 1999; Bayenet et.al., 2000).

The planning process will also provide an interactive platform for all relevant staff at the institution to develop and document a collective vision, values and mission statements (Baban, 2015). In addition to developing comprehensive strategies, and detailed action plans for the core activities of teaching and learning. These supporting documents will provide specific points of reference and guidance in the planning process and during the implementation period.

### **A Practical Approach for Developing a Learning and Teaching Strategic Plan**

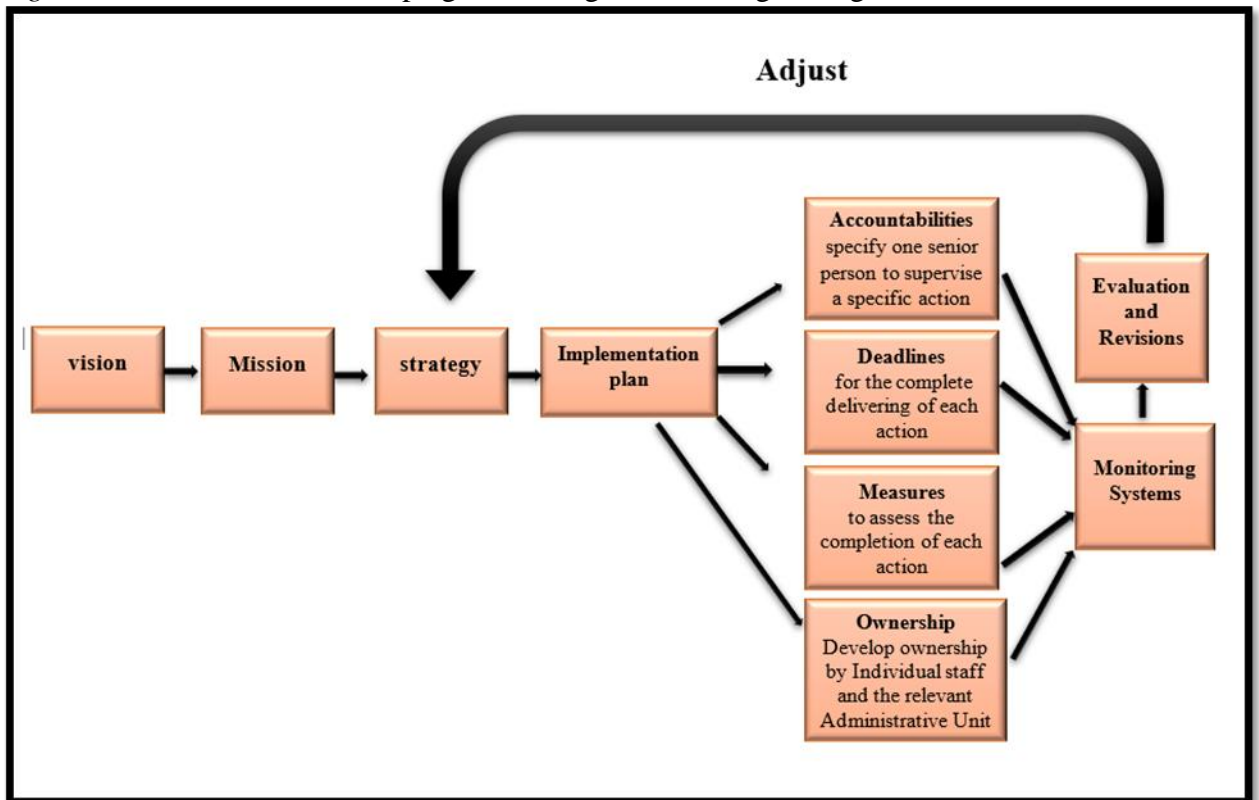
In terms of process, strategic planning will require developing a collaborative learning and teaching vision, identifying the priorities, procedures, and operations to achieve the vision. The collective institutional vision is then translated into a mission statement and goals. Then after, the planners need to articulate practical strategies for achieving the goals as well as addressing goal measurement which involves articulation of objectives (the short-term conditions needed to achieve

desired conditions for a particular goal), indicators (the quantifiable measures of progress; they provide numeric assessment of the desired conditions of well-being for a particular goal) and benchmarks (the target levels of performance expressed in measurable terms and specified time frames, against which actual achievement is measured).

An effective implementation plan detailing accountabilities, deadlines and measures for assessing the completion of various tasks is also required. These should be accomplished in a positive environment inspiring the sense of ownership for the plans by staff and relevant academic units. Next monitoring as well as evaluation and revisions are required to inject the necessary adjustments to further enhance the process (Fig 1).

This process amongst other issues will require growing and obtaining collective institutional understandings and agreements on the purpose of an organisation. Defines why it exists? what it is proposed to do? A role is defined as the actions or functions that it assumes to achieve its purpose. In addition to the fundamentals of learning and teaching (Biggs, 2001) which include vision, core values and operating principles as well as priority and accountability issues. More specifically (Baban, 2018a, 2018b, 2023);

Figure 1. The Process of Developing a Teaching and Learning Strategic Plan



## **Institutional Agreements**

An essential first step for any strategic planning is obtaining institutional agreements on the following concepts and principles:

- i. **Organizational core values and operating principles.** These are the beliefs and principles that guide the organization; these should be shared and strongly held values by senior management and staff. By ensuring that all employees are working toward the same objectives, having clearly defined institutional values helps the organisation realise its mission. These principles should guide every decision the institution makes. HEI's Core values often include academic freedom, academic excellence, equitable access, respect, accountability, transparency, honesty, integrity and collegiality.
- ii. **Vision for the Target Community.** This is the HEI's impression of what the community it serves would be like if the values and operating principles including graduate employability profiles were shared and practiced by all involved. The vision must be based on the values of those involved in the process and will have a stake in the achieving the vision.
- iii. **Mission.** This is the HEI's public statement of the contribution it promises to make to help accomplish the community vision.

## **The Planning Process**

Developing a learning and teaching plan is a collective process involving input from all relevant staff (Biggs, 2001; Biggs and Tang, 2007, Baban 2018b, 2023), hence, once, a combined institutional view is developed and agreed upon, the planning process can proceed through determining the following issues:

### **i. The Current Status of the Learning and Teaching at the HEI.**

The required information can be gathered using both internal and external questionnaires to establish a realistic understanding of the HEI's real competencies in learning and teaching as well as the demand for HEI education, employability of its graduates. Besides identifying and examining actual and potential local, regional and national competitors in this field.

### **ii. Priority Learning and Teaching Issues.**

Identifying these priorities requires preparing and shaping a HEI's learning and teaching with a particular focus on the future. The priorities will set the direction of the HEI over the long term and clearly defines the overall mission including markets, customers and products; as well as the vision in terms (conceptualisation of what the organization's future should or could be). In turn, it will determine the institutions niche, graduate employability profile and competency within its geographic and virtual environments.

**iii. Expected Objectives.**

These objectives should be articulated to express what the HEI must achieve to address the learning and teaching priority issues.

**iv. Determine Accountability.**

Determine the accountable personnel and the relevant time lines for implementing the strategies, action plans, and budgets and effectively communicate the process of allocating resources (time, human capital, and funds) to address the priority issues and achieve the defined objectives.

**v. Reviews.**

Regular reviews should be conducted to ensure that the plans are performing as planned, evaluate the outcomes and to adjust the plans as necessary. Ultimately the learning and teaching plan requires that:

1. All degree programmes have curriculum statements outlining the graduate profile of those who graduate with the award of the degree.
2. All courses in the degree have a clear statement of learning outcomes mapped in the graduate profile, indicating how the learning outcomes from the course contribute to the degree.
3. All courses have a clear statement of how the teaching methods used in the course relate to the learning outcomes for the course and provide these for students.
4. All courses have a clear statement of assessment requirements for the course and how these relate to the learning outcomes for the course.

**A Collaborative Process for Developing a Learning and Teaching Strategic Plan**

The following represents a participatory and an interactive process for developing the strategic plan based on written responses from staff at various HEI, college and department levels (Biggs, 2001) derived through the following specific tasks Figure (2). The tasks can only be successfully executed after establishing institutional agreements on the fundamentals such as the institution's goal, core values and operating principles.

**Task 1: Defining the Learning and Teaching Vision, Mission and Values.**

The task, through the questions below, aims to develop a consensus on the learning and teaching vision, mission and core principles.

### Developing the Vision

Based on institutionally agreed values, concepts, definitions and your own experience, list five points best defining the learning and teaching vision for the institution as a distinguished local, regional or international HEI.

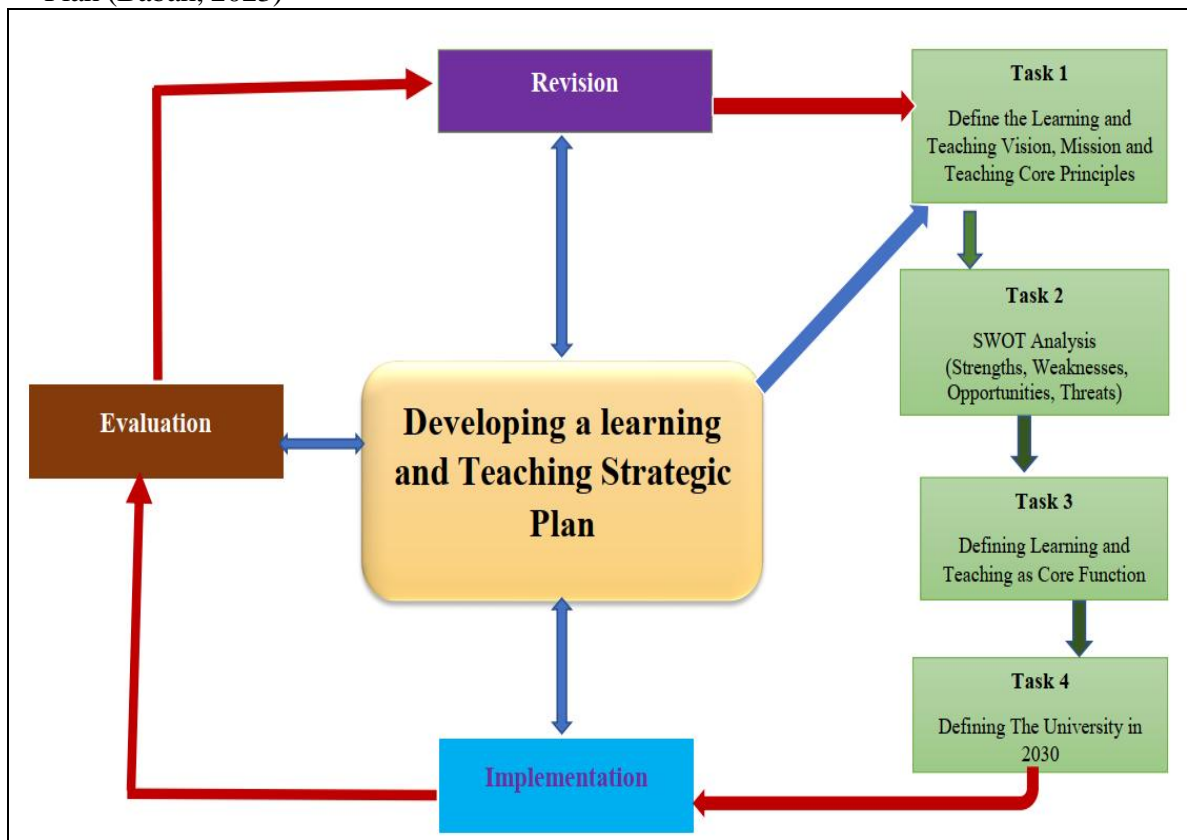
### Developing the Mission

Based on institutionally agreed values, concepts, definitions and your own experience, list five points best defining the learning and teaching mission for the institution as a distinguished local, regional or international HEI.

### Developing the Learning and Teaching Core Principles

Based on institutionally agreed values, concepts, definitions and your own experience, list five points best defining the learning and teaching core principles for the HEI. These might include staff development, pedagogy, graduate employability profile and links to the market, links with international institutions and professional organisations).

Figure 2. A Collaborative Process for Developing a Learning and Teaching Strategic Plan (Baban, 2023)



### **Task 2: SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis**

The task, through the questions below, aims to establish the current status of the HEI by focusing on Quality, Relevance, Internationalisation, Accreditation and Graduate Profile/Employability. Then comparing these characteristics with the main competitors locally, regionally and internationally.

#### **Defining Strengths, Weaknesses, Opportunities, Threats**

Based on institutionally agreed values, concepts, definitions and your own experience, perform SWOT analysis for the HEI's Teaching and Learning approaches as well as quality, curriculum content, development and relevance).

### **Task 3: Learning and Teaching as Core Functions**

This task, through the question below, aims to define the institution's learning and teaching processes, delivery and assessment modes. Then relate these core function to the preparation of a distinctive HEI graduate obtaining the knowledge, skills and the intellectual curiosity required for the development of region, country and worldwide.

#### **Defining Learning and Teaching Core Functions**

Based on institutionally agreed values, concepts, definitions and your own experience, list five points best defining the Learning and Teaching, curriculum content and relevance, development as well as graduate profile and market needs.

### **Task 4: The HEI in 2030**

The task, through the question below, aims to develop consensus regarding the main points defining the HEI in 2030 to become the preferred destination for students, lectures and researchers as well as being the first choice for employers.

#### **Defining the HEI on 2030**

Based on institutionally agreed values, concepts, definitions and your own experience, list five points best defining the HEI in 2030.

### **The Implementation Plan**

The implementation plan is the means of turning learning and teaching goals and objectives into a working plan. There are a number of prerequisites that reinforce implementation and ensure a successful outcome, these include (Baban 2018a, 2018b, 2023):



1. Assignment of responsibility, deadlines and identification of measures of completion and documentation. Therefore, it is necessary to identify one person to be accountable for the implementation of a specific action to completion, a person to monitor the implementation of the specific action, a date by which the action is expected to be completed, and what measures will be used to define success in the implementation of the action. Figure (3), represents a basic implementation plan for a HEI learning and teaching priority, containing clearly defined actions, implementation and monitoring responsibilities as well as the deadlines for delivering the actions.
2. The person's assigned responsibilities for the actions must have the authority and the necessary resources (people, time, space, technology, and funding) to deliver the required objectives on time.
3. Facilitating faculty participation as a central component of HEI operations. Therefore, the HEI should target faculty members as individuals and aim at obtaining commitment, willingness and a positive collective sense of the need for change. In addition to encouraging the organisational units to take responsibility for their strategic planning, while promoting alignment between unit-level plans and with the HEI's overall strategic plan.
4. Strengthen the participation and capacity of planners and implementers. This is necessary to enable the organizational units to successfully fulfil their role in strategic planning process and it can be achieved through creating a diverse leadership team with deep organisational knowledge, a variety of perspectives, and an understanding of decision-making powers and boundaries
5. Conducting a semi-annual review. This review is necessary to transparently manage the goals of the strategic plan.
6. The implementation plan should be flexible in its formation; hence it can be easily adjusted to respond to concerns about the planning process as well as the internal and external changes that will occur during the life time of the strategic plan.
7. HEI's in their early years of strategic planning, especially those embarking on strategic planning for the first time need to be mindful of financial limitations and establish goals and action plans reasonably feasible in regard to both human and financial resources.

Figure 3. The Implantation Plan for an Identified Priority within HEI Learning and Teaching Plan (Baban, 2023)

Teaching and Learning Priorities				Dates			
Priority: Curriculum Development and Renewal				Sept	Oct	Nov	Dec
Actions	Implementation	Monitoring					
<b>1.1. Staff Development.</b>							
A	Staff Training on graduate Profile, Curriculum Development and Program Benchmarking	Head of Dept.	L & T Unit				
B	Training in Class administration	Head of Dept.	L & T Unit				
C	Training in preparing course handbooks	L & T Unit	Head of Dept.				
D	A development strategy to introduce staff to in new learning methods and technologies.	L & T Unit	Head of Dept.				
<b>1.2. Curriculum Development</b>							
A	Prepare graduates for professional Practice and fulfilled the University's graduate attributes.	Dept. Scientific Cttee	Univ. Council + L & T Unit				
B	Form a Curriculum and Renewal Committee.	Head of Dept.	Dept. Council				
C	Embed Graduate Attributes into coursework, including assessment, design, teaching and evaluation.	Dept. Scientific Cttee	Univ. Council + L & T Unit				
D	Examination of Core courses with a particular focus on learning to the graduate profile and market needs.	Dept. Scientific Cttee	Univ. Council + L & T Unit				
E	Committee evaluating (Benchmarking) of complete curriculum internally and with other relevant University.	Dept. Scientific Cttee	Univ. Council + L & T Unit				
F	Department council approval of curriculum.	Dept. Council	Head of Dept.				
G	University Council approval of curriculum.	University Council	Univ. Council + L & T Unit				

## Conclusions

HEI's are facing ongoing challenges to stay relevant and competitive in their learning and teaching approaches and programmes offered which have significant impacts on graduate employability. Evidently, these aspirations can be achieved via modernising a HEI's vision and programmes utilising new approaches to learning and teaching and producing graduates with the relevant graduate employability profiles to gain employment with government and the private sector. This paper presented a participatory process for developing learning and teaching strategic plan based on staff feedback at various HEI, college and department levels derived through several tasks. The tasks can only be successfully executed after establishing institutional agreements on the institution's operating principles and learning and teaching fundamentals such as vision, mission, values and goals. The paper also proposes an implementation procedure to manage the delivery of declared and approved learning and teaching priorities and objectives

The process of planning must start with a clear understanding of the motivation for planning; ensuring the availability of all the necessary resources, and the leadership must maintain a focus on the strategic plan's priorities and goals. Furthermore, middle management and staff must be engaged throughout the

planning process so they develop the capacity and understanding required to implement the plan. At the same time, the wide input from multiple constituencies regarding the institution's major learning and teaching priorities must be carefully considered and accommodated within the plan.

This paper also promotes establishing collective institutional agreements on the institution's operating principles, priorities and fundamentals to allocate and ensure the availability of all the necessary resources when they are needed at university, college and departmental levels. Hence, the leadership should focus on aligning the necessary human, financial and physical resources allocations and cultivating new resources to support the key teaching and learning priorities in the university strategic plan.

Experience has shown that, the planning process and associated procedures can also advance evidence-based decision-making and in particular, the budget process and to lay the foundation for performance measurement, which allows managers to make resource allocation decisions in accordance with clearly defined teaching and learning goals. In addition, it assists the monitoring of progress whilst detecting deviations from the plan and correcting them on a timely basis.

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## **Scoring Rubrics Method in Performance Assessment and its effect of Mathematical Achievement**

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This study aimed to investigate the impact of using scoring rubrics on assessing the performance of students in achievement. The study followed an experimental approach, and the sample consisted of 187 male and female students enrolled in the Calculus course. They were divided into three groups: the first experimental group, whose performance was evaluated using analytical scoring rubrics, the second experimental group, whose performance was evaluated using holistic scoring rubrics, and the control group, whose performance was evaluated using the traditional method. Additionally, a mathematics achievement test was developed, and two of scoring rubrics, one analytical and the other holistic, were prepared to evaluate students' performance. The results of the study favored the use of analytical scoring rubrics over holistic correction rules, as they considered all details, procedures, and levels of understanding and perception. The students expressed satisfaction with the use of analytical and holistic performance scoring rubrics in evaluating their performance. The study recommended the need for students to pay attention to interpreting their procedures when performing mathematical tasks. It also encouraged teachers to use scoring rubrics to evaluate students' performance and called upon curriculum authors to make the necessary modifications and additions to increase students' opportunities for justifying their procedures. Moreover, conducting in-depth studies that allow students to justify their procedures was suggested.

*Keywords:* performance-based assessment, scoring rubrics, achievement, composition and inverse functions, assessment strategies, educational psychology, pedagogical methods.

### **Introduction**

The past few years have witnessed significant development in the field of assessment and its growing importance among education experts for the purpose of educational reform and improvement. Thomas Kalvin, the president of the International Organization for Measurement and Evaluation, addressed the issue of educational reform and development through various assessment processes during the 27th conference of the organization. He emphasized that most past reform efforts focused on educational inputs, while recent trends have emerged that

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prioritize educational outcomes and the extent to which students acquire knowledge, skills, behaviors, and attitudes.

According to the National Council of Teachers of Mathematics (NCTM, 2000), assessment is the process of gathering evidence about students' mathematical knowledge, their ability to use mathematical knowledge, and their attitudes towards mathematics. It involves extracting judgments from this evidence for various purposes. Assessment has become a primary source of evidence on which teachers base their inferences about what students know or need to learn. Furthermore, student assessment should not be conducted solely for the purpose of evaluation but also for guiding and supporting student learning and understanding patterns of knowledge.

Education experts and researchers (Jarrah, Khasawneh, & Wardat, 2020; Alotaibi, Khalil, & Wardat, 2021; Tami & Roger, 2000) believe that assessment is a systematic process that requires collecting objective and authentic data from multiple sources using various tools, in line with specific objectives, to reach quantitative estimates and descriptive evidence. These estimates and evidence are used to make appropriate judgments or decisions. Undoubtedly, these decisions have a significant impact on learners' performance and their ability to carry out specific tasks or assignments. On the other hand, traditional assessment approaches adopt an educational philosophy that emphasizes highlighting individual differences and encourages competition for achieving a superior relative position among peers, without considering the individual's possession of functional skills, ethics, and constructive positive behaviors.

This narrow perspective focuses on the accumulation of specific information in the learner's mind, which no longer suits the current and future requirements of education and its changing needs in this era characterized by cognitive explosion, information revolution, and communication. In light of this broader perspective, assessment is no longer an end in itself for determining the success or failure of learners and their progression to higher grades or educational stages. Instead, it has become an integral part of the learning process, guiding, enhancing, and correcting its trajectory. This requires a shift from prevailing traditional testing methods, numerical grades, and assessments that focus solely on comparing learners' performance to the adoption of methods and systems that foster the learner's integrated and balanced personality, their possession of functional skills, and deep understanding of the curriculum content acquired through self-learning and curiosity, enabling them to interact with and enrich their environment (Assessment Strategies and Tools Manual, 2004).

Tashtoush & Rasheed (2023) argue that to improve and enhance the assessment process in mathematics, there must be standards or criteria that determine how to deal with assessment mechanisms. This is essential for the development of assessment tools used by teachers. Assessment is defined as the process of making judgments about the value of objects, individuals, or subjects, and in this sense, it requires the use of standards or criteria to estimate this value. It also encompasses the meaning of improvement, modification, and development that relies on these judgments (Tashtoush & Rasheed, 2023). This guide considers the learning outcomes that should be the basis for planning the assessment process, selecting



appropriate tools, distributing grades across assessment tools, and allowing teachers the opportunity to choose the suitable tool that aligns with the educational situation and the learning goal being assessed.

Performance assessment is a valuable method of evaluating students' understanding and abilities in educational settings. It involves measuring what students know and can do by having them demonstrate their skills, knowledge, and competencies through various tasks, projects, or activities. Performance assessments are designed to assess a student's ability to apply their knowledge and skills in real-world contexts, moving beyond simple memorization or regurgitation of facts (Al-Subaie and Al-Khudair, 2023; Al-Ruwaili, 2016; Sahin & Baki, 2010).

Al-Subaie and Al-Khudair see that the scoring rubrics play a crucial role in the process of performance assessment in education. A rubric is a scoring guide or framework that outlines specific criteria and levels of performance for a given task or project. Here's how rubrics contribute to educational evaluation (Al-Subaie and Al-Khudair, 2023):

- **Clarity and Transparency:** scoring rubrics make the assessment process more transparent by clearly defining the expectations for students. They provide a set of criteria that both teachers and students can refer to, ensuring a shared understanding of what is expected.
- **Consistency:** scoring rubrics promote consistency in grading and evaluation. They help teachers maintain objectivity by providing a standardized method for assessing student work, reducing the potential for bias.
- **Feedback and Improvement:** scoring rubrics allow for targeted and constructive feedback. Teachers can use rubrics to provide specific comments and suggestions for improvement, helping students understand where they excelled and where they need to focus on enhancing their skills.
- **Student Self-Assessment:** scoring rubrics empower students to assess their own work against predefined criteria, fostering self-awareness and self-improvement. This encourages students to take ownership of their learning.
- **Alignment with Learning Objectives:** scoring rubrics are often aligned with learning objectives, ensuring that assessment tasks are directly tied to what students are expected to learn. This alignment enhances the validity of the assessment.

Many educational experts and researchers (Abdallah & Wardat, 2021; Tashtoush et al., 2023; Moscal, 2003; Sahin & Baki, 2010; Abo Obaid, 2011) agree that the assessment process utilizes several tools, including:

- **Continuous Assessment:** This is an organized assessment conducted throughout the teaching process, aiming to diagnose strengths and weaknesses in learners' performance, identify difficulties they face during learning, apply appropriate remedial methods, assist learners in recognizing their abilities and potentials, suggest ways to enhance them to the maximum extent, and consequently issue a realistic judgment determining learners' performance level. This type of assessment contributes to detecting

weaknesses and strengths in the educational program, with the purpose of reviewing, modifying, and developing its components.

- **Formative Assessment:** This assessment accompanies daily teaching activities and aims to continuously provide teachers and learners with performance results to improve the educational process. It is used to assess the achievement of objectives and utilize feedback to modify the course and enhance the learning process.
- **Summative Assessment:** It refers to making judgments about the extent of learners' acquisition of learning outcomes with the aim of making decisions such as promoting learners to a higher level or graduation.
- **Self-Assessment:** It involves students' participation in determining levels and criteria of performance and applying them to their own work, issuing judgments related to their achievement of these criteria and levels. Self-assessment serves as a tool for reflection, self-learning, and self-monitoring of performance.
- **Peer Assessment:** It is the active collaboration of a small group of learners to assess the work completed by one of their members or another group, aiming to achieve one or multiple defined objectives within the framework of acquiring cognitive or social knowledge that benefits them through the teacher's evaluation.

One of the common methods that has gained significant popularity in recent years in assessment is performance-based assessment, also known as scoring rubrics. Abu Obaid (2011) defines scoring rubrics as plans developed by specialists or teachers to guide them in analyzing students' performance tasks. Moscal (2003) also defines them as methods that can be used to evaluate students' responses to performance-based assessments, based on beliefs that good assessment begins with considering what students should know and how to assess this knowledge. Linda (1999) views scoring rubrics as benchmarks that include rules, principles, and explanations used to assign grades to responses on each criterion and all the criteria that make up the performance task.

In contrast to traditional assessment approaches, which usually involve more objective methods of grading tasks, alternative assessment and its accompanying use of scoring rubrics involve self-judgments that create a greater challenge in fostering trust and agreement in grading performance tasks. Using scoring rubrics extensively contributes significantly to providing high levels of confidence in assigning authentic and reliable grades to students (Cohen, 1994).

Scoring rubrics have garnered significant attention from many education experts in recent times, owing to the increasing emphasis on performance-based assessment. They provide indicators of performance quality in tasks and make self-judgments more objective and realistic, moving away from biases when evaluating student performance. Several education experts (Hart, 1994; Moscal, 2003; Alarabi & Wardat, 2021; Sahin & Baki, 2010; Abo Obaid, 2011; Tashtoush, Wardat, Aloufi, & Taani, 2022b) classify scoring rubrics into four main types as follows:

- **Holistic Scoring Rubrics:** These rubrics provide an overall assessment of the student's performance in a comprehensive and holistic manner. It estimates the student's proficiency as a whole, where each rating on the scale represents a general impression. This type of rubric is not suitable for classroom use as it focuses on overall competence and is not designed to align with curriculum or instructional objectives.
- **Analytic Scoring Rubrics:** In these rubrics, the scoring is divided into separate categories or dimensions that represent different aspects of performance. Each dimension is measured separately, and the results of the dimensions are combined to determine an overall score. The multiple dimensions provide teachers with the opportunity to assess various areas that may differ in their overall importance. Analytic scoring rubrics also provide more information to students about their strengths and weaknesses in multiple areas of performance.
- **Single-Trait Scoring Rubrics:** These rubrics involve pre-determining the main criterion for successful task performance that needs to be assessed. The single-point feature is identified by the teacher based on the nature of the task. This involves narrowing down the criteria for judging performance in the task to a single classification or main dimension. It helps teachers and students focus on a single aspect of performance.
- **Multi-Trait Scoring Rubrics:** These rubrics resemble single-point scoring rubrics, but they allow for the assessment of performance across multiple dimensions. While they share similarities with analytic scoring rubrics in measuring multiple areas, multi-trait scoring rubrics differ in the nature of the dimensions or traits that make up the assessment scale.

These different types of scoring rubrics offer educators a range of options to assess and provide feedback on student performance, allowing for a more comprehensive evaluation aligned with specific objectives and providing students with valuable information about their performance in different areas.

Both holistic and analytic scoring rubrics are characterized by their ability to gather data and information about students' performance levels in educational tasks and improve their performance and cognitive skills. After constructing them, teachers use them for evaluating students' performance on one hand and benefiting from them in the teaching process on the other hand (Stanley, 2014). However, holistic scoring rubrics estimate students' performance as a whole and provide an individual score. They are employed when a quick and consistent judgment is needed, especially for assessing complex and internally interrelated skills. This type of scoring rubric is often used in standardized tests (Tashtoush, Wardat, & Elsayed, 2023; Mertler, 2001). On the contrary, analytic scoring rubrics make judgments on each dimension of performance independently, offering a gradation for each dimension and an overall assessment of all dimensions. They provide more detailed information but take longer to administer compared to holistic scoring rubrics. Diagnostic tests frequently utilize this type of scoring rubric (Nitko, 2001).

Based on the foundation that traditional assessment methods in most educational institutions have proven to be ineffective in measuring students' skills and knowledge, it became necessary to develop and adopt modern assessment methods, diversify student assessment approaches, and focus on performance based on performance criteria. These approaches aim to measure learning outcomes and processes simultaneously (McLellan, 2008). Therefore, this study considers performance assessment rubrics as indicators of performance quality in specific tasks. They have the ability to gather information about students' task performance, improve their performance and cognitive skills, and contribute to making self-judgments on student performance more realistic. Many education experts in this field recognize the use of performance assessment rubrics as providing convincing justifications for the feasibility and effectiveness of this type of assessment.

### **Problem Statement**

Scoring rubrics are educational concepts and a type of assessment based on performance that plays a significant role in evaluating the process of teaching and learning mathematics. Undoubtedly, this type of assessment provides teachers with information about students' understanding of knowledge and skills and their ability to apply them in learning mathematics. It also enables teachers to integrate classroom teaching with performance-based assessment and scoring rubrics, enriching their educational and pedagogical experience.

Since associations are the fundamental building blocks of studying calculus, this study aims to provide a background on some scoring rubrics that fall under the title of performance-based assessment. These rules can benefit teachers and university instructors, as they are the key element in the assessment process in the classroom. Two scoring rubrics were adopted for assessing mathematical tasks: the first is the holistic correction rule, and the second is the analytical correction rule. Each of them has its own aspects. The holistic correction rule provides a basis for comparing two performances, but it does not rely on task analysis or provide diagnostic information about students' task performance. On the other hand, the analytical scoring rubrics provides more detailed grading and its results are described as more accurate, although it may focus more on certain aspects of performance compared to others.

Due to significant shortcomings in the methods and techniques of assessment adopted in our various educational institutions, and based on field observations by researchers who are mathematics teachers at different educational levels, as well as their supervision of pre-service mathematics teachers in the educational field, and the participation of others in international assessment tests such as TIMSS, PISA, and STEM, this study aims to respond to the importance of having modern assessment methods and techniques. It aligns with the global, Arab, and local movements in the Jordan to develop assessment methods and techniques based on student performance. The idea of this study also stems from the researchers' struggle to understand students' thought processes when they attempt to perform

tasks of different levels in operations on associations, especially in tasks related to composing associations and finding inverse associations, and interpreting the low level of performance in these tasks. Specifically, this study aims to answer the following main question:

What is the impact of using scoring rubrics for performance assessment on the achievement of students in Calculus course?

### **Hypothesis of the Study**

There are no statistically significant differences at a significance level ( $\alpha=0.05$ ) among the students' performances on the mathematical achievement test, for each of the three groups: first experimental group, second experimental group and control group.

### **Study Importance**

The importance of the study stems from the significance of the topic it addresses. The theoretical importance lies in the fact that it is one of the studies that call for the examination of associations in general, and specifically the operations of composing associations and finding inverse associations. It involves using methods and techniques to assess students' performance in Calculus, based on alternative evaluation that requires searching for multiple sources of evidence, building conclusions, and judging what students know to achieve realistic assessment. Researchers hope that this study will enrich the theoretical and research literature in mathematics and fill a gap in this area of research. The practical importance of this study lies in its potential to benefit students, faculty members, and specialists in developing the assessment process. It enables them to become familiar with performance-based assessment tools and the use of correction rules.

### **Study Objectives**

This study aimed to Understanding how to apply scoring rubrics and assessing performance in the Calculus course among students, through the achievement test in mathematics, since the understanding performance evaluation criteria helps students know how to answer to the test questions and recognize the subgrades for each step in their responses.

### **Limitations**

- **Time Boundaries:** This study was conducted during the second semester of the academic year 2022/2023.

- **Spatial Boundaries:** The study was conducted at AL-Huson University College at AL-Balqa Applied University.
- **Human Boundaries:** The study was conducted on students enrolled in the Calculus course.
- **Subject Boundaries:** This study addressed the overall and analytical correction rules, their results using data collection tools, procedures, the nature of the community and the sample, and the operations of composing associations and finding inverse associations.
- The study is defined by its psychometric properties, including acceptable validity and reliability, for the purposes of scientific research to achieve the study's objectives.

### Procedural Definitions

- **Performance-based Assessment:** It is a type of assessment designed to measure a student's ability to perform specific tasks and judge their achievement using assessment tools that estimate their level.
- **Scoring Rubrics:** A method of evaluating a student's performance based on meaningful criteria and judging their performance level in a single task or multiple tasks.
- **Holistic Scoring Rubrics:** A scale that provides a general overview and estimation of a student's performance in a specific task.
- **Analytical correction Rubrics:** A scale that categorizes a student's performance in a specific task into multiple levels, where each level is measured separately, and then an overall judgment is made based on all levels.

### Literature Review

Through reviewing the theoretical and educational literature that addressed the importance of using scoring rubrics in teaching and learning mathematics, this study discussed some previous studies related to the subject of the current study, which could be useful to mention in the current study. McBride and Carifio (1995) conducted a study aiming to investigate the effectiveness of using analytical scoring rubrics to assess students' performance in geometric proof by employing cognitive behavior theories of geometric knowledge. A group of evaluators assessed the performance of 241 students in geometric proof using a correction rule that included multiple criteria through various tests measuring students' ability in geometric proof. The study results showed that the use of analytical scoring rubrics yielded better results than traditional assessment methods.

Similarly, Lumely and Yan (2001) examined the impact of broad-spectrum assessment on teaching methods and instructional strategies followed by teachers in Pennsylvania. The study identified factors influencing teachers' beliefs and usage of broad-spectrum assessment and used a questionnaire administered to 168 teachers from 20 different schools. The study revealed that while teachers

recognized the importance and value of the scouring rubrics presented in the assessment guide, they did not use them. They attributed this to developing their own correction rules. Furthermore, teachers adhered to traditional methods and did not adopt advanced scouring rubrics in assessment.

Al-Absi (2007) conducted a study aiming to investigate the effect of using scouring rubrics to assess performance in achievement and attitudes of tenth-grade students in mathematics in Jordan. Two correction rules, holistic and analytical, were developed, and an achievement test and a questionnaire to measure students' attitudes were administered to 128 students divided into three groups: the first experimental group was assessed based on an analytical correction rule, the second experimental group was assessed based on a holistic correction rule, and the control group was assessed using traditional methods. The study results showed the effectiveness of both holistic and analytical assessment methods on students' performance. The study recommended incorporating scouring rubrics as a means of assessing students' performance and achievement in mathematics and training teachers to use them.

In the same context, Sahin and Baki (2010) conducted a study aimed at investigating the possibility of using scouring rubrics as a multidimensional assessment approach to evaluate mathematical power. The study included 62 students from three eighth-grade classes in Turkey and employed a case study methodology. The study results showed that the use of scouring rubrics effectively contributed to the students' growth in problem-solving skills, decision-making abilities, communication skills, as well as the evaluation of practical and conceptual knowledge. This demonstrated the potential for assessing learning outcomes and processes.

Furthermore, Balawneh (2010) aimed to examine the effectiveness of performance-based assessment in developing mathematical thinking and problem-solving abilities among secondary school students. The study included a sample of 74 female students from the eleventh grade in a school in Jordan. An experimental group was evaluated using performance-based assessment, while a control group was assessed using traditional methods. The researcher utilized tests for mathematical thinking and problem-solving to collect data. The study results indicated statistically significant differences favoring the experimental group in terms of mean scores in mathematical thinking and problem-solving tests. The researcher recommended further studies on alternative assessment methods, the development of specialized assessment guidelines, and the diversification of classroom exercises and homework to include performance tasks that stimulate logical thinking.

Regarding studies targeting secondary school students, Abu Obeid (2011) aimed to investigate the impact of using scouring rubrics to assess performance on students' achievement and attitudes towards mathematics. Two correction rules, holistic and analytical, were developed for this purpose. The study included a sample of 128 students divided into three groups: the first experimental group was assessed using analytical correction rules, the second experimental group was assessed using holistic correction rules, and the control group was assessed using traditional methods. Achievement tests and an attitude scale towards mathematics

were administered after the study implementation. The study results revealed statistically significant differences attributed to the application of the assessment method in favor of the first and second experimental groups compared to the control group, while no statistically significant differences were found between the two experimental groups.

In a related context, Al-Maliki (2011) conducted a study aimed at investigating the impact of using analytical performance evaluation criteria on the academic achievement of third-grade students. The study included a sample of 46 students from schools in KSA, divided into two groups: experimental and control. A test was administered to assess academic achievement. The results showed the effectiveness of analytical performance evaluation criteria in assessing students' performance, and the study recommended the use of these criteria in teaching mathematics to elementary stage students.

Al-Ruwaili (2016) conducted a study to examine the effect of scouring rubrics on performance evaluation and its impact on the academic achievement and attitudes of eleventh-grade female students towards mathematics. The purposive sample consisted of two groups: experimental (29 students) and control (28 students). An achievement test of multiple-choice type and an attitudes scale were prepared. The results of the study indicated the effectiveness of using scouring rubrics in evaluating students' performance, and the study recommended the utilization of scouring rubrics in assessing students' performance.

Sarhani (2016) aimed to investigate the effectiveness of using analytical performance evaluation criteria in solving mathematical problems and enhancing the academic achievement of seventh-grade students in KSA. The researcher used an experimental approach with two groups: control and experimental. The study included a sample of 46 students. The researcher developed a student activity guide and a teacher guide for teaching ratio and proportion lessons based on analytical performance evaluation criteria, along with a achievement test. The results showed the effectiveness of the experimental treatment in improving students' achievement in the achievement test with a significant effect size. The study suggested conducting further research on analytical performance evaluation criteria to enhance learning in other mathematical subjects and different educational stages, as well as comparing them with holistic performance evaluation criteria.

Tashtoush and Rasheed (2023) study aimed to evaluate the performance of calculus students on mathematical tasks and the procedures they follow in the processes of composite functions and finding inverse functions, as well as interpreting these procedures. The study used a mixed-methods approach and included three students enrolled in the Calculus course at Sohar University. The students were subjected to a short test, and their performance was evaluated using both holistic and analytical correction rules. Individual interviews were conducted and analyzed. The results of the study favored the use of analytical scouring rubrics over holistic correction rules, as they considered all details, procedures, and levels of understanding and perception. The students expressed more satisfaction with the analytical correction rules, which considered their responses to the test tasks. The study recommended that students pay attention to explaining their procedures



when performing mathematical tasks and encouraged teachers to use scoring rubrics to assess students' performance.

While previous studies mentioned focused on students in different educational stages, covering various topics such as algebraic equations, operations on numbers, ratio and proportion, fractions, and geometry, the current study focused on university-level students in advanced topics related to composite functions and finding inverse functions. Additionally, the current study followed an experimental methodology, whereas some previous studies followed mixed-methods, descriptive, or case study approaches. However, this study aligns with previous studies in utilizing tests as a data collection tool. This study contributes to supporting previous studies that emphasized the importance of using scoring rubrics in evaluating students' performance in mathematics.

### Methodology

The current study followed an experimental methodology to investigate the impact of using scoring rubrics for evaluating performance in the achievement of students taking the Calculus course. The study was conducted based on three groups: the first experimental group, the second experimental group, and the control group.

### Participants

The population of the study consisted of regularly enrolled students at AL-Huson College University at AL-Balqa Applied University during the second semester of the academic year 2022/2023. The study sample was purposefully selected from students enrolled in the Calculus course and distributed across five sections. Three sections were randomly selected to represent the three study groups: the first experimental group, whose performance was evaluated using analytical correction rules; the second experimental group, whose performance was evaluated using holistic correction rules, and the control group, whose performance was evaluated using the traditional method. Table 1 illustrates the distribution of study participants.

*Table 1. Study Sample*

Group	No
First Experimental Group	62
Second Experimental Group	64
Control Group	61
<b>Total</b>	<b>187</b>

### Instruments

**Mathematical Achievement Test:** After reviewing the theoretical and research literature (Tashtoush, 2009; Al-Ruwaili, 2016; Sarhani, 2016; Tashtoush & Rasheed, 2023b), a Mathematical Achievement Test was developed, the test consisted of three mathematical tasks that covered the process of combinatorial permutations, the nature of combinatorial permutations (whether they are switchable in general

or not), finding the inverse permutation and its relationship to the process of combining it with itself, each task was assigned five points, and the maximum score for the Mathematical Achievement Test was 15, the test tasks were structured as follows: *Direct Task*: Students answered this task by identifying the given data and applying the rule directly in two steps. *Reverse Task*: Students used the given data and performed the steps of the previous task in reverse order, linking the results. *Comprehensive Task for both Concepts*: Students analyzed the given data, found the inverse permutation, and linked it to the concept of combining it with itself when verifying the correctness of the answer.

To ensure the validity of the instrument, it was presented to a group of experts in pure mathematics, mathematics curricula, and teaching methods. Their opinions and suggestions regarding the tasks, language accuracy, question nature, difficulty level, and alignment with the study objectives were taken into consideration. Based on their feedback, the test items were revised until the test reached its final form. The opinions of the students were also obtained through a survey sample of 25 students who were selected from outside the study sample. Their feedback was used to modify the wording of the third task, which students had difficulty understanding regarding the method of verifying the solution's accuracy.

To establish the reliability of the instrument, the method of inter-rater agreement was followed by calculating the correlation coefficient between the evaluations of the two researchers for the survey sample. The coefficient was found to be 0.958. This coefficient was chosen because it is difficult to conduct a test-retest reliability coefficient for the students' responses. It is not preferable to reapply the test to the same group with a time interval between the applications, as it may be influenced by the students' recall factor of the test tasks, leading to an increased reliability coefficient. Alternatively, students might become familiar with the test, resulting in higher scores in the second application and reducing the reliability coefficient.

**Scoring Rubrics:** This study relies on evaluating students' performance as an attempt to develop the assessment system for university instructors in general and specifically for instructors at AL-Balqa Applied University. Two scoring rubrics were applied to the three tasks given to students: the holistic and analytical. A set of descriptors was developed to describe different performance levels on the tasks using the holistic scoring rubric, which includes the following categories: (Perfect, Median, Novice, Weak). The following tables provide a description of each level along with the corresponding score for each performance level on the three tasks.

Table 2. Student Performance Using the Holistic Scoring Rubrics on the First Task

Performance Level	Performance Details	Scoring
Perfect	Utilizing rules and algorithms correctly and in a proper sequence to find the matching $(f \circ g)(x)$	2
Median	Improper utilization of rules and algorithms to find the structure, or an incorrect sequence in using the rules in opposite side $g(f(x))$ not $f(g(x))$	1
Weak	Erroneous utilization of rules and algorithms without considering any sequencing to find the structure, or no solution exists	0

Table 3. Student Performance Using the Holistic Scoring Rubrics on the Second Task

Performance Level	Performance Details	Scoring
<b>Perfect</b>	Proper utilization of rules and algorithms involves finding $(gof)(x)$ and establishing the relationship between $(fog)(x)$ , followed by performing a comparison	<b>2</b>
<b>Median</b>	Incorrect utilization of rules and algorithms, failing to establish any connection between direct and inverse usage, thus neglecting to mention the relationship between them	<b>1</b>
<b>Weak</b>	Incorrect application of the inverse procedure without addressing any relationship between it and the original procedure, or no solution exists	<b>0</b>

Table 4. Student Performance Using the Holistic Scoring Rubrics on the Third Task

Performance Level	Performance Details	Scoring
<b>Perfect</b>	Proper utilization of rules and algorithms with a correct sequence and validating the correctness of the solution using two valid methods	<b>3</b>
<b>Median</b>	Proper utilization of rules and algorithms with a correct sequence and validating the correctness of the solution using one valid method	<b>2</b>
<b>Novice</b>	Proper utilization of rules and algorithms with a correct sequence, but without verifying the accuracy of the solution, or errors in the operations resulting in an incorrect final answer	<b>1</b>
<b>Weak</b>	Incorrect utilization of rules and algorithms with an incorrect sequence (resulting in an incorrect solution), without verifying the accuracy of the solution, or no solution exists	<b>0</b>

In the analytical scoring rubrics, estimates have been provided to describe the different levels of performance for students in three tasks, which include: (Task Understanding, Solution Planning, Solution Execution, and Solution Verification). The following tables illustrate a description of each performance level for the three tasks, along with the corresponding Scoring.

Table 5. Student Performance Using the Analytic Scoring Rubrics on the First Task

Performance Level	Performance Details	Scoring
<b>Task Understanding</b>	Clear and accurate understanding is demonstrated through writing the rules for both $(f)(x)$ and $(g)(x)$ and identifying the task's objective, which is to find $(fog)(x)$	<b>2</b>
	Clear identification of the given information without specifying the objective $(fog)(x)$ , or specifying the objective without writing the given data	<b>1</b>
	Failure to specify the given data or the objective (indicating a lack of understanding of the problem)	<b>0</b>
<b>Solution Planning</b>	The required strategy is complete: $(fog)(x)$ , followed by a correct sequence of steps	<b>2</b>
	The strategy only addresses a portion of $g(x)$ , or the strategy does	<b>1</b>

	not lead to solving both $(g)(x)$ and $(f)(x)$ separately.	
	There is a lack of strategy.	<b>0</b>
<b>Solution Execution</b>	correct manner: Applying f to g.	<b>2</b>
	Incorrect solution execution: Applying g to f.	<b>1</b>
	Failure to execute the solution	<b>0</b>
<b>Solution Verification</b>	Complete verification: Repeating the solution to ensure its accuracy.	<b>2</b>
	Partial verification: Incorrectly repeating the solution	<b>1</b>
	Failure to verify.	<b>0</b>

Table 6. Student Performance Using the Analytic Scoring Rubrics on the First Task

<b>Performance Level</b>	<b>Performance Details</b>	<b>Scoring</b>
<b>Task Understanding</b>	Clear and accurate understanding is demonstrated through writing the rules for the two mappings, $(f)(x)$ and $(g)(x)$ , and specifying the objective of the task, which is to find $(gof)(x)$ . The understanding is directly related to the first task.	<b>2</b>
	Specifying the given data and identifying the first objective $(gof)(x)$ without understanding its relationship to the first task, or specifying the given data and the first objective $(gof)(x)$ with a misunderstanding of the second objective (its relationship to the first task)	<b>1</b>
	No given data, no objective specified, and no understanding of the relationship between the objective and the first task.	<b>0</b>
<b>Solution Planning</b>	Complete plan: Sequential steps to find $(gof)(x)$ and compare it to $(fog)(x)$ .	<b>2</b>
	A plan to find $(gof)(x)$ without connecting it to the first task.	<b>1</b>
	No plan provided.	<b>0</b>
<b>Solution Execution</b>	Correct solution execution: Finding $(gof)(x)$ , comparing it to $(fog)(x)$ , and writing the complete commentary	<b>2</b>
	Correct solution execution without linking it to the first task, or incorrect solution execution with an incorrect link to the first task.	<b>1</b>
	Failure to execute the solution.	<b>0</b>
<b>Solution Verification</b>	Complete verification: Repeating the process of finding $(gof)(x)$ and ensuring its relationship to the first task.	<b>2</b>
	Incorrect repetition of the solution.	<b>1</b>
	Failure to verify the solution.	<b>0</b>

Table 7. Student Performance Using the Analytic Scoring Rubrics on the First Task

<b>Performance Level</b>	<b>Performance Details</b>	<b>Scoring</b>
<b>Task Understanding</b>	Clear, accurate, and comprehensive understanding is demonstrated through writing the rule for $f(x)$ , specifying the objective as finding $f^{-1}(x)$ , and mentioning the validation rules for confirming the solution	<b>2</b>
	Partial understanding: Providing the given data without specifying the objective.	<b>1</b>
	No understanding demonstrated.	<b>0</b>
<b>Solution Planning</b>	The strategy is complete: Symbol substitution, followed by crucial steps, and then an overview for verification	<b>2</b>
	The strategy is incomplete: Steps are provided without symbol	<b>1</b>

	substitution, and there is no plan for verification.	
	No strategy or verification plan provided.	<b>0</b>
<b>Solution Execution</b>	Correctly: Applying the steps in a proper sequence.	<b>2</b>
	Completely incorrect: Making errors in executing the steps or in the symbols used.	<b>1</b>
	Failure to execute the solution	<b>0</b>
<b>Solution Verification</b>	Complete verification: Checking in at least one direction or both directions.	<b>2</b>
	Partial verification: Not reaching a conclusive result.	<b>1</b>
	No verification conducted.	<b>0</b>

To ensure the validity of the scoring rubrics, they were presented to a group of experts in mathematics curriculum and teaching methods. Their opinions and suggestions regarding the criteria on which the rubrics were built, the nature of the assessment, and the extent to which they achieve the study's objectives were taken into consideration. Based on their feedback, some criteria in the scoring rubrics were modified until they reached their final form.

To establish the reliability of the instrument, the researchers evaluated the responses of the survey sample twice, with a one-week interval between evaluations. The results of each evaluator were compared independently, and the agreement coefficient was measured using Holsti's equation (Holsti, 1969), which yielded a value of 0.938. Additionally, the Pearson correlation coefficient was calculated for the evaluations of student performances according to the holistic and analytical scoring rubrics, resulting in a coefficient of 0.965.

## Procedures

The study sample was determined, and the mathematics achievement test and the scoring rubrics scale for holistic and analytical scoring were prepared to be implemented during the experimental period. Validity and reliability checks were conducted for both instruments. The students were exposed to an objective explanation of the concept of permutations and finding the inverse permutation two weeks prior to the study. The survey sample of students was given a brief test containing the three tasks of the study during one of the lectures. The students' opinions about the test were taken into consideration, and based on their feedback, the test duration was increased from 15 minutes to 20 minutes. Furthermore, the third task was modified after the students expressed their lack of direct understanding of the intended purpose of verifying the correctness of the answer. Afterwards, the test was administered to the study sample under natural conditions, resembling a short classroom test. The students had already been acquainted with the details of the holistic and analytical scoring rubrics before taking the test. Each student's performance on the test tasks was evaluated according to the holistic and analytical scoring rubrics. A comparison was made between the evaluation results, and the students' performance assessment results were entered into the SPSS program for data analysis, addressing the research question, discussing the findings, and presenting recommendations and suggestions.

## Data Analysis

For the statistical analysis procedures, the data was entered into the computer memory and analyzed using the SPSS software for statistical data processing. The mean scores and standard deviations were calculated for the three groups of students on the achievement test to detect apparent differences in the mean scores. Additionally, one-way analysis of variance (ANOVA) was used to determine the presence of differences among the mean scores of the three groups of students based on the evaluation method for the mathematics achievement test.

## Results

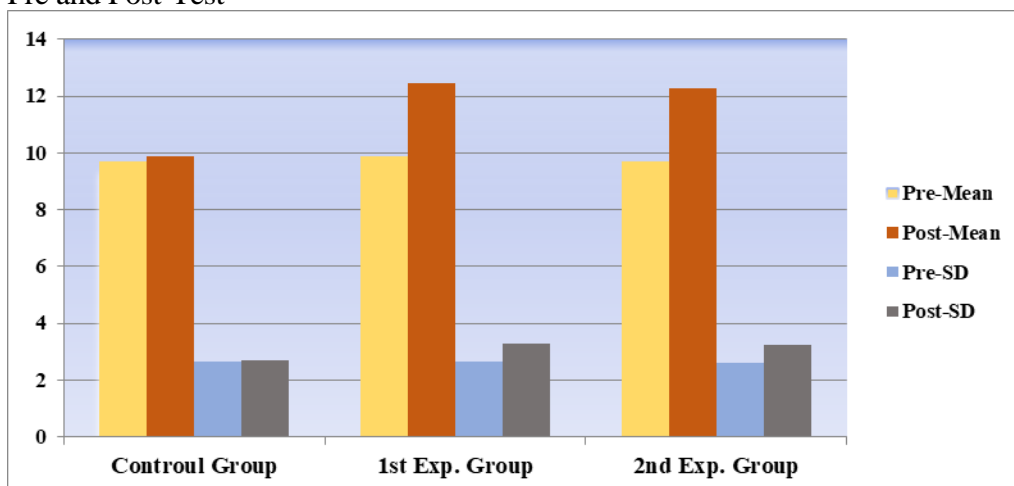
The main objective of the research question was to determine the effect of using scoring rubrics for performance assessment on the achievement of students in Calculus. To detect statistically significant differences at a significance level ( $\alpha=0.05$ ) among the students' performances on the mathematics achievement test, the mean scores and standard deviations were calculated for each of the three groups: the first experimental group, the second experimental group, and the control group. Table 8 illustrates this.

Table 8. The Mean Scores and Standard Deviations

Group	No	Test	Mean	SD
First Experimental Group	62	Pre-test	9.88	2.64
		Post-test	12.44	3.28
Second Experimental Group	64	Pre-test	9.72	2.61
		Post-test	12.28	3.21
Control Group	61	Pre-test	9.71	2.63
		Post-test	9.88	2.69
Maximum Score of Achievement Test is (15)				

Table 8 demonstrates the apparent variability in the mean scores and standard deviations of students' performance on the mathematics achievement test, according to the group variable (First Experimental Group, Second Experimental Group, and Control Group). Figure 1 shows the mean scores and standard deviations of students' performance on the pre and post-mathematics achievement test.

Figure 1. Mean Scores and Standard Deviations of Students' Performance on the Pre and Post-Test



To determine whether the observed differences in arithmetic means are statistically significant at a significance level of ( $\alpha=0.05$ ), one-way analysis of variance (ANOVA) was utilized, and Table 9 illustrates the results.

Table 9. ANOVA Test for the Math. Achievement Test

Source of Variance	Sum of Squares	df	Mean of Squares	F	Sig.	Effect Size ( $\eta^2$ )
Between Group	208.65	2	104.33	5.01	0.000*	0.72
Within Group	3825.36	184	20.79			
Total	4034.01	186				

\* Sig. Level ( $\alpha=0.05$ )

From Table 9, it is evident that there are statistically significant differences ( $\alpha = 0.05$ ) attributed to the effect of the group, with the differences favoring the first experimental group. The results also indicate the effectiveness of using scoring rubrics and their significant impact on evaluating students' performance in the achievement test. The effect size, measured using eta squared ( $\eta^2$ ), was 0.72, meaning that 72% of the variance in students' performance can be attributed to the use of correction rules, while 28% can be attributed to uncontrolled factors.

## Discussion

The study results showed statistically significant differences in the means of students' grades among the three groups in the achievement test, attributed to the evaluation method. This was in favor of the first experimental group, who were evaluated using analytical correction rules, and the second experimental group, who were evaluated using holistic correction rules, compared to the control group, who were evaluated using the traditional method. This result aligns with the modern educational system's aim to integrate assessment as an integral part of the educational process. Assessment greatly contributes to students' learning of

mathematics, improves their achievement, and provides opportunities for obtaining information about their performance, which positively impacts their learning in Calculus.

The reason for the superiority of the first and second experimental groups, evaluated using analytical and holistic correction rules, may be attributed to the fact that performance-based learning is more student-centered. Performance tasks help students understand their strengths to enhance them and identify their weaknesses for improvement. They also evaluate learning processes and outcomes, providing an accurate assessment of students' actual performance. Furthermore, the use of scoring rubrics aims to identify the individual student's performance level. Students need to feel that to achieve excellence, they must be diligent and perseverant, which positively affects their achievement. The use of scoring rubrics integrates learning and assessment processes, resulting in students acquiring knowledge, understanding, and skills using various teaching styles and strategies (Tashtoush, Wardat, Aloufi, & Taani, 2022a; Fannakhosrow et al., 2021; Rasheed et al., 2021; McLellan, 2008; Rasheed & Tashtoush, 2023) to achieve that knowledge through a multidimensional assessment of their performance. It is natural for students to have more confidence in their actions when they are aware of the details of the scoring rubrics they will encounter. However, they need to become accustomed to such procedures that will be applied to their performance before they face specific tasks. This increases the value of their actions in response to these tasks and generates the conviction that if they fail in some aspects, they can still succeed in other areas.

The results also indicate a preference for analytical scoring rubrics over holistic correction rules. The reason for this may be that the analytical correction method considers all the details of the procedures, as well as the levels of understanding, perception, problem-solving, and verification for students. This generates a sense of assurance among students that their rights will not be completely lost if they fail in some aspects. They trust some aspects and strive in others, even if they are unsure of their ability to accomplish them. This type of assessment gives attention to details that students would not have cared about without being exposed to their evaluation method, such as writing a solution plan and verifying its correctness. This result aligns with the modern assessment system's goal of highlighting the mathematics that students must know and perform, providing each student with the opportunity to demonstrate their mathematical ability according to their capabilities. This positively affects students' performance and achievement. Additionally, introducing students to the assessment method and criteria used to judge their performance can have a positive impact on alleviating their anxiety, as indicated by the results of some studies (Tashtoush, Alshunaq, & Albarakat, 2020; Sarhani, 2016; Wardat et al., 2023; Tashtoush & Rasheed, 2023b; Carifio & McBride, 1995).

Finally, this study plays a crucial role in the field of performance-based assessment and educational research, as it provides an analytical and methodological framework for understanding and assesses students' educational performance in Calculus. It also contributes to the development of performance-based assessment-dependent educational programs. This is achieved through the following:



- **Student Performance Assessment:** The use of various assessment tools, such as the scoring rubrics, helps develop assessment models to measure students' achievement in Calculus, as well as in various mathematical fields. It helps determine the progress of students in understanding Calculus, enhances their strengths, and addresses their weaknesses.
- **School Performance Analysis:** Different assessment tools can be used to assess students' performance based on statistical data and quantitative information available in identifying the factors that affect their success.
- **Educational Effectiveness Assessment:** Various assessment tools can be used to employ statistical analysis techniques to measure the effectiveness of educational programs and teaching methods, as well as to identify effective ways to achieve educational objectives.
- **Mathematics Curriculum Enhancement:** The use of various assessment tools helps in the development of Calculus curricula specifically, and mathematics curricula in general, making them more up-to-date and suitable for students' needs and the requirements of the job market.
- **Development better teaching methods that encourage active learning and enhance students' understanding of mathematical concepts.**

### **Recommendations**

Based on the positive results obtained from this study, the researchers recommend the following:

- Increase teachers' awareness and understanding of the value of encouraging students to explain their procedures while performing assigned tasks. Create an environment that facilitates this in the classroom and focus on verifying the correctness of solutions to increase students' confidence in themselves and their procedures.
- Encourage teachers to push students to deepen their understanding and awareness of the steps involved in their procedures, as this has an impact on their learning and progress.
- Encourage mathematics teachers at AL-Balqa Applied University and various Jordanian universities to prepare and use different types of performance scoring rubrics to assess their students' performance based on performance-based assessment criteria.
- Call upon curriculum and textbook authors, especially those responsible for the Calculus course and other mathematics courses in general, to make necessary additions and modifications based on the results of this study. This will increase opportunities for students to justify their procedures through tasks that require it or incorporate it to verify the solution.
- Encourage planners and developers of the Calculus course, as well as other mathematics courses, to focus on performance scoring rubrics by

enriching the curriculum with performance-based tasks that are built on assessment criteria.

- Conduct similar studies on other tasks that require students to justify their procedures and demonstrate logic and sequencing.

## Conclusions

Performance assessment is significant in education because it provides a more authentic and comprehensive evaluation of students' abilities, preparing them for real-world challenges. Rubrics are essential tools in this process, offering clarity, consistency, and the opportunity for constructive feedback to both educators and students, ultimately enhancing the educational evaluation process.

The study results showed statistically significant differences in the means of students' grades among the three groups in the achievement test, attributed to the evaluation method. This result aligns with the modern educational system's aim to integrate assessment as an integral part of the educational process.

Assessment greatly contributes to students' learning of mathematics, improves their achievement, and provides opportunities for obtaining information about their performance, which positively impacts their learning in Calculus.

Performance-based learning is more student-centered. Performance tasks help students understand their strengths to enhance them and identify their weaknesses for improvement. They also evaluate learning processes and outcomes, providing an accurate assessment of students' actual performance.

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## **Exploring the Preservice Teachers' Work to Label the Plants in the Faculty Garden**

*By Sibel Telli\**

This descriptive qualitative case study aims to find out the pre-service science teachers (PST)' confidence about instructional practice in outdoor setting, their knowledge about the plants and it explores the two research questions: To what extent do the preservice science teachers have confidence to teach in the outdoor settings? (1) and What are the preservice teachers' knowledge about the plants that they see on a daily basis? (2). To do this, it was reported the entire activity of two voluntary pre-service science teachers (PST)' work to label the plants at the faculty garden. The data collection encompassed rounds of semi-structured interviews, observations and a portfolio was prepared. The protocol addressed preparation for the connection to everyday life, their General Biology Course and for their collaboration. Preservice science teachers labelled in total 124 plants from 14 species by focusing on mostly the trees. They reported that their main challenge is to label the family Pinaceae, although they have seen these plants almost daily for over two years. They reported that this practice-based instructional work at the faculty garden enhances their knowledge and confidence to teach in the outdoor settings.

*Keywords:* biology education, outdoor learning environments, out-of-school teacher education, pre-service teacher education, science education

### **Introduction**

Research reports the importance of biodiversity for ecological stability in many aspects (Arese Lucini, Morone, Tomassone & Makse, 2020; De Boeck, et al., 2018), just to name one of these, planting enhance the soil by improving the soil nutrient status, facilitating the enzyme activity and support the bacterial diversity which is important for the plants (Xu, et al., 2022). Unfortunately, contradictory to this, the sharp decline in biodiversity due to the environmental problems, climate change (Cardinale et al., 2012) and the human activities are reported as the related factors call forth the rapid extinction of species (Bowler et al., 2020; Shivanna, 2020). Adding to this, research also reports that nearly 80% of our planet's biodiversity remains to be discovered and named (Rao, 2022) while the term 'biodiversity' is still not precisely comprehended and not even heard by the most of the population (Hooykaas et al., 2019).

Additionally, scholars report that the biodiversity and plant-based knowledge have serious effects in the conservation of species (Adeleye, Haberle, Gallagher, Andrew & Herbert, 2023), positively correlate with the conservation of biodiversity

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and understanding (Eylering, Neufeld, Kottmann, Holt & Fiebelkorn, 2023). So, in this vulnerable and intertwined balance learning about the species is essential for their preservation and ecological stability. Adversely, generally societies suffer from the lack of plant knowledge even in the very close by environment which is describe as plant blindness (Wandersee & Schussler, 1999) and even the (subject) teachers are not exceptional (Dikmenli, 2010; Mercan & Köseoğlu, 2022; Tekin & Aslan, 2022).

Along this line, to allocate more time on education (Thomas, Ougham & Sanders, 2021) for biodiversity and species knowledge in the school curriculums (Frisch, Unwin & Saunders, 2010) and strength the teacher education programs across the educational levels (Kaasinen, 2019) could be one possible way to improve the current level of species literacy in the societies. However, researchers emphasize that pre and in service teacher education programs highly focus on formal settings with limited outdoor education. As a matter of fact that, the outdoor learning is poorly understood (Fisher-Maltese, 2014) while teacher education programs still mainly suffer from the gap between theory and practice (Douglas, 2016; Runesson-Kemper, 2019).

Largely Research reports that, the teacher identity and role develop throughout their profession, not surprisingly, the beginning teachers are not feeling self-confident and need support (Sabina, Touchton, Shankar-Brown & Sabina, 2023). Thus, for them taking their students outside the classrooms is a challenge. The teachers needs to be supported (Kisiel 2005) for the teaching in the informal learning environments (Cetin, 2020; Olson, Cox-Petersen & McComas 2001), specifically the beginning teachers (Ateşkan & Lane, 2016; Cooke-Nieves, Wallace, Gupta & Howes, 2022). As for example, Ordon, Bartelheimer & Asshoff, (2021), in their recent research with the biology preservice teachers reported that their high level of interest for outdoor teaching but a lower level of self-efficacy before their course that focuses on field trips. After the field trip course, preservice teachers showed improvement in their self-efficiency in the post test and the follow-up test revealed that this was a sustained and long-lasting effect. Additionally, based on the analysis of fourth to ninth grade (ages 10–14) students' self-reported outcomes on 28 field trips to natural environments, researchers showed that the students self-reported the higher learning outcomes on field trips to natural environments as long as their teachers are more involved in the tour (Alon & Tal, 2017).

These research findings suggest enhancing the teachers competency on conducting field trips and outdoor education both for their professional activities and to boost their students' educational gains. Hence, it is a necessity for the teacher education programs to support the teachers' practice as early as possible in their professional trajectory (Blaat & Patrick, 2024). Considering the mentioned (contextual) challenges related with the field trips and outdoor education in the teacher education program in Türkiye (Akar, 2014; Demir, 2022, Karbeyaz & Kurt, 2022; Lane, Ateşkan & Dulun, 2018), as a center of daily activities the school gardens might have a significant role to be able to connect the learning environments as an instructional strategy (Van Dijk-Wesselius, Van den Berg, Maas & Hovinga, 2020). Following on Stigler and Hiebert's (1999), schools at primary and secondary level should be restructured as places where teachers can learn. This recalls the

literature that mentions the schoolyards have potential to combine out-of-school learning environments for student learning as well as for the pre-service (science) teachers' education (Telli, 2022; Kaasinen, 2019). In this frame, Garden-Based Learning (GBL) contributes many areas of education as for example nutrition, health, students' engagement, connectedness with nature, especially important in metropolitan big cities and support the emotional physical and intellectual development of the school students (Earl & Thomson, 2020; Mansuroğlu & Sabanci, 2010; Ürey, 2018).

As it is well documented in the literature, the teachers and how they structure their teaching is important for their students and the educational outcomes in all educational context so as in the outdoor education (Cox-Petersen & Pfaffinger 1998; Lewalter, Gegenfurtner & Renninger, 2021). Eventually, we still need to know more about how to incorporate the school garden at different level of education into the pedagogy and the didactical knowledge effectively (Bergan, Nylund, Midtbø, & Paulsen, 2023; Jorgenson, 2013, Yahampath, 2023) to support the preservice teacher education programs with the practice based research.

This paper addresses this gap through its investigation of two voluntary 2<sup>nd</sup> grade preservice science teachers' activities that focus on the faculty garden where participants of this study have daily access during the academic year and in their leisure time.

Building upon this, this study explores the below two research questions:

1. To what extent do the preservice science teachers (PST) have confidence to teach in the outdoor settings?
2. What are the pre service teachers (PST)' knowledge about the plants that they saw on a daily basis?

## **Materials and Methods**

### **Participants and Procedure**

In this descriptive case study (Yin, 2014) with phenomenological approach (Moran, 2000), the entire activity of two voluntary 2<sup>nd</sup> grade pre-service science teachers' work to label the plants at the 2014-2015 academic year spring term was reported. At the time of the study, their subject topic in the General Biology course was biodiversity and only two preservice science teachers were interested in this task from the group. In connection with this, the assignments were suggested to the preservice teacher who had interest in teaching outdoor learning environments (purposive sampling, Cohen, Manion & Morrison, 2017, p. 219).

The faculty garden was proposed for the convenience of students due to the variety of plants that was suitable for a small-scale practice based preservice teachers' work. The faculty garden had the leisure facilities which was generally used for the relaxation purposes by the staff and the pre-service teachers but only occasionally used for the preservice teachers' teaching practice. This study reports one of these instructional practices by focusing on the subject teaching, namely

biodiversity. At the time of this study, the faculty garden had mainly two green areas; one was named as the front garden where the main entrance (see Figure 1a) is and second was the back garden (see Figure 1a). The work in the front garden was reported previously (Telli, 2022) and this study focuses on the faculty back garden. To note, the education faculty garden was renovated and reopened in 2019. This work was completed before the construction started (COMU, 2019, February 12).

In this study, pre-service science teachers determined their workload and time according to their schedule as well as the part of the faculty garden for their work (see Figure 1). They were free to choose and use the information sources to label and document the plants. Researcher gave them full responsibility to plan and structurally support throughout their work, such as providing connection with the plant taxonomy experts for their questions to finalize their labelling and equipping them with the digital and hard copy taxonomic keys.

To start with, first, the two preservice teachers made a round tour of the whole faculty garden (see Figure 1, Yıldız, 2012) before deciding the part they prefer to work on. The researcher joined their second round tour in which they briefed their plans and gave their reasoning for the choices. Meanwhile, the researcher interviewed the preservice science teachers to figure out the reasoning why they wanted to work in the faculty back garden. Afterwards, the researcher explained the objectives and goals, shared the guiding questions to support their thinking process and invited them to share their perspective. This was the first progress meeting.

Second, the pre-service science teachers (PST) prepared a draft working plan, their task divisions and a timeline by responding to the given guiding questions. They shared their preparations with the researcher at the second progress meeting, revised the plan based on the feedback and discussion. In these meetings, the pre-service science teachers (PST) expected to take the initiative, formulate their work, exchange their ideas with each other and discuss with the researcher to finalize the schedule for this work. After finalizing their schedule and deciding their workload, they photographed the plants that they wanted to work with.

Third, the protocol addressed the frame of the study, their collaboration and task division, moral right-wrong and moral good-bad (ethics) in general and in specific, the plants ethics that discusses the moral value of plants, and individual responsibilities toward them (Stroppa, 2023), the guiding questions to connect their work to everyday life (e.g., *How many plants have you noticed in the faculty back garden?, Do you know them with taxonomical information and/or distinguish?*), and their General Biology Course (e.g., *Is it sufficient time to reserve for the topic? How does the theoretical knowledge in the course support your practical study at the faculty garden?*) was finalized subsequently. The pre-service science teachers were asked for their consent to participate in the study anonymously.

They worked one month in the spring term and reported they spend 3 or 4 hours weekly in total 15 hours to complete their work. At the end of one month's work, the final report was prepared as a portfolio. Lastly, they prepared a lesson plan and organized a practice based teaching demonstration (1 class hour=45 min.) for their classmates (45 students) at the faculty back garden where they completed their work. During this presentation, they shared their experience and gains from this



work with their classmates. In the end, they discussed the use of school gardens in biology and science teaching with their classmates and had feedback for their work.

Figure 1a. The Location of COMU Education Faculty, Anafartalar Campus



Figure 1b. The Photos from the Faculty Back Garden



Source: 2015: google map and photos.

### Data Collection Tools

The data collection encompassed by rounds of semi-structured interviews, observations and a portfolio was prepared.

The semi structured interview questions firstly, addressed general aspects of the pre-service science teachers previous experience in the field trips and their existing plant knowledge with the questions: *Which school subject you were taken out for out - door activities, how do you summarize your function in those field trips? What do you think about the particular gain from those trips as a student?* Secondly, their current work was addressed with the questions: *what is your biggest struggle while working at the faculty garden to label the plants now? How do you find the plant that you chose for this study? What time of the day do you notice this plant? What is the first characteristic of the plant that you notice?* These two groups of questions were not asked in a predetermined order and were posed naturally as the conversation developed.

As for the observations, the pre-service science teachers' work at the faculty garden was observed in several cycles by the researcher. These field trips were noted to find out the pre-service science teachers' plant knowledge, how they handle the challenges and how they structured their work afterwards. In these observations, the structure of the work and their cooperation were observed according to their plans at the protocol. The preservice student teachers observed each other's work as well and gave peer feedback and self-reflected on these.

Portfolio was organized in line with the protocol and included the pre-service science teachers self-reflection to the peer feedback and the researcher's feedback, their own teaching in the teaching demonstration and the material that they prepared. Moreover, the pre-service science teachers included their answers to the three knowledge questions (*I know the plant before, I noticed the plant at the campus yard, I have the taxonomic knowledge for this plant*) in response format yes/ no. The portfolio checklist was shared for the complete final version of the portfolio.

### **Analysis**

To answer the first research question, the preservice teachers (PST)' responses to the interview questions, the preservice teachers' reflection in the portfolio, and the observations notes were analyzed.

To answer the second research question, the preservice teachers (PST)' labeling work, their response to the three knowledge questions were investigated. Based on the contiguity (Maxwell & Miller, 2008), their answers were summarized and quotations from preservice teachers were shared.

The portfolio was analyzed in the line with the protocol from the content point of view. A checklist used for this purpose.

## **Results and Discussion**

This descriptive case study with the phenomenological approach investigated the practice based experience of two voluntary preservice science teachers to label the self-selected plants at the faculty back garden.

As for the first research question, "*to what extend the preservice science teachers have confidence to teach in the outdoor settings?*"

To sum up, for the first round of semi structured interview questions, the preservice teachers (PST) pointed to their very limited experience in the outdoor environment in their previous student life. Generally, they described these experiences as the daily visit towards the natural and historical environments which is similar to Demir (2022) findings but different then Blatt & Patrick (2014). The preservice teachers (PST) agreed about their role in these activities as a passive observers most of the time. They pointed out that they did not make any subject related preparations and/or report neither before nor after these trips as a student at that time. They viewed this as the main source for the challenges to plan their own schedule at the current study. They found these field trips were one of the days

they look for at the school and a nice day in their memory from their students' time, especially traveling and being with their classmates outside the classroom. These findings are in line with previously reported research findings with DeWitt & Storksdieck (2008)

The pre-service teachers (PST) responds to the questions which address the previous experience as a school student as below (semi structured interview questions, data collection tools, p. 7).

Preservice teacher 1:

*I could not always hear what the teacher said. Sometimes we were too busy with photographing ourselves and looking around ... not focus on what the teacher was saying. I remember clearly, after the breaks and before we started to walk out, the teacher specially paid attention if there were any of us missing. I am now not sure we could follow any subject topic even if it were there.  
We were so happy and enjoyed it!*

To summarize the pre-service teachers (PST) answers to the second group of the interview questions that addressed their current work: It took two weeks for the pre-service teachers (PST) to structure their work which was half of the time devoted for the study. Most of the time they viewed this as one of the main challenges to plan their own schedule. They found taking their own initiative as a complexity for them. Regardless of this, they found the feedback and guiding questions helpful to understand and structure their current own work. They said that they chose the faculty back garden since they spent most of their time here for their studies and group work previously. That's why, they thought they were familiar with the plants since some of the plants they noticed beforehand, for example the walnut tree and other fruit trees especially when they have fruits on (Mercan & Köseoğlu, 2022). Yet, they have the difficulty to label the trees they saw daily (Ozturk-Akar, 2023). They could not give any specific time of the day to notice the plant for the first time. They said they were too busy with their studies. What they appreciated in this part of the faculty garden was a peaceful nice place to study and/or spend time with their friends.

The preservice teachers (PST)'student teachers answer to the second round of the interview questions that addressed their current work (semi structured interview questions, data collection tools, pg 7).

Preservice student 1:

*Learn on my own and search for the answer! I did not expect that it would be that difficult, first I was scared then I enjoyed it.  
I am still back to the idea about giving me the full freedom to plan the work. Truly to say, I do not know what to do for the first meeting but happy with deciding the part of a garden we planned to work on. It was at least something in our hands to come to the meeting.  
When you shared the guiding questions, all became meaningful even my almost empty look to the plants in the back garden. It would be helpful to start with these guiding questions or maybe share some previous assignments.  
I learned a lot about the plants but of course not all, it is impossible there are so many. But now I know how.*

Preservice teacher 2:

*I really looked for a ready plan that was given by you and just go and do with this one. Step by step... it was not a possibility.*

*I feel I have to take initiative otherwise the work is not going, time is running. After all I understood this is the point, I should be active and take the initiative.*

*I focused on the guiding questions and read them carefully in the protocol. Slowly, I got used to it and started to work with my classmate.*

*I learned a lot about the plants but what I learned the most, Nature need real good eye to see the detail and differences”*

Preservice teacher 2:

*I enjoyed the work, truly to say more than I expected. I want to take my student out of the classroom and use the opportunities for this. But I am still feeling this will cost too much time to teach and too much organization. If the classroom is big for sure I do not want to do it.*

*With this work, I noticed the importance of gardens for education and to teach the plants. We can learn here! I have more attention now to the plants, especially family Pinaceae*

To conclude, the analysis of interviews with two pre-service science teachers (PST) indicate that they were not confident at the beginning. Through the work they developed their self-confidence and the plant knowledge which is in line with Ordon et al. (2021) findings and the importance of training for pre-service teachers in the outdoor environments for their confidence and professional development (Alon & Tal, 2016).

As for the second research question “*What are the preservice teachers' knowledge about the plants that they see on a daily basis?*”

The preservice teachers (PST) prefer to use the electronic sources to label the plants, yet it was observed that the information they found was complicated for them in the first place. They emphasized the quick accessibility of e-sources which also provided them focusing on their work, but they pointed out that they need more knowledge to be able to progress with the taxonomy keys. In total, they labeled 124 plants from 14 species. The preservice teachers' answer to the knowledge questions showed that they are familiar with most of the plants (8 yes for 14 different plant species) but their taxonomic knowledge about these plants needs to be supported (Table 1).

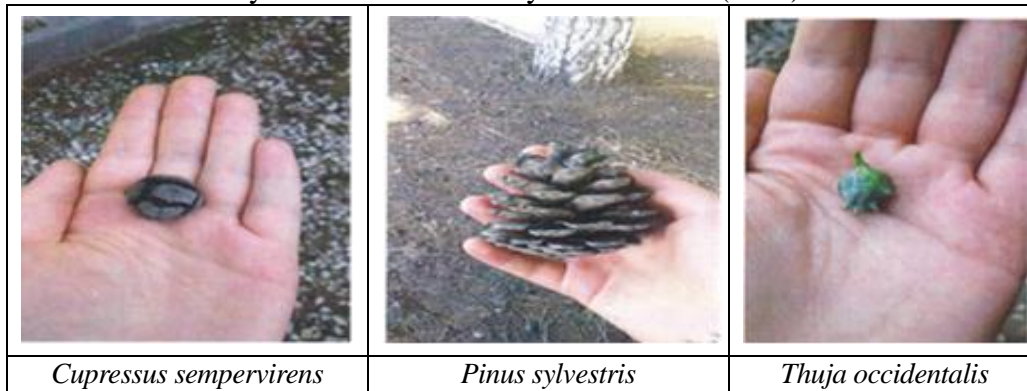
Table 1. Sum of the Labeling Work at the Faculty back Garden and the Student Teachers' Answers to the Three Knowledge Questions

	Species	English	Turkish	Number of labelled plants	Knowledge Questions					
					I know the plant before.*		I noticed the plant at the campus garden.*		I had taxonomic knowledge.	
					S1	S2	S1	S2	S1	S2
1.	<i>Prunus avium</i>	Cherry	Kiraz	1	+	+	-	-	-	+
2.	<i>Pirus communis</i>	Pear	Armut	5	+	+	-	+	+	+
3.	<i>Cydonia oblonga</i>	Quince	Ayva	1	+	+	-	-	+	+
4.	<i>Rosa L.</i>	Rose	Gül	1	+	+	+	+	-	-
5.	<i>Juglans regia</i>	Walnut	Ceviz	1	-	+	-	+	+	-
6.	<i>Ficus carica</i>	Fig	Incir	1	+	+	-	+	-	+
7.	<i>Malus domestica</i>	Apple	Elma	1	+	+	-	-	+	-
8.	<i>Malva Vulgaris</i>	Mallow	Ebegümeçi	1	+	-	-	-	-	-
9.	<i>Pinus sylvestris</i>	Scots pine (UK), Scotch pine (US) or Baltic pine	Saricam	46	-	-	+	+	-	-
10.	<i>Cupressus sempervirens</i>	Cypress tree	Selvi - Servi	34	-	-	+	+	-	-
11.	<i>Pinus pinea</i>	Stone pine	Fistik Cami	4	-	-	+	+	-	-
12.	<i>Thuja occidentalis</i>	Thuja	Mazi	1	-	-	+	+	-	-
13.	<i>Populus alba</i>	Populus	Kavak	1	+	+	+	+	+	-
14.	<i>Buxus sp.</i>	Buxus	Simsir	26	-	-	-	-	-	-
<i>Total number of plants</i>				124						
				<i>Total Yes</i>	8	8	6	9	5	4
				<i>Total No</i>	6	6	8	5	9	10

\*+ Yes, know, -, No, I do not know

The findings suggest that as long as the pre-service students (PST) have connection with the plants such as fruit trees, they have relevance and recognition which might also count as the plant awareness (Nates, Campos & Lindemann-Matthies, 2010; Staag & Dillon, 2022). They reported their challenges to label, especially the family Pinaceae. They said that they appreciated the contact with the expert especially for these trees, at the beginning to compare the cones was a helpful tip (Figure 2).

Figure 2. Photographs from the Pre-service Teachers (PST)' Portfolio, Comparing the Cones of Family Pinecea at the Faculty Back Garden (2015)

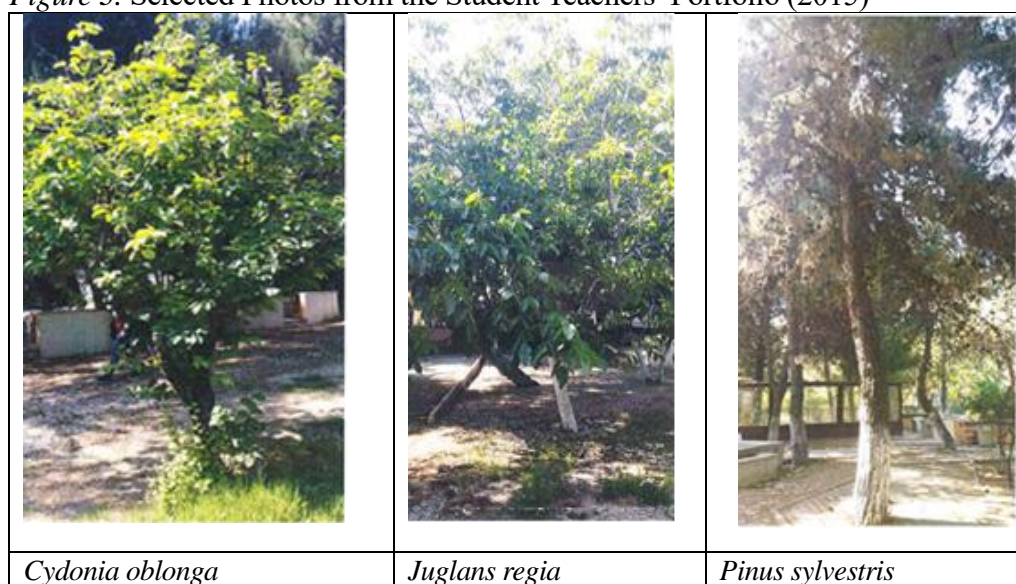


Analysis of pre-service teachers (PST)' self-reported outcomes showed that they learn more about plants and increase their plant taxonomy knowledge during this small-scale practice work at the faculty back garden. They reported that they noticed the importance of learning at the out class setting since they experienced and learned a lot from their own work.

Current study's outcomes would lead an example for a preparation program for the preservice teachers (PST) to improve their outdoor learning experience. These outcomes would contribute to the existing literature that points to the importance of outdoor learning and its contribution to significant learning outcomes (DeWitt & Osborne 2007; Falk & Dierking 2000).

The pre-service teachers (PST) prepared one portfolio (hard copy) for their joint work. They included the literature list that they searched and used, the photos from the faculty back garden and the plants there (Figure 3), their plan with the drafts, their lecture plan for the demo teaching with drafts and the relevant teaching materials. They added their responses individually for the three knowledge questions, guiding questions and the self-reflections to the peer feedback, the feedback from the researcher and classmates. The final version of the portfolio evaluated in respect to its content based on the checklist shared with the preservice (PST) teachers. Meantime, the pre-service teachers (PST) were asked for their opinion about their portfolio preparation process. Generally speaking, they were positive to the portfolio preparation process and portfolio assessment. They suggested preparing such a portfolio only electronically since all their materials were electronic (Hardy & Hardy, 2018). The portfolio and their work were presented to their classmates, and they shared their experiences in a classroom discussion.

Figure 3. Selected Photos from the Student Teachers' Portfolio (2015)



### Conclusions

The teacher education programs need to develop the teachers' practical competences with appropriate interdisciplinary, pedagogical and professional competences to perform in the different learning environments. Following on researchers recommend on the out-door learning process that emphasizing the experience on the confidence of preservice teachers, this study contributes to the preservice teacher (PST) education with the aim to make them familiar with the educational use of the school gardens, develop their subject teaching skills and support their confidence to teach in the informal learning environments.

Given that this work is based on two voluntary pre-service teachers (PST) instructional practice in the faculty back garden and reported their self-efficacy and how they benefit from this practice. In essence, the two voluntary preservice teachers (PST) experienced an instructional approach that was different from their classmates. The researcher then assessed the students' experiences regarding their self-efficacy. They benefit from the extra instructional input obviously and had a better feeling about themselves. This methodological aspect compromises the research that is the main limitation of this study. This suggests that further studies might search the learning outcomes of the participants with the learning experience of the rest of the classmates. At any rate future study can benefit from the findings of current descriptive case study, as such additional information about the preservice teacher (PST) instructional practice.

Taking the point of the preservice teacher education, a step forward, this study gives below suggestions to conserve the in-city faculty gardens to support the pre-service teacher (PST) instructional practice on subject teaching and develop their self-efficacy at different educational settings.

Based on this first, this study draws the attention to the importance of faculty gardens for the pre-service teachers' teacher education programs in this manner which is parallel with the previous studies. To do this, start with the potential contributions of the faculty gardens that could be investigated and planned for the academic year, and/or integrate across the curriculum in harmony with the related subject teaching. While doing these school students' visits to the faculty gardens may contribute to the faculty and schools' collaborations and fulfill "a class day out" in a feasible way. The structured teaching-learning activities and (digital) teaching materials (Kali, Levy, Levin-Peled & Tal, 2018) would increase the benefit from the schools' visits as it is highly suggested in the previous research (Cox-Petersen & Pfaffinger 1998; Lakin, 2006; Karbeyaz & Kurt, 2022). Notably, this would provide an instructional practice for the preservice teacher and opportunity to reflect on their own teaching (Ma & Green, 2021).

Second, the faculty garden in this study is located in a city center. To address as a green area, these gardens are viable places to leverage the urban green areas and landscape, especially in the city. Besides being educational institutions, they have environmental, aesthetic value and recreational functions (Akca & Zulfikar, 2019; Güneroğlu & Pektaş, 2022). That's why, their architecture should be considered for the sustainability of the urban areas in harmony with their surroundings (Çalışkan, 2023). Their renovations and construction plans should rethink the effects on the acoustic and traffic as well (Burns, 1979; Horoshenkov, Khan & Benkreira, 2013; Maleki, Hosseini & Nasiri, 2010). This is especially important to protect the existing sources (Saglik, Kartal, Şenkus & Temiz, 2021) in the cities with a potential to develop. The pre-service teacher education (subject teaching) would profit from such a conservation plan for the practice based instructional education in the preservice teacher education.

As final, the potent value of green areas in the educational institution may be supported with encouraging programs (Anthony, 2021, Ribeiro, et al. 2021) such as UI GreenMetric World University Rankings. The institution's potential impact for both sustainable societies and green campus could be placed among quality indicators of the higher education institutions. Hence, the faculty garden at the city center has the potential participation in such a ranking while supporting the awareness of the green areas and function in the instructional practice of the preservice teachers (PST).

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## **Preparing Pre-Service Teachers for Teaching in the Digital Age**

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At the onset of the COVID-19 pandemic, many traditional contact higher education institutions, such as the institution where the study was based, transitioned abruptly to remote online learning. Students in the School of Education at the institution who are predominantly from the lower end of the socioeconomic digital divide in South Africa had no choice but to navigate digital technologies to further their education. The extent to which their digital learning experience fostered the requisite TPACK (Technological, Pedagogical, and Content Knowledge) and other cross-functional skills needed for the 4IR classrooms remained uncertain. Framed by the TPACK Model, this paper employed a mixed-method approach to understand students' online learning experiences and how their digital learning experiences prepared them for their future teaching practices. Data generated from questionnaires randomly distributed to undergraduate students, followed by a focus group interview with twelve purposively sampled students across the five undergraduate clusters of the school, was used to address the research objective. The findings revealed that it is unlikely that their virtual learning experience could have prepared them for teaching in the digital age. Insights from this paper will benefit academics in their online pedagogical engagements and curriculum design while informing policy directions at the institutional level.

*Keywords:* digital learning, pre-service teachers, 4IR classroom, TPACK, students' experiences

### **Introduction and Background**

In an era of rapidly advancing technologies, the talents of the future workforce are expected to be digitally competent and possess other cross-functional skills to be employable (Äma & Emetarom, 2020; World Economic Forum (WEF), 2020a; 2020b). The same applies in teacher education, where pre-service teachers are expected to acquire cross-functional skills in addition to Technological, Pedagogical, and Content Knowledge (TPACK) in the course of their undergraduate programme (Kroon & Gravett, 2022; Astuti et al., 2019) to be ready for the 4IR classroom that awaits them. In the rapidly evolving world of the 4IR, Kroon and Gravette emphasize the need to engage teachers with tasks that require "complex thinking, metacognition, and problem-solving; are engaging; and allow for social interaction, experimentation, and curious exploration" to enable deep learning (2022, p. 12). That way, pre-service teachers develop these skills/competencies, which they can, in turn, transfer to their learners.

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At the start of the pandemic-induced lockdown, the institution where this study was based capacitated the academic community to transition to online remote learning. For most of the student body in the School of Education (SoE) who are from poor socioeconomic backgrounds, remote online learning commenced in rural South Africa since they had to leave their university residences before transitioning to the online learning mode. In the current context, irrespective of the mode of engagement, teachers are expected to develop relevant TPACK and other cross-functional skills to be employable in the digital age (Atibuni, Manyiraho, & Nabitula, 2022). However, the extent to which the students from the SoE engaged digital learning and fostered the requisite TPACK (Technological, Pedagogical, and Content Knowledge) and other cross-functional skills needed to teach in their 4IR classrooms remains uncertain. As such, this study aimed to explore pre-service teachers' experiences of digital teaching to determine the extent to which they felt prepared to teach in the digital age:

1. What are pre-service teachers' experiences of digital teaching at the SoE in a South African (SA) university?
2. How did the digital learning experiences of pre-service teachers at the SoE in an SA university prepare them to teach in the digital age?

The paper proceeds with a review of relevant literature, an explanation of the theoretical framework, and the research methods engaged. Next will be the data presentation and discussion sections before the conclusion.

### **Literature Review**

Pre-service teachers are students who are enrolled in teacher education departments, faculties, or schools within institutions of higher learning, training to become future professional teachers (Ardiyansah, 2021). To teach in SA schools, pre-service teachers can either complete a Post-Graduate Certificate in Education (PGCE) programme for one year based on their undergraduate qualification or pursue a Bachelor of Education (BEd) degree for four years (Kroon & Gravett, 2022; Department of Basic Education (DBE), n.d.; Maringe & Chiramba, 2022). The later programme makes room for pre-service teachers to study discipline-specific courses (core modules) and teaching method modules in the first three years before integrating the education disciplines in year four (Maringe & Chiramba, 2022; Arek-Bawa & Reddy, 2022).

Stemming from a segregated apartheid past, teacher education in SA continues to produce teachers for a divided society (Maringe & Chiramba, 2022), as socioeconomic and political inequities still shape tertiary and basic education environments. Schools are divided into five categories, referred to as quintiles, ranging from 1 to 5 (Hall & Giese, 2009). Quintiles refer to the ranking of schools based on weighted poverty indicators, including the community's income level and infrastructure (Lekhu, 2023; Dass & Rinquest, 2017). Irrespective of the ranking and the environment,

the National Policy Framework for Teacher Education aims to enable "high standards for teaching and learning" (Lekhu, 2023, p. 114).

The SoE offers both BE(d) and PGCE programmes to pre-service teachers to prepare them to teach in SA schools. The SoE is organised into six disciplinary clusters of which five provide undergraduate training. Most of the student body is from poor socioeconomic backgrounds, as they attended schools in the SA Basic Education system's lower quintiles (1 and 2) (Le Grange et al., 2020). Although the SoE went all out to equip staff and students with devices and data bundles to support digital learning, connectivity, electricity, and infrastructural issues which are rife in the SA context continues to hinder virtual education (Arek-Bawa & Reddy, 2022; Şenel & Şenel, 2021). It is thus imperative to assess how the digital learning journey of these pre-service teachers prepared them for their future 4IR classrooms that await them after graduation.

Drawing from the work of Shulman (1987), Kroon and Gravett identified five categories of a well-designed teacher education programme: "content knowledge; general pedagogical knowledge; curriculum knowledge; pedagogical content knowledge; knowledge of learners and their characteristics; and knowledge of educational contexts." (2022, p. 4). These categories can be synthesised into disciplinary content knowledge and pedagogical knowledge. In addition, teachers should be digitally literate and proficient in using digital technologies and artificial intelligence in education (Kroon & Gravette, 2022) to be competent in this digital world (Lestari & Santoso, 2019; Bingimlas, 2018). Thus, emphasising the need for pre-service teachers to be TPACK competent.

Further, today's pre-service teachers are generally called digital natives because they were born into the digital world (Chen et al., 2010). However, the (Chen et al., 2010) study suggests a gap in their everyday use of digital technologies and their use in teaching and learning/ content creation as they rarely engaged these tools for academic purposes. Since today's pre-service teachers will influence future generations of learners, academics have a duty to equip pre-service teachers with skills that make them comfortable with engaging digital technologies in teaching (Kivuyani, 2013; Chen et al., 2010). This is even more pertinent considering that transferring Information Communication and Technology (ICT) skills from everyday use into teaching and learning is not automatic (Chen et al., 2010). It is, therefore, imperative that teacher development should incorporate these skills into their programmes.

Besides the study by Chen et al. (2010), other studies on pre-service teachers' competence and preparedness for teaching have resulted in mixed outcomes. Earlier studies appear to agree with Chen et al.'s outcome. Kivuyani's (2013) study emphasized producing pre-service teachers who can engage digital technologies. Failure to do so will result in a mismatch between the teaching approach and the learning style of a digitally savvy generation of learners. Premised on TPACK, based on qualitative interviews with 11 students, Chigona and Chigona's (2013) study revealed that SA pre-service teachers were under-prepared to teach with ICT because of the instructional methods used by academics in teacher education. They further emphasised a need for quality and digital age-appropriate instructions in teacher training programmes. More recently, Ardiyansah's (2021) study of pre-

service teachers' readiness for online international teaching internships concluded that they felt fully equipped to teach online despite the contextual obstacles they encountered. Dorsah (2021) also found that pre-service teachers had a high sense of readiness for online learning. Still, aspects such as learner control and self-efficacy in using devices, the internet, and communications were low. In 2023, Lekhu's research in the Free State Province of SA revealed the need to improve pre-service teachers' pedagogical content knowledge while calling for a teacher education programme responsive to the socioeconomic context in addressing the 4IR workplace requirement. The mixed outcomes further emphasise the need to ascertain the preparedness of pre-service teachers of the SoE to promote quality education when they take up professional teaching positions.

### **Cross-Functional Skills (4 Cs)**

In this digital age, teachers should possess four competencies (4 Cs) to adapt to the exponential technological advancement associated with a 21<sup>st</sup>-century education. These include Critical thinking and problem-solving, Creativity and Innovation, Communication, and Collaboration (Kroon & Gravett, 2022, p. 9; Astuti et al., 2019) allied to the skills required of the 4IR workplace. Notably, these skills are affiliated with higher-order thinking attributes and soft skills that are not easily automated (Teo et al., 2021; Astuti et al., 2019; Anderson et al., 2001).

Drawing from the work of other scholars, Ülger (2016) describes critical thinking as the ability to identify and focus on a problem to understand and judge the situation logically. It focuses on analysing the information and logical decision-making. Simply put, it means "finding solutions to problems" (Äma & Emetarom, 2020, p. 438). Creativity and innovation are crucial to discovery as students exhibit the "ability to develop, implement, and provide new ideas to others, as well as being open and responsive to different new perspectives" (Astuti et al., 2019, p. 7). Collaborative attributes enable pre-service teachers to work in teams, show leadership, empathise, and respect the views of others, while working productively with them (Astuti et al., 2019). Communication, which is embedded in interpersonal skills, paves the way for individuals to readily "persuade others to activate global citizenship" in an increasingly interconnected world to build more inclusive economies (WEF, 2020a, p. 8).

Many researchers such as (Teo et al., 2021; Peled, 2020; Äma & Emetarom, 2020; Astuti et al., 2019; Ülger, 2016; Stanley & Marsden, 2012; Loveless et al., 2006) have considered the 4 Cs for many years. Teaching approaches usually endorsed for developing the 4 Cs are predominantly learner-centred and stem from active pedagogical practices (WEF, 2020a; Äma & Emetarom, 2020; Ülger, 2016). Active pedagogical approaches involve learners as "active searcher[s] in the process of knowledge building and application of knowledge and skills" (Mocinic, 2012, p. 96), resulting in more efficient education, especially in the digital age (WEF, 2020a). Such approaches entail active student involvement in the process of authentic learning. Amongst other characteristics, active teaching strategies enable varied learning styles, encourage cognitive collaboration with others, advance higher-



order thinking processes, foster reflective and metacognitive practices, and integrate intellectual and practical activities (Mocinic, 2012). All these align with the competency-based curriculum disposition where academics facilitate learning using diverse strategies to promote collaborative learning in communal spaces (Khoza & Mpungose, 2020; Chisholm, 2019; McKenna, 2003). This curriculum is tailored toward producing cross-functional skills required in the current and future workplace (Khoza & Mpungose, 2020).

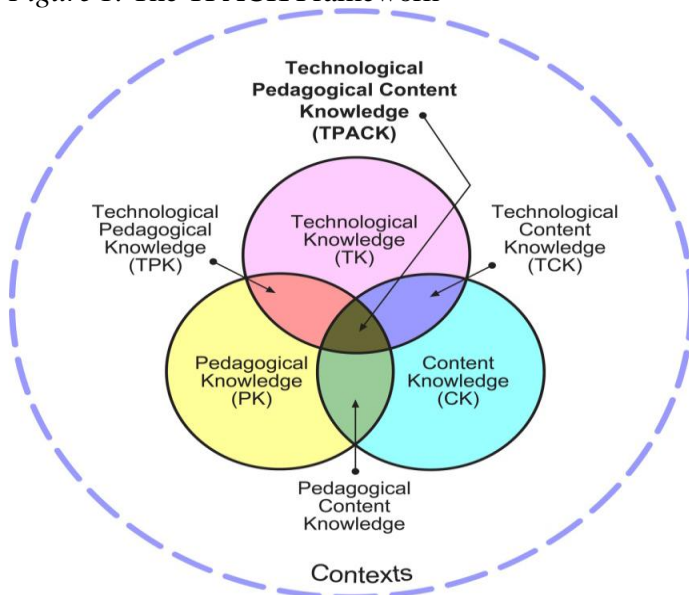
Active teaching strategies comprise problem-based activities, questioning, collaborative and interactive learning, case studies, self-reflective journals, and blended learning, amongst others (Teo et al., 2021; Peled, 2020; Äma & Emetarom, 2020; Astuti et al., 2019; Ülger, 2016). In this research, the extent to which the participants felt equipped with the 4 Cs from their online digital learning experiences was assessed to determine their preparedness to teach in the digital age.

### **Theoretical Framework**

The Technological Pedagogical and Content Knowledge (TPACK) model proposed by Koehler and Mishra (2009) is a suitable framework for understanding pre-service teachers' self-assessed TPACK competence in their digital learning journey. It is borne out of the belief that teaching is a complex task that draws on multiple knowledge (van Wyk & Waghid, 2022; Koehler & Mishra, 2009) and skills, especially in the digital age. The three domains (Technological Knowledge [TK], Pedagogical Knowledge [PK], and Content Knowledge [CK]) indicate the core knowledge that teachers must possess to be competent in the 21st century (Lestari & Santoso, 2019; Bingimlas, 2018). Rather than considering these domains independently, Koehler and Mishra (2009) advise that the overlapping rings be regarded as interdependent sections of a larger, more complex knowledge composition.

CK relates to subject-matter knowledge in any discipline (Irwanto et al., 2022), which is deemed a fundamental prerequisite (Mpungose, 2020, cited by van Wyk & Waghid, 2022) in the teaching profession. PK acquaints pre-service teachers with an awareness of varied strategies used in teaching and learning, in addition to learner characteristics. TK refers to the ability to use information technology effectively for "information processing, communication, and problem-solving," as it goes beyond basic computer literacy to cover digital literacy (Koehler & Mishra 2009, p. 61). Pedagogical Content Knowledge (PCK) is foundational in teaching and describes how teachers transform certain content via different representations to enable learning (van Wyk & Waghid, 2022; Koehler & Mishra, 2009). Knowledge of how technology can be used to influence content translates into Technological Content Knowledge (TCK), while knowing how technology aids the teaching and learning process is described as Technological Pedagogical Knowledge (TPK) (Bingimlas, 2018; Koehler & Mishra 2009). Finally, TPACK is "an understanding that emerges from interactions among content, pedagogy, and technology knowledge" (Koehler & Mishra, 2009, p. 66), resulting in meaningful teaching with technology.

Figure 1. The TPACK Framework



Source: Koehler & Mishra (2009, p. 63).

Even though the TPACK model is critiqued for its complexity and unclear construct distinction theoretically (Graham, 2011), it has become "a required area of expertise for teachers" (Joo, Park, & Lim, 2018, p. 48) and is widely used in understanding teaching in a technological environment (Martin, 2015; Schmidt et al., 2009). Previous studies have investigated the pre-service teachers' TPACK with mixed results. On the one hand, Erdogan and Sahin (2010) concluded that student teachers in the secondary school programme in Turkey were less competent in their TPACK domains than those in the primary school programme. Kivunja (2013) emphasised the need for higher education to prepare pre-service teachers to teach effectively in the digital age. Chigona and Chigona (2015) reached a similar conclusion that new teachers in the Western Cape (SA) institution were under-prepared to teach with ICT because of "the quality of instruction they receive during their training" (2015, p. 478). More recently, van Wyk and Waghid (2022) confirmed that pre-service teachers could not implement ICT tools successfully due to infrastructural issues, school culture, and the inability to integrate 4IR pedagogical practices into teaching and learning. On the other hand, Irwanto et al. (2022) investigated pre-service teachers in Indonesia and concluded that their TPACK abilities were generally high. These mixed outcomes provide further impetus for investigating pre-service teachers' TPACK in the SoE, which this study aimed to address.

### Research Methodology

This study adopted a mixed-method research approach based on a case study design popularly used to understand issues about complex real-life situations in specific contexts (Harrison et al., 2017) or institutions such as the SoE. In addition

to enhancing the validity of our study, a mixed-method approach enables triangulation of the data that strengthens the conclusions reached (Schoonenboom & Johnson, 2017). Located in a pragmatic paradigm, the study offers a broad understanding of pre-service teachers' virtual learning experiences (Kivunja & Kuyini, 2017) to ascertain their preparedness to teach in the digital age. Since the primary objective of this study is exploratory, Morse and Niehaus (2009 cited in Schoonenboom & Johnson, 2017) contend that the theoretical drive is inductive. As such, the "core" component is qualitative, denoted by QUAL + quan (Schoonenboom & Johnson, 2017, p. 112). The first four letters of the core component (in this case, qualitative) are written in upper cases, while those of the supplementary component (quantitative) are in lower cases. Thus, the study employed a convergent parallel strategy to interpret qualitative and quantitative findings while drawing on the former to explain pre-service teachers' preparedness to teach in the digital age (Hafsa, 2019; Schoonenboom & Johnson, 2017).

In mixed-method research, data can be generated quantitatively and qualitatively (Schoonenboom & Johnson, 2017). This research generated quantitative data via survey questionnaires on Google Forms forwarded to all the students (about 4,500) in the SoE. Qualitative data was generated from Focus Group (FG) interviews with students across all clusters and levels of study. However, the survey instrument disseminated to all students in the SoE via the university notice system yielded zero responses even after repeated distribution. As the COVID-19 restrictions eased, two research assistants were hired to distribute physical copies or send the links to others, depending on their preference. The researcher also sought permission from some students before sharing links with them. After five months, 46 print responses were received, with 27 online responses totalling 73. While 73 responses may be deemed small compared to the estimated sample requirement of 354, data collection via survey was extremely problematic and tiring. That said, being an exploratory QUAL + quan research, scholars (Morse & Niehaus (2009) cited by Schoonenboom & Johnson, 2017) argue that the emphasis should be on the dominant QUAL findings. Nonetheless, both sources generated data that corroborated one another. In addition, the qualitative findings explained the quantitative results and guided the conclusions reached.

The initial plan was to generate qualitative data from 20 individual interviews across all levels and clusters – 4 levels of study by five undergraduate disciplinary clusters. This also met with challenges in locating willing participants within the stipulated period, leading to a change in the data source for FG discussions. In the end, 13 students across all levels of study participated in the FGD. Still, the contributions of one post-graduate participant were declared invalid, leaving a balance of twelve for further analysis. The number of participants falls within the threshold (five to fifty) deemed adequate to achieve trustworthiness in qualitative research (Vanover et al., 2022). The discussions were audio recorded with the participant's permission, transcribed, and sent back to one participant as a member check to aid the credibility of the data.

## Data Presentation and Discussion

In line with the concurrent parallel mixed-method design, both the quantitative and qualitative data were generated during the same period. This section presents the quantitative data and discussions, followed by the qualitative findings before the overall interpretation.

### Quantitative Data Findings and Discussion

Table 1. Demographic Information

<b>Gender</b>		
Men	32	44%
Female	40	55%
Prefer not to say	1	1%
	73	
<b>Level of Study</b>		
First-year	13	18%
Second-year	12	16%
Third-year	16	22%
Fourth-year	32	44%
	73	
<b>NSFAS Funding</b>		
Yes	65	89%
No	8	11%
	73	
<b>Accommodation during Lockdown</b>		
Home with family	44	60%
Accommodation near School	24	33%
Residence of friends or other relatives	5	7%
	73	
<b>Preferred Mode of Study</b>		
Blended (Online and Face-to-face)	37	51%
Online	22	30%
Fact-to-Face	14	19%
Grand Total	73	

The survey instruments predominantly comprised of closed-ended questions were broken down into three sections – Section A sought to gather demographic data such as gender, level of study, funding, and accommodation during the lockdown. Section B comprised two sets of Likert Scale questions – one focusing on students' digital learning experiences, including their perception of their TPACK competence (22 items adapted from the work of Zhou and Zhang, 2021 and

Baticulon et al., 2021) and the second question focused on their perception of their cross-functional skills (8 items adopted from Oliveira and Souza, 2022). The survey adopted a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5) for section B and part of section C. The other part of section C elicited their success experiences (7 items)/barriers (10 items) encountered on their digital learning journey.

As seen in Table 1, most respondents were females (55%), while one student preferred not to disclose their gender as the institution's policy allowed. Respondents cut across all levels of study but skewing more in favour of the 4<sup>th</sup> (44%) and 3<sup>rd</sup> (22%) year student cohorts who had experienced face-to-face, online, and hybrid learning modes during their stay in the SoE. Nonetheless, the perspectives of the 1<sup>st</sup> and 2<sup>nd</sup>-year students enriched the data generated. Further, almost 90% of the respondents were funded by NSFAS, depicting their low-income family status. Many had to return home at the start of the pandemic-induced lockdown, where digital learning commenced.

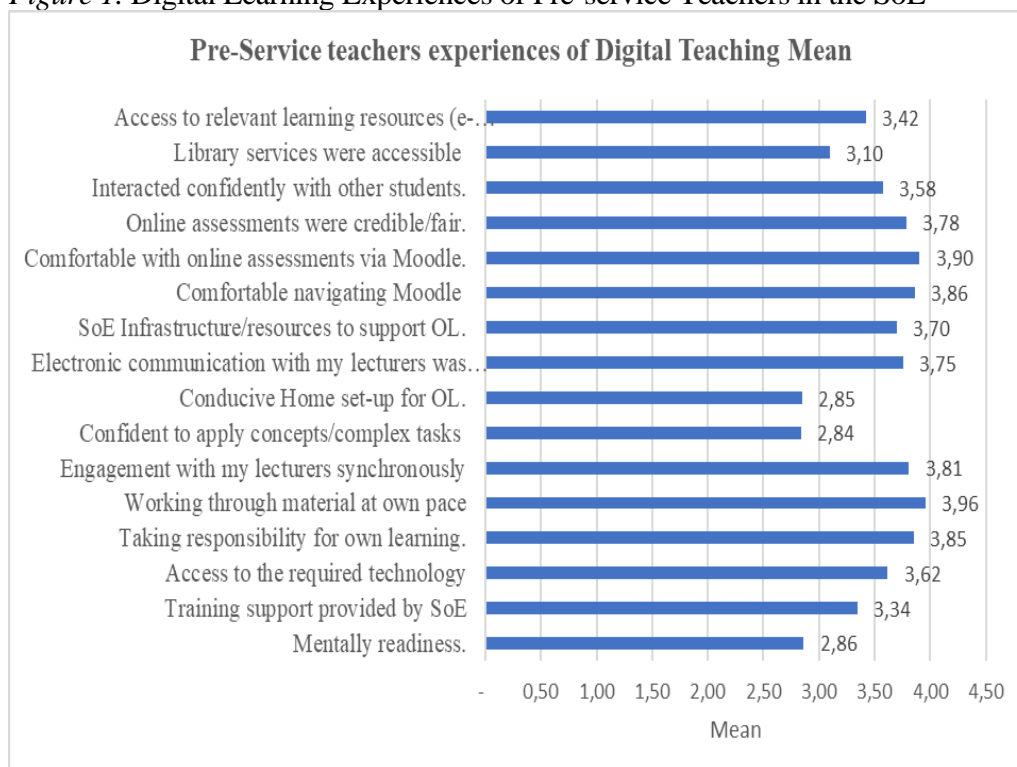
*Table 2. Pre-Service Teachers' Experiences of Digital Teaching*

	Mean	Standard Deviation	SD	D	N	A	SA	Total
Mental readiness	2.86	1.15	10	16	28	12	7	73
Training support provided by SoE	3.34	1.04	3	12	25	23	10	73
Access to the required technology	3.62	1.21	3	15	9	26	20	73
Taking responsibility for own learning.	3.85	0.98	2	3	20	27	21	73
Working through material at own pace	3.96	1.06	3	4	12	28	26	73
Engagement with lecturers synchronously	3.81	1.06	2	7	16	26	22	73
Confident in applying concepts / handling complex tasks online	2.84	1.11	7	25	19	17	5	73
Conducive Home Set-up for Online Learning	2.85	1.40	16	17	14	14	12	73
Electronic communication with my lecturers was helpful.	3.75	1.00	1	6	23	23	20	73
Infrastructure/resources to support OL.	3.70	1.06	2	9	16	28	18	73
Comfortable navigating Moodle	3.86	1.03	3	4	14	31	21	73
Comfortable with online assessments via Moodle.	3.90	1.06	2	5	17	23	26	73
Online assessments were credible/fair.	3.78	1.06	3	8	8	37	17	73
Interacted confidently with other students.	3.58	1.12	2	11	22	19	19	73
Library services were accessible	3.10	1.16	8	13	24	20	8	73
Access to relevant learning resources (e-Textbook, database, software)	3.42	1.01	4	8	22	31	8	73
	<b>3.51</b>		<b>71</b>	<b>163</b>	<b>289</b>	<b>385</b>	<b>260</b>	<b>1168</b>

The outcome of the survey on pre-service teachers' digital learning experiences is presented in Table 2. Strongly Agree is denoted by SA, Disagree (D), Neutral (N), Agree (A), and Strongly Agree (SA). Based on the extent to which they agreed /strongly agreed with the item questions, pre-service teachers scored the experiences of digital learning relatively high, with an above-average weighted mean score of 3.51. From the Bar graph (Figure 1), many attested that digital learning allowed

them to work through materials at their own pace (3.96), which was considered one of their successful experiences. As such, it can be inferred that their virtual experience spurred them towards independent learning, deemed a key attribute for success in the online learning environment (Chorrojprasert, 2020, cited in Dorsah, 2021). This is followed by their satisfaction with online assessments (3.9). Contrary to the fears of many academics, participants were quite comfortable negotiating digital learning via the learning management systems (3.86), which may not have been unconnected with the fact that they are all digital natives.

Figure 1. Digital Learning Experiences of Pre-service Teachers in the SoE



While the high mean scores mainly depicted positive digital learning experiences, some participants were not mentally ready to transition to online learning, which they regarded as a barrier in their studies. Others found their home set-up unconducive for digital learning. At the same time, some had difficulties applying concepts learned and tackling complex tasks, probably due to the inability to seek/access clarification as and when required. On average, their self-assessed online learning experience was pleasing as the majority opted for Hybrid as their preferred mode of learning (51%), followed by Online mode at 30%.

Regarding their TPACK, participants judged themselves highly, as seen in the graphs below (Figures 2 to 5). With 68% agreement, they felt that the content knowledge acquired from their online learning journey would enable them to teach in the digital age. Similarly, they were confident that the pedagogical knowledge and skills acquired during the same period would be helpful in the future classroom, with 70% agreement. Of all the three TPACK domains, participants

felt least confident in their ability to teach with digital technologies in their future classrooms based on an agreement level of 65%. This outcome, which aligns with prior studies (Li et al., 2022; Irwanto et al., 2022), is not unexpected because some of them are first-time users of digital technologies who "Lack[ed] ... knowledge to use the computer". Nonetheless, with an overall agreement of 74%, participants were assertive that their online learning experience prepared them for teaching in the digital age.

Figure 2. Self-Assessed CK

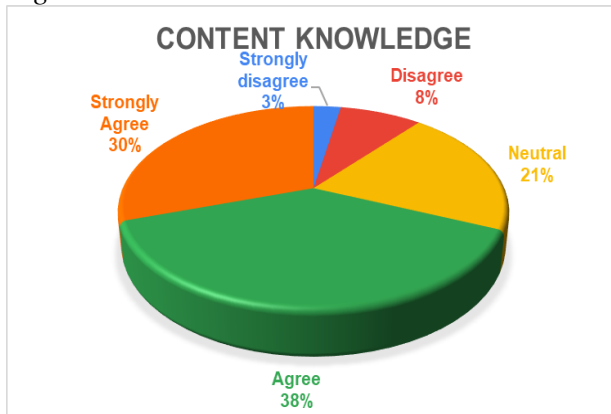


Figure 3. Self-Assessed PK

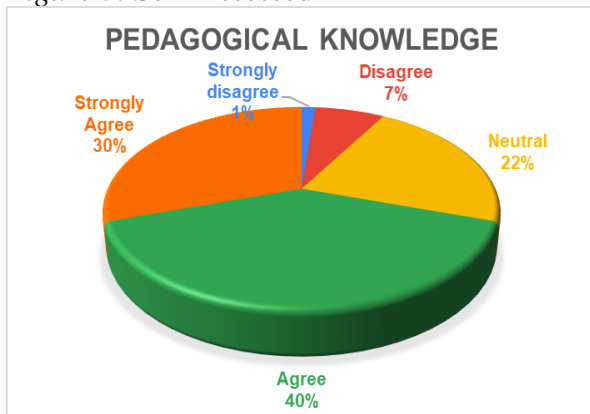


Figure 4. Self-Assessed TK

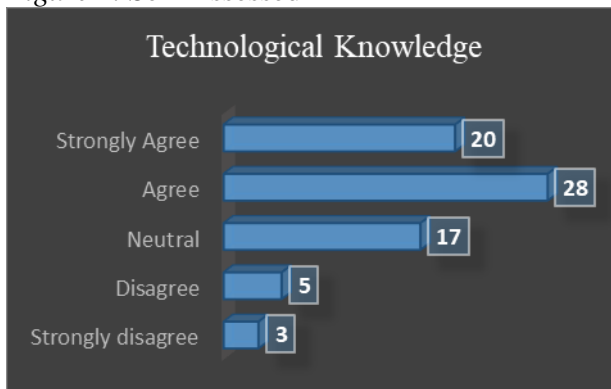
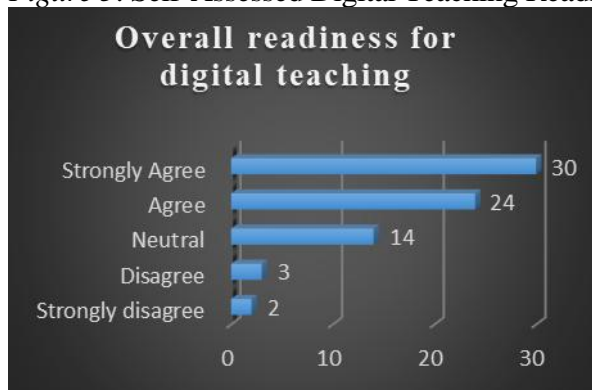


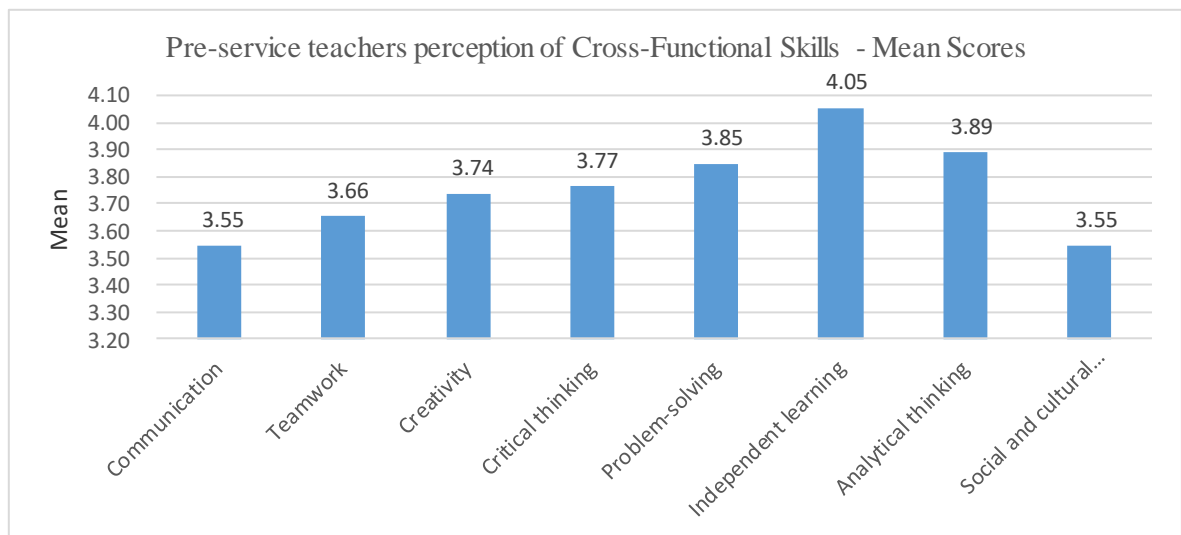
Figure 5. Self-Assessed Digital Teaching Readiness



While the overall outcome of this study contradicts the work of previous scholars (Erdogan & Sahin, 2010; Chigona & Chigona, 2013; Kivuyani, 2013; van Wyk & Waghid, 2022) who concluded that pre-service teachers were underprepared to teach effectively in the digital age, other authors (Ardiyansah, 2021; Irwanto et al. 2022) concluded that their TPACK abilities were generally high. The mixed outcome makes room for further studies in this area.

Besides acquiring TPACK, pre-service teachers should possess other cross-functional skills or 4 Cs to adapt to the 21<sup>st</sup>-century education system (Kroon & Gravett, 2022; Astuti et al., 2019). Regarding cross-functional skills (4 Cs), the participants generally judged themselves competent, as seen in Figure 6.

Figure 6. Self-Assessed Cross-Functional Skills



On a scale of 1-5, participants were quite confident in their cross-functional skills. The participants' perceptions of their cross-functional skills could be attributed to the COVID-19 pandemic. The high mean scores in independent (4.05), Problem-solving (3.85), and analytical thinking (3.89) could have resulted from the need to figure out things on their own due to social distancing and the lockdown. This could have been compounded by the inability to easily reach their lecturers and



peers due to power cuts, poor connectivity, financial, and other domestic constraints. For the same reason, they interacted less as group activities were minimized. This could have impacted their social skills, as seen in the lower mean scores for teamwork (3.66) and communication (3.55), which aligned with the conclusions reached by Peled (2020) and Dorsah (2021), respectively. However, many digital platforms such as Zoom and Microsoft Teams make room for interaction, discussions, and group activities via breakout rooms. As such, opportunities exist for these digital natives whose lives revolve around digital platforms (Chen et al., 2010) to collaborate comfortably if needed. The onus is, therefore, on the academics (du Preez & le Grange, 2021; Ama & Emetarom, 2020; Waghid & Waghid, 2016) to implement digital pedagogies that will engage students, facilitate communication and socialization while furthering independence and active learning.

### Qualitative Data Findings and Discussion

The FG discussions occurred while the student community was responding to the survey. Data generated from FG interviews with selected participants across the four undergraduate levels of the B.Ed programme helped to explain and strengthen the research outcomes (Table 2). Pseudonyms were assigned to participants to protect their identity so they could freely express their views. Even though 13 participants were involved in the discussions, the views of the post-graduate student were excluded because of the focus on the BE.d programme.

Table 3. Focus Group Participants

Participants	Gender	Year of Study	Specialisation
Student 1	Male	1st Year	Social Sciences
Student 2	Female	1st Year	Social Sciences/languages
Student 3	Female	3rd Year	Life/Natural Science & Technology
Student 4	Male	3rd Year	Languages / Social Sciences
Student 5	Female	2nd Year	Foundation Phase
Student 6	Female	2nd Year	Foundation Phase
Student 7	Male	4th Year	Social Science
Student 8	Male	1st Year	Physical / Natural Science
Student 9	Male	4th Year	Languages / Social Sciences
Student 10	Male	2nd Year	Social Sciences
Student 11	Female	3rd Year	Languages / Social Sciences
Student 12	Female	Masters	Teacher Development
Student 13	Female	2 <sup>nd</sup> Year	Social Sciences

All participants agreed they could **teach with digital technologies**, although some experienced initial hiccups. *"I come from rural areas where we are not used to these online learning ... since we were used to learn[ing] or to writ[ing] in hard copies, it is very problematic to adapt to writing online and scan. All that requires enough time."* (Student 8). For this category, the problem would have been exacerbated by the fact that they received limited training on online learning, and the first-year computer literacy programme was not very helpful, as noted by all

the participants. Student 5 *"didn't receive any training with online learning, especially with the zoom thingy. You just had to figure it out yourself. Nobody told you what to do"*. While student 4 stated that the first-year computer literacy programme *"sort of gives you an idea of how to use devices,"* student 7 disagreed, saying that *"I'm a mentor. You find that the student is coming from deep rural area and the student is not exposed to these things... they end up registered in the wrong modules because ... they are not equipped."*

Regarding **cross-functional skills**, literature (WEF, 2020a; Ama & Emetarom, 2020; Ülger, 2016) suggests these skills are mainly acquired in an active pedagogical environment. To this end, the interview sought to ascertain the dominant teaching approaches adopted by their lecturers. Student 4 found interaction with peers restrictive, but Student 1 preferred interacting with them because he found *"the information ... given by the lecturers ... hard to understand... With our peers, because they are very patient with us, they give us that time"*. In some large classes, lecturers *"just post the slides. And then that becomes a problem because sometimes you just don't understand with all those big words and all, so you want to interact with the lecturers and ask questions so you don't have that"* (student 6). The situation was not different in synchronous classes which were mainly *"teacher-centred where they... would read the slides, ... try and explain them better, they inform them [students] of what to expect next, they end the class. They come back tomorrow and do the same"* (Student 9). Student 11 had a similar experience with his lecturer, who adopted a teacher-centred approach to teaching *"over PowerPoint,"* making it *"difficult to understand geographical terms."* Student 4 questioned the practice adding that, reading through a PowerPoint presentation *"was something I could have done in my own time."* Even when the question and answer strategy was used to determine whether students understood the course material, the level of interaction was minimal as *"everyone has a choice to just switch off their mics and just keep quiet. Maybe for the [session], one person is answering – maybe two"* (Student 9). A similar view was shared by students 6 and 7, while student 3 stated that the discussion strategy was used. In all, many of the students stated that the approach adopted by their lecturers in their digital learning journey was predominantly teacher-centred, with limited student engagement and interaction opportunities.

From the above discussions, it appears that the experiences of participants hardly align with the characteristics of active pedagogical practices (Mocinic, 2012) discussed in the literature review section. The teaching approaches were not varied enough to cater to pre-serve teachers' diverse learning styles, contrary to the expectations of active pedagogy. In addition, opportunities for interaction were inadequate. For instance, participants who found materials uploaded online difficult could not seek clarification from their lecturers, while others hardly engaged in synchronous class meetings. As such, it is unlikely that deeper levels of learning could have been attained. Furthermore, evidence of collaborative learning strategies in communal spaces was also limited as passive, teacher-centred pedagogical practices prevailed. Rather than the competency-based curriculum, these passive approaches align with a performance-based curriculum that is judged inadequate in fostering cross-functional skills and preparing teachers for the 21<sup>st</sup>-

century classroom (WEF, 2020a; Ama & Emetarom, 2020; Khoza & Mpungose, 2020; Chisholm, 2019). Thus, the extent to which the digital pedagogies of academics in the SoE equipped pre-service teachers with the requisite skill set to teach in the digital age becomes debatable.

On the other hand, could the skill set that the teacher-centred approaches failed to deliver have been stimulated/acquired by the peculiar circumstance of some pre-service as they engage digital technologies in their academic pursuits? Below are the views of pre-service teachers on their cross-functional skill set.

*Student 4 - With problem-solving, I think it helped because it got problems, and you independently find your way around these problems.*

*Student 3 - Yes, we do. Because it's either you solve a problem, or you fail. So, in a way, you were forced to be creative so that you can pass. It's more like we were given an opportunity to explore our creativity so that we can develop them.*

*Student 10 - As I majored in creative arts, it allows us all to be creative. I remember this semester, we were supposed to recreate Sarafina scenes as our major assignment.*

*Student 11 - For me, communication was effective during online learning because, firstly, we were able to communicate with our lecturers through emails, through WhatsApp.*

*Student 5 - Yes, it did help me to [be] independent. Because I remember first semester, for a month or two, I was alone at home because of COVID, so I didn't have anyone to ask or refer to. So, I had to learn on my own. It did push me to be independent.*

Given the participants' responses above, it would appear that the contextual limitations associated with experiences of online learning fostered the development of some cross-functional skills in them. For example, as untrained students from deep rural South Africa with no prior encounters with technological devices grapple with digital learning, they would have developed strategies to survive academically. This could have entailed delving into their creative recesses to formulate strategies to solve the peculiar problems they encountered in their learning journey. In the process, some of them may have mistakenly registered for the wrong modules. Still, somehow, they learned independently, thought creatively, and solved problems partially or wholly in their studies. After all, individuals adapt to changing situations by becoming "creative out of necessity and motivated out of desperation" (Allen & Gerras, 2009, p. 78). As such, it can be insinuated that the digital learning experiences of some pre-service teachers enabled the development of critical thinking, creativity, problem-solving, and independent learning abilities, as alluded to by previous studies (Susanto et al., 2022) and the quantitative survey. Although an earlier study by Astuti et al. (2019) surmised that pre-service teachers judged themselves low on problem-solving and critical thinking, the forced transition to "online learning is an excellent opportunity" for developing cross-functional skills (Susanto et al., 2022, p. 85). In terms of communication skills and other collaborative attributes, the limited interaction and lack of group work strategies could have hindered the development of these skills, as indicated in the low mean score from the survey, which aligned with prior studies (Peled, 2020; Dorsah, 2021) even though the FG participants thought otherwise.

In terms of teacher competence, the focused group discussions also inquired about pre-service teachers' perceptions of the **pedagogical, content knowledge**, and other attributes acquired in the digital learning journey. Their perceptions were mixed, with most of them confident that they were ready to teach:

*Student 1 - Yes, I think I can say that I have the qualities of a teacher. Because in the module called TP, as a first-year student, ... we are receiving various feedback ... Yes, I can be a great teacher.*

*Student 7 - I am a person who never misses class. I think everything that was given to me has given me enough skills and has prepared me for the real world.*

*Student 4 - I just want to make a comment and say I think that most of the attributes since it was online learning that we need to acquire has to be self-motivated.*

*Student 13 – Yes, I think they [do]. I will make an example with TP. The lecturers, they give us notes, and they assess us on the teaching strategies, and they give us feedback on how we should correct ourselves and how we can improve ourselves.*

*Student 9 – I believe that most of us we haven't. Because just to be honest, I don't know how far this thing is going to go and where it is going to be published, but to be precise, I don't think I have acquired such skills and knowledge and all that. ... Because I for one, maybe out of a hundred classes I've had from the day online learning began, maybe I've attended five. ...I have people who come to me on a daily basis saying I'm failing to study this module; how can I do it? So I'm feeling as if once you don't understand any module that you are doing, you are bound to not have those values and those beliefs because these modules they guide your beliefs and your way of thinking as a teacher towards being a professional. So by virtue of you not attending and just arriving anytime and writing in groups and writing together, I don't believe you can actually achieve those attributes that we have spoken about.*

The above excerpts from the FG discussions also indicated that many participants believed their digital learning experiences prepared them for future teaching. However, a voice cautioned that the acquisition of those had to be self-motivated, while a lone voice categorically said he did not. Irrespective of the views held by the majority, evidence from the FG discussions casts doubts on the participants' preparedness to teach effectively. A learning environment blurred by the screen, with limited engagement, where students can choose to "switch off their mics and just keep quiet" (student 9); some "go to the bathroom and miss the most important thing about the whole session" (student 4); and others "enter the zoom class and sleep" (student 13) would hardly foster the knowledge and skills expected of a professional teacher. Irrespective of the mode of engagement, interaction is important in the learning space (Mocinic, 2012). Coupled with the predominant passive pedagogies employed, it would appear that the digital learning experiences of the participants lean towards the performance-based curriculum that is found wanting in preparing graduates for the digital age (Atibuni, Manyiraho, & Nabitula 2022; WEF, 2020; Ama & Emetarom, 2020). The situation was further compounded by their unhappiness with online assessments due to poor quality feedback besides time constraints. No one was pleased with the quality of the feedback because "we just get marks, you don't know what you did wrong" (Student 4). Based on the above, the authors tend to share the views of the lone voice that the digital learning experiences of the participants are unlikely to have prepared

them to teach in the digital age, except for those who would have been self-motivated. What, then, is the way forward?

Even though some may argue that "*South Africa as a country is not on a level of online learning*" (Student 9), given the contextual difficulties (load shedding, connectivity, in addition to the digital divide exacerbated by the pandemic), it is clear that digital learning has come to stay. Irrespective of these difficulties, the benefits of digital learning to the students and the institution abound. Besides contributing to enabling students with the skill set of the digital age (Susanto et al., 2022), the institution and the community benefit immensely from increased access as physical capacity constraints and the associated costs are minimized. The theory aspects of the courses in the SoE can run online with provisions for shared spaces for the practical components. Cost savings derived from this approach can be redirected to other areas of growth and sustainability, while the "missing middle" benefits from reduced fees. This realization may have contributed to the institution's adoption of the current Hybrid learning mode. The participants from the survey and the FGI also opted for Hybrid learning as their preferred mode of education, followed by a fully online mode. However, to effectively prepare teachers for the digital age, there is a need to improve the quality of the digital offering.

While the participants considered the digital infrastructure in the SoE adequate, there were support issues, as broken laptops remained unrepaired for up to six months, pointing to the need to strengthen the ICS's human resources. Although participants judged themselves competent in navigating digital technologies for learning and teaching, they bemoaned the lack of training support to prepare them for virtual education. Since many students are from underprivileged backgrounds and some are from deep rural areas, the need for training in digital technologies cannot be overemphasized. Such training could be incorporated into the first-year orientation programme and the year-long academic support programme with mentors equipped to assist them. Besides aiding the holistic development of pre-service teachers, providing such training is also necessary to avoid a deficit in the instructional process for future generations and close the digital divide (Peled, 2020).

Academics must be trained to employ digital pedagogical approaches in virtual classrooms. This will engage students and keep the class meetings exciting (Mishra, Gupta & Shree, 2020) while aiding the development of cross-functional skills. Incorporating new teaching methodologies into teacher training programmes would likely enhance the effectiveness of pre-service teachers in their future classrooms (Lekhu, 2023). While students can choose to switch off their mics or sleep off, the onus is on the academics to incorporate activities that will elicit students' active participation and interest such that:

*Someone feels like they are missing out from not being in the class. Create a positive environment where I feel by myself when I walk outside that I want to run in the house so that I can get to my PC and get into the class. The lecturers, it's not their duty to entertain us, but they could put a little more effort to make sure the class is interesting. (Student 4)*

Academics must, therefore, delve into their creative reassesses to activate a form of transformative agency that furthers learning in the light of context-specific conditions and other factors, as Damşa et al. (2021) observed.

### **Summary of Findings**

In response to the first research question, the quantitative findings revealed that pre-service teachers learned to work independently during their virtual learning experience, probably due to their limited interaction opportunities with their peers and lecturers. They were also happy with online assessments, which they judged credible as they comfortably navigated online platforms in their digital learning journey. However, many were less confident in applying learned concepts or handling complex tasks online, probably due to the inability to access required guidance. Some found their home setting un conducive for online learning, which may not be unconnected with their predominantly poor socioeconomic background, while others were not mentally ready for virtual education. The survey further revealed that pre-service teachers were confident they had acquired the requisite TPACK and other cross-functional skills needed to teach in the digital age. The qualitative interview clarified these findings and offered more details that answered research question 2.

From FG discussions, this paper argued, on the one hand, that the limited interaction opportunities could have spurred independent learning, creativity, and problem-solving skills as pre-service teachers had to find creative ways to learn on their own. On the other hand, limited interaction emanating from the predominant passive teacher-centred approaches, inadequate student engagement in synchronous class meetings, and difficulties in accessing lecturers to clarify problems hindered learning. These, coupled with minimal/non-existent feedback on assessments, could have constrained the application of learned concepts and the handling of complex materials, thereby stalling deeper levels of learning. Thus, this paper further argued that the online pedagogical experience of pre-service teachers is unlikely to have enabled the skill set needed to thrive as teachers in the digital age.

### **Conclusion**

As part of a more extensive study on digital transformation in the SoE, the paper explored pre-service teachers' experiences of digital teaching to determine the extent to which they felt prepared to teach in the digital age. The findings from this mixed-method research were somewhat mixed. The quantitative results suggest that many pre-service teachers felt their digital learning journey equipped them with the requisite TPACK and cross-functional skills to teach in their future classrooms. Pre-service teachers' views from the qualitative FG discussions were not too different. However, they experienced initial hiccups venturing into digital learning without training and limited prior engagement with digital technologies. Their peculiar circumstances and restrictions compelled them to devise strategies to solve their problems and learn independently, thereby facilitating the acquisition

of some cross-functional skills. The discussions also indicated the dominant use of passive instructional approaches allied to the performance-based curriculum, which is less likely to further the skill set required to teach in the digital age. Coupled with the limited interaction and poor-quality feedback, the extent to which they acquired the requisite TPACK and cross-functional skills becomes unjustifiable.

As the institution adopts a hybrid mode of education, the need to enhance online pedagogical practices to ensure quality education becomes imperative. A critical factor that came out strongly in this study was continuous training. Academics must be trained to keep abreast with interactive online methods to further meaningful learning while enabling the development of cross-functional skills. Training in digital technologies will not only ease the virtual learning experience of our supposedly digital natives but also position them to engage as global citizens in an increasingly borderless world. Irrespective of our contextual difficulties, digital pedagogies hold strong promises for increased access to quality education for all (United Nations Educational, Scientific and Cultural Organisation (UNESCO) by Miao et al., 2021) needed to build more resilient knowledge economies and foster true democracy. As such, the institution must continue strengthening its digital pedagogical practices to produce teachers fit for the digital age while contributing to national good/imperative.

Being case-based, the study's findings may be limited in applicability. Nonetheless, sufficient details were provided to enable possible replicability by interested scholars. They may also consider increasing the scope of their study to include teacher education programmes in an entire state or country to obtain a more robust outcome. An interesting comparison between the views of pre-service teachers from underprivileged and privileged backgrounds could also be done in future research. While the authors acknowledge the limitations posed by the low response to the survey, it is a QUAL + quan study. Data from the FG discussions helped to explain the quantitative responses and enriched the conclusions. Other scholars may expand the scope quantitatively to attain a more generalizable outcome. Nonetheless, the study promises valuable insights to academics who seek to advance quality digital engagements at teacher education institutions that aim to produce holistic teachers for the digital age. It also guides policy decisions on digital education, training, and the acquisition of resources for meaningful transformation in the light of the 4IR while contributing to scholarship in digital pedagogies, particularly in poor socioeconomic contexts.

### **Acknowledgments**

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## **Basic School Leaders' Continuous Professional Development for the 4IR: A Systematic Literature Review across Africa**

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The role of continuous professional development (CPD) in advancing basic school leaders in the context of the fourth industrial revolution (4IR) cannot be overemphasised in the actualisation of positive change in the school system. The 4IR transformed the nature of work across human endeavours, requiring school leaders to be trained and retrained. The study endeavoured to understand CPD approaches available in Africa for school leaders in 4IR. This study adopted a systematic review of the literature. Several bibliographic databases identified two thousand three hundred and fifty-three academic articles using the PRISMA protocol. Hence, the eleven studies on basic school leadership CPD in Africa were used. As a result of the review, CPD activities should focus on enhancing school leaders' abilities to manage, build teams, be professional, communicate effectively in interpersonal situations, and teach and assess. Furthermore, in-service training, cohort meetings, group learning/collegial learning, learning by exposure, formal leadership training for new principals, compulsory leadership courses through the leadership training centre, regular training, networking, and coaching, among others, could be used as CPD to prepare school leaders for the 4IR.

*Keywords:* continuous professional development, collegial training, education leaders, in-service training, 4IR

### **Introduction**

Leadership plays a vital role in the actualisation of positive change in every organisation including the school. The current global changes call for improved leadership capacity to lead a sustainable system (Fry & Egel, 2021; Schein, 2015; Leadership and leadership for sustainability, n.d.; Rogers, 2011). The school like every other sector is faced with changes and globalisation (Wiseman, 2014). As part of the basic education system, educational leaders are responsible for leading continuous improvement of national curriculum framework (Nuttall et al., 2020). Therefore, educational leaders, involved in the routine administration of educational system need to take time to consider on their individual and professional development as leaders and administrators in the changing world (Cravens & Zhao, 2022; Norazana & Zabidi, 2021; Tran et al., 2020). The Fourth Industrial Revolution (4IR) brought about changes to career and institutional development.

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The rapid change of the 4IR transformed the nature of work across human endeavours. The presence of 4IR in Africa and other continents of the world is regarded as the great world-shaking shift in this generation and provides opportunities for enhancing human life (Ramaphosa, 2020). It is inevitable that “disruptive technologies like machine learning, artificial intelligence, and big data are changing the way we live, the way we work and do business, and the way we govern” (Ramaphosa, 2020). The 4IR is seen as an instrument of providing a solution to Africa’s challenge namely, access to quality and sustainable education (Kayembe & Nel, 2019; Ramaphosa, 2020; Xiaolan, 2020). Hence, basic school leaders must be abreast of this fact and harness possible approaches for placing the school at the centre, in the realisation of this goal.

The 4IR movement led to a shift from a handicraft economy-based approach to a machine economy-based approach (Ndung'u & Signé, 2020). Educational institutions are not left out of this rapid shift. Theories of professional development continue to evolve and remain focused on the tradition of integrating educators with the world of work based on the 4IR. Journeying through history reveals that humans have aspired to improve production (Lange, 2019; Melber, 2020; Brahma, 2020; Lin & Lukodono, 2021). During the First Industrial Revolution (IR), steam and waterpower were used to automate production operations. During the Second IR, the operations moved from the use of water and steam to electric power. While in the Third IR, advancements in electronics and information technology contributed to the automation of manufacturing and service provision (Brahima, 2020; Lin & Lukodono, 2021). The 4IR arose from the Third (IR), the digital revolution that has been gaining traction since the mid-twentieth century. It is distinguished by a convergence of technologies that blurs the distinctions between the physical, digital, and biological domains (World Economic Forum [WEF], 2017). Robotics, virtual reality, cloud technology, big data, artificial intelligence, the internet of things, and emotional intelligence have all contributed to the 4IR's development (Chao, 2017). Besides blurring the lines between physical, digital, and biological aspects of life, the 4IR marked by the integration of technologies.

In the era of 4IR and the impending transformation required, school leadership development is an essential strategy to increase teachers’ effectiveness and promote a knowledge-based education institution. The rapid change, development, and globalisation as a result of 4IR; have posed challenges to institutions of learning today as compared to the past. To remain relevant in terms of comparative advantages, institutions require agile, resilient, and adaptable leaders (Mdluli & Makhupe, 2017; Naidoo & Potokri, 2021). Such contemporary school leaders should possess goals and aspirations to place their institution on the global map through regular training and development of their workforce to navigate the unknown future. Somogyi (2021) contends that reflective learning skills, technological and intercultural competence should be given priority now, more than ever, for employees to navigate the 4IR terrain. For basic education to have a favourable comparative advantage and achieve its goals in 4IR, it requires a sound human capital development foundation, as people and knowledge serve as key drivers of today’s world (Rasool & Botha, 2011; Aliyu & Kabiru, 2014; OECD, 2017; Awodiji & Ijaiya, 2019). Educational institutions are sub-systems that

embrace much of the nation's development and produce most of the skilled professionals required in the labour market (Mansoor, 2010; Awodiji, 2018). School leaders with regular continuous development programmes tend to have better staff retention, higher job performance, increased productivity, and comparative advantages (Aliyu & Kabiru, 2014; Awodiji, 2018).

Basic school, being foundational education as a citadel of learning, cannot be left behind in the 4IR due to the need for primary relevant human capital required for the demand of the industry 4.0 society. Research has established needs for reskilling school leaders in the rapidly changing technological environment and to effectively lead schools for the 4IR era (Naidoo & Potokri, 2021). Naidoo and Potokri (2021) identified 4IR skills requires of education leaders and acknowledged the need for them to be better trained. Hence, the educational leaders' continuous professional development programme (LCPDP) cannot be jettisoned in the rapidly changing world. COVID-19 as a catalyst for change with the experience of "New Normal" demands retooling educational leaders' skills, knowledge, and competences. School administration has changed due to several influences including the pandemic, technology advancement, digitalisation, remote learning, and other 4IR attributes. Thus, the role of educational leaders at all levels of the system (school principals and their management teams, district education leaders, school supervisors, educational board members, local government education inspectors, department/ ministry of education officers among others) cannot be underestimated, which necessitates review on suitable approaches for leaders' CPD for the 4IR. Thus, this review focused on identifying existing CPD approaches available in Africa that can be used to advance basic school leaders (principals, deputies, headmasters, head of departments (HODs), and school management teams (SMTs) leadership skills requires for 4IR.

### **Research Question**

The research question that formed the basis for this study is:

What continuous professional development approaches in 4IR are available for basic school leaders across Africa?

## **Literature Review**

### **The Concept of Basic School Leadership**

Education leadership is commonly understood as the act of influencing subordinates in schools with a primary aim to achieve educational goals (Bush, 2019; Connolly et al., 2017; Johnson, 2020; Daniëls et al. 2019). Leadership is described as "a process of influencing whereby an individual exerts intentional influence over others to shape activities and relationships in a group or organisation." (Bush & Glover, 2003, p. 3). School leadership in Africa has been conceptualised under ten models of leadership out of which three models (transformational, instructional and distributed) have been established in the

literature (Bush & Glover, 2016; Shaikh et al., 2018; Mestry, 2021). A successful school leader focuses on learning, which is the primary objective of an educational institution (Bush & Glover, 2014). In terms of student successful learning outcomes, school leaders are second only to teachers (Gurr, 2019). It thus requires school leaders to be possessed with relevant skills that will enable them to achieve effective learning performance in their schools.

School leadership studies have revealed that school leaders come to the fore in ensuring effective school climate and student achievement (Witziers et al., 2003). For decades, educational leadership has been studied, resulting in a variety of leadership styles, such as instructional leadership, situational leadership, transformational leadership, distributed leadership, shared leadership, democratic leadership and team leadership (Harris, 2013; Zaccaro et al., 2001; Gupta et al., 2010; Terzi & Derin, 2016; Jones et al., 2016; Buch & Glover, 2003; Hallinger, 2003; Daniëls et al., 2019; Naicker & Mestry, 2013).

School leadership is conceptualised as emerging approach so that a diversity of administration methods can be employed to accomplish an educational institution's most significant key mission (Witziers, et al., 2003). Studies have recognised three elements of school leadership as defining the school mission, managing the instructional programme, and promoting a positive school learning climate (Witziers et al., 2003; Kokkinou & Markaki, 2015; Blackmore, 2013; Farrell, 2019). These dimensions led to other school leadership responsibilities, such as to frame goals, coordinate curriculum, monitor progress, and set expectations (Robinson, 2007; Macbeath & Dempster, 2009; Robinson, 2011; Cambridge Assessment International Education, 2017). In the attainment of these functions demands continuous development of school leaders in the changing world.

Leading in school usually involves influencing teachers and other stakeholders without relying on one person alone. The influence process should ideally result in an effective learning climate that all stakeholders (such as students, teachers, parents, and society) perceive as a benefit and ensures that all school organisational processes (such as monitoring the instructional process, managing personnel, and allocating resources) run smoothly (Daniëls et al., 2019). Therefore, basic school leaders are personnel saddled with instructional and administrative responsibilities by influencing others to attain the school's educational goals.

### ***The Concept of Continuous Professional Development***

Leadership development is central to attaining institutional goals (The Wallace Foundation, 2013). Globalisation and change call for training and retraining at all levels of the educational system. Continuous Professional Development (CPD) as philosophy and training enables human capital to improve instructional and professional performance, which keeps the school in their capability to continue and attain the level of increased potentials (Raza, 2010). CPD is an institution-wide concept that dates back centuries (Awodiji, 2021). CPD is conceptualised as prearranged, long-term programmes aimed to improve educational leaders' roles, promote student success, and support reflective practice (Fenwick & Pierce, 2002). According to Filipe (2014) CPD refers to those activities that enhance school leaders'

competence, knowledge and skills in management, team building, professionalism, interpersonal communication, technology, teaching, and accountability (Herbert & Rainford, 2014). CPD is denoted as events targeted at improving the skills and knowledge of educational leaders through orientation, training, and assistance (Lessing & de Witt, 2007). CPD is the “deed taken to maintain, update and grow the knowledge and skills required for our professional role” (Institute of Training and Occupational Learning, n.d., p. 1). CPD is recommended as the emerging consciousness of educational leaders’ incompetence or lack of skill to operate according to expectations or laid-down standards (Steyn, 2008).

The CPD is described as the method of improving and strengthening the instincts, skills, abilities, competencies, and processes of school leaders that educational system requires to continue to exist, adapt, and thrive in a 4IR world (United Nations, n.d.). CPD is an educational approach offered to educational leaders to gain expert qualifications such as university degrees, formal coursework, conference participation, and informal learning openings established in preparation for identified needs in the changing world (Awodiji et al., 2020). CPD includes higher education training, conferences, workshops, mentoring, and more (Mathib, 2007; Tingle et al., 2017; Daniëls et al., 2019; Awodiji, 2021).

The CPD is further considered as a learning event, which necessitates a shift in educational leaders’ behaviour because of the knowledge and skills required for the changing world of work (Awodiji, 2021). CPD serves as a structure for assisting educational leaders to build their individual and functional skills, knowledge, competencies, and capabilities, thereby increasing value to them towards the attainment of educational objectives in the 4IR world (Isabirye & Moloi, 2013; Sarbeng, 2013; Ijaiya, 2017; Awodiji, 2021). CPD prepares educational leaders with the knowledge, skills, understanding, competencies, and access to information that empowers them to operate efficiently (Whittle et al., 2012). Moreover, CPD is regarded as actions that improve an educational leader’s expertise, competence, skills, knowledge, and attitudinal change (OECD, 2009; 2020), with the aim of increasing the quality of pupil learning (Asghar & Ahmad, 2014), and effective change management in the school system (Othman & Abd Rahman, 2013; Tsotetsi, 2013). Thus, in the context of this study, CPD is a proactive approach to career growth and skill enhancement. It is a lifelong journey of learning and self-improvement that helps school leaders stay competitive, adapt to change, and achieve their career goals in 4IR. CPD is a concept that pertains to the ongoing process of learning, skill development, and personal growth that school leaders engage in throughout their careers to make them fit for the 4IR.

### ***The Concept of Fourth Industrial Revolution (4IR)***

The Fourth Industrial Revolution (4IR), often called Industry 4.0, is a term coined to describe a new era of technological advancement that is transforming how we live and work. The 4IR combines digital, physical, and biological technologies to build on the first three revolutions. Here are some attributes associated with 4IR: Industry 4.0 integrates various technologies, including artificial intelligence (AI), robotics, big data, 3D printing, augmented reality, the

Internet of Things (IoT), and blockchain (Abdulraheem-Mustapha, 2021; Ajani, 2021; Moloi & Mhlanga, 2021; Schwab, 2016; World Economic Forum, 2017; Xu et al., 2018). Innovation and efficiency are enhanced through the interconnection of these technologies (Ajani, 2021; Moloi & Mhlanga, 2021). The 4IR is driven by the digitalisation of virtually every aspect of our lives and industries. It involves collecting and analysing massive amounts of data to make informed decisions and improve processes.

Moreover, 4IR features the Internet of Things (IoT), which consists of physical objects that collect and exchange data wirelessly through sensors, software, and connectivity (Atasoy, 2022; Letuma, 2022; Xu et al., 2018). This interconnected network allows for real-time data analysis and control, contributing to smarter and more efficient systems. AI and machine learning play a central role in 4IR by enabling machines and systems to learn from data, make decisions, and adapt without human intervention (Krafft et al., 2020; Parmiggiani et al., 2020). This leads to automation and predictive capabilities. Automation, driven by advanced robotics and AI, revolutionises manufacturing, logistics, and customer service (Bayode et al., 2019; Sima et al., 2020; Yusuf et al., 2020). Robots are becoming more capable and versatile, leading to improved productivity and cost-effectiveness (Ilori & Ajagunna, 2020; Xu et al., 2018). The vast amount of data generated by IoT devices and other sources is analysed to gain insights, identify patterns, and make data-driven decisions. This helps organisations optimise their operations, marketing, and customer experiences. Thus, 4IR systems are the integration of physical and computational components, which enable the monitoring and control of physical processes through digital means. They are at the heart of smart factories and autonomous systems. Whereas blockchain is used for secure and transparent transactions and data management. It has applications in supply chain management, financial services, and many other areas. In addition, Augmented Reality (AR) and Virtual Reality (VR) technologies enhance learning, training, design, and remote collaboration. They have applications in gaming, healthcare, and education (Fonariuk et al., 2023; Ilori & Ajagunna, 2020; Xiarewana & Civelek, 2020; Zhang et al., 2022).

The 4IR also encompasses advancements in biotechnology, including gene editing and personalised medicine (Krafft et al., 2020). These innovations are transforming education, transportation, communication, healthcare and agriculture. Industry 4.0 offers opportunities to improve sustainability by optimising resource usage, reducing waste, and monitoring environmental impacts (Gürdür Broo et al., 2022; Recalde et al., 2020; World Economic Forum, 2017). However, the 4IR brings challenges, such as concerns about job displacement due to automation, data privacy and security issues, and the need for regulatory frameworks to govern emerging technologies (Gürdür Broo et al., 2022; Uys & Webber-Youngman, 2019). It could be concluded that 4IR is a transformative phase in which the fusion of technologies reshaped industries, economies, and societies. It has the potential to greatly improve efficiency, productivity, and innovation while also posing complex challenges that need to be addressed for responsible and ethical development.



***School Leaders' Continuous Development in the Fourth Industrial Revolution***

As schools and society are constantly changing, preservice training is no longer a reliable basis for teaching long-term. Consequently, continuous professional development is essential for upgrading and updating educational leaders' skills, competencies and knowledge (Luneta, 2012; Lo, 2020a, b). A school-based leadership professional learning effort will be effective if it emphasises motivation, continuous improvement, teamwork, and developing its professional learning culture (Fullan & Quinn, 2016). In the same vein, schools will be more effective when their leaders are kept up to date (Ahmadi & Keshavarzi, 2013; Daniēls et al., 2019). Modern educational trends are focused at developing productive schools. Modernised schools cannot exist without appropriately trained educational leaders (Daniēls et al., 2019). Without staying abreast with current developments and accepting professional advancement, educational leaders cannot be effective (Jovanova-Mitkovska, 2010). Netolicky (2016) argued that professional personalities and behaviour of educational leaders are influenced not just by formal education, but also by life experience.

In light of the changes and technological advancement that the 4IR placed on school leaders, as well as the increased complexity of the external factors such as the pandemic and other social forces, it is vital that they are provided with adequate training for their demanding roles (Bush, 2009). Changes like the 4IR cannot be easily imagined and implemented in a linear sequence. This is especially true when it comes to leading schools toward efficacy and sustainability (Leahy et al., 2021). Faced with change, the body of knowledge in educational leadership should be continually learning and updating its instructional leadership skills and knowledge (Luneta, 2012; Whittle et al., 2012). With the COVID-19 crisis that affected schools globally and brought about online learning, blended learning, social distancing, and other unusual activities, educational leaders need to reimagine and reskill their leadership approach. Scholars in the fields of the future of work and the future of learning proposed adopting the flipped classroom over traditional approaches is necessary. That is the transition from the stock of knowledge to the flow of knowledge (McGowan & Shipley, 2015; Yu, 2016). The fourth industrial revolution is characterised by automation, service delivery, cost efficiency, machine learning, artificial intelligence, learning optimisation, and emotional intelligence (World Economic Forum [WEF], 2017; Chao, 2017). Therefore, the need to train and retrain school leaders to acquire relevant skills to manage schools for the 4IR is important and futuristic.

Various skills should characterise any CPD programme for educational leaders in the dynamic and challenging world. Gray (2016) suggests that such skills and competencies should include equity leadership, soft skills, ownership of ICT processes and tools, hard work, creativity, critical thinking, people management, service-oriented, trans-disciplinary skills, and cognitive flexibility. Furthermore, Education Design Lab (2018) and Reaves (2019) recognised skill development areas for school leaders in the 4IR as initiative, collaborative approaches, creativity, problem-solving, critical thinking, empathy, oral communication, resilience, and intercultural fluency. Moreover, for basic school leaders to cope with 4IR, they are to be equipped with in-depth knowledge of teachers-learners, cultivating innovation, facilitating resources,

engaging stakeholders, and the ability to maximise resources (Nkambule, 2020; Teacher American Association of Colleges of (P21) and Education and the Partnership for 21st Century Skills, 2010; Tigere, 2020).

There are CPD approaches for basic school leadership proposed in the literature, which include training, networking, direct instruction by experts or experienced persons, workshops, presentations, conferences, and symposiums (Mathib, 2007). Further approaches include university-based principal preparation programmes, cohort or peer support meetings, and mentoring (Tingle et al., 2017). Bush et al. (2011) suggests contact sessions, mentoring, and networking, while Daniëls, et al. (2019) posits incidental and informal learning, intentional learning, and formal training. Kempen and Steyn (2016), and Reaves (2019) described CPD approaches for education leaders as an ongoing, system-wide and individual process as well as traditional learning through courses, speakers, or postgraduate study, collaborative learning, role models and anti-models, coaching, and social media as heutagogical approach (self-determined) learning.

In summary, CPD for school leaders is crucial to the ability of educational institutions to adapt to the rapidly changing technology and knowledge landscape. Technology, artificial intelligence, automation, and big data are all part of the Fourth Industrial Revolution, which presents opportunities and challenges for education. School leaders play a pivotal role in navigating these changes and driving educational innovation. A critical component of their continuous development is integrating technology and digital literacy, data-driven decision-making, adaptive leadership, fostering innovation, global awareness, lifelong learning, ethical considerations, collaborative leadership, diversity and inclusion, resource management, critical thinking, problem-solving, agility, resilience, adaptability, communication, cyber security, and sustainability awareness. School leaders should be continuously trained in the 4IR, participate in workshops, network, and engage in self-directed learning opportunities. This will enable them to lead their institutions effectively in an ever-evolving educational environment.

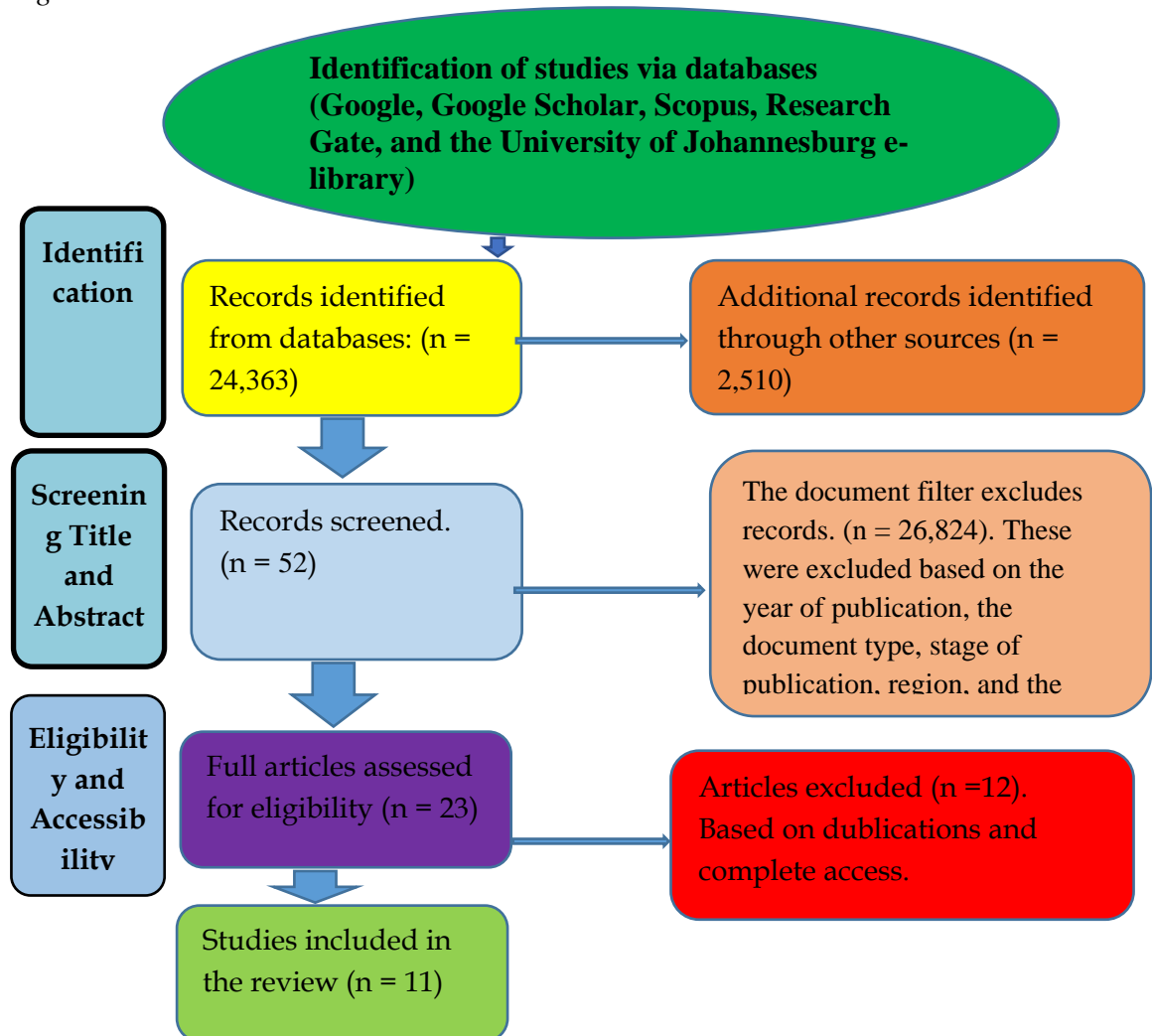
## Methodology

As a form of qualitative research, a systematic review was planned to fill a gap by considering the existing related empirical and theoretical literature (Durach et al., 2017; Hallinger, 2018). It is imperative to outline themes and phrases that would guide and provide relevant literature in the area of review (Nowell et al., 2017; Jansen, 2019). Therefore, the study adopted a systematic review approach (Hallinger, 2018; Bellibaş & Gümüş, 2019; Ahmed, 2020) to identify and create approaches of the school leadership continuous professional development literature in Africa. Thus, thematic analysis was done to identify the findings to answer the research question stated (Adewale et al., 2022; Bellibaş & Gümüş, 2019; Jacob et al., 2022). Hence, words or sub-themes related to leadership, basic school leaders, educational leadership, leaders' continuous professional development, professional development, and staff development were used. From this, various expressions and phrases were formed to incorporate into the inquiry terms when utilising the database. These

keywords/themes explored include leadership, educational leadership, school leadership, instructional leadership, staff development, professional development, and mentoring.

### Search Approaches

Figure 1. PRISMA of the Review



To generate existing empirical, theoretical, and related literature for the review on the basic school leadership CPD literature in Africa, it was important to investigate the data accessible through a wide range of stages, for example, visual library, the web, the utilisation of course readings, diaries, meeting procedures, government, and Non-Governmental Organisations (NGO's) reports for the study. Google, Google scholar, Scopus, Research Gate, and the University of Johannesburg e-library were used as search engines. Based on initial hits of 24,363 and 2,510, as shown in Figure 1, the limiters such as peer reviewed, report, thesis/dissertation, location (Africa), and English were applied, yielding a total number of 52 results. Selection of articles was based on content, timeliness, relevance, and accessibility; and the analysis of content and abstracts were used to make the decision.

A set of inclusion and exclusion criteria was used in to ensure the resources and bases were appropriate. Inclusion criteria required that all sources be indexed with the words "basics school leaders" educational leadership" "school leadership" "continuous professional development" and "leadership development" in both abstracts and full texts. Literature from 2006 to 2021 was used in order to have a view of recent school leadership professional development progress in Africa.

The exclusion criteria are those characteristics or resources excluded from consideration due to publication dates, places of publication, teachers' development, tertiary institutions, and relevance to the study. Therefore, the study excluded literature before 2006. The literature was limited to Africa-based journal articles, books, thesis/dissertations, and reports for generalisation and implications of findings. Additionally, materials irrelevant to Africa were omitted from the study due to national and continental policies addressing issues differently. Furthermore, material that did not focus on the key components or themes was excluded from the study.

The database found 2,363 and 2,510 articles after a thorough search (Figure 1). Some documents were excluded based on the document filter's determination of the publication year, type, stage, school type, region, and publication language. However, others were included based on inclusion criteria. Consequently, only 11 articles qualified for inclusion. The PRISMA protocol (Figure 1) describes this.

### ***Ethical Issues***

In academic research, ethical considerations for maintaining individual privacy are paramount (Hallinger, 2018). The researchers, therefore, ensured that the exploration given is scientific, logical, and correct with the aim of providing information in the discipline of school leadership on continuous professional development for the 4IR in Africa to government officials, educational policymakers, school leaders, scholars, and others.

Considering the nature of the study, the available data was limited by ethical concerns. The researchers remained objective as much as possible in their review. While reviewing related literature on the subject matter, plagiarism issues were also taken into account. The thoughts were paraphrased and reconstructed in accordance with the current study. All the resources used were acknowledged using appropriate referencing style to avoid violating copyright laws (Santini, 2018; Calver, 2015).

Table 1. Results

Authors/ Year	Topic	Methodology	Theory used	Key Findings	Themes/Approaches
Uworwabayeho et al. (2020)	Developing the capacity of education local leaders for sustaining professional learning communities in Rwanda.	A Mixed method with triangulation (meta-analysis, surveys and from Focus Group Discussions (FGDs).	Theory of Change	(1)An improvement in the competencies (shared and transformational leadership), confidence, and commitment to roles and tasks of school leaders after CPD; (2)Leadership behavioural change (LBC)-(frequently arranging coaching and mentoring activities for teachers), and school leadership practices. (3)Improvement in school performance.	In-service training: leadership skills in education, professional ethics in education, moral education and human rights, and the management of extra-curricular activities, and emotional intelligence
Ebot-Ashu (2020)	Leadership and management preparation and development of school leaders in Cameroon.	Mixed method of case study design was adopted	Not available	(1) School leaders in Cameroon recognised that leadership training related to personal management (self-advancing skills), administrative leadership practices (financial management, strategic management, and public policy), and community relationship management may not likely prepare them as effective leaders. (2)School leaders seemed to be interested in developmental programmes with focus on pedagogical skills, school health and safety responsibilities.	Leadership learning and development, Conferences and workshops, Training on the Job, and Sharing best practices among school leaders through an informal network.
Sofa & Abonyi (2017)	Investigating school leaders' self-reported professional development activities in Ghanaian rural basic schools.	A concurrent mixed-methods approach was adopted to gather data from three groups of basic school leaders of one rural educational district in Ghana.	Not available	(1). Leadership development in Ghanaian basic schools is greatly dependent on casual learning, which is personal, hence failing to stimulate collaboration and innovation in leadership within the education system. (2). School leaders adopted informal and self-directed development initiatives in Ghana.	Workshops, seminars, forums, unstructured and non-intentional experiences, reading books, coaching and advice from colleagues and supervisors, visits to other schools, and formal university courses are all possible strategies for learning.
Usman (2016)	Professional development, instructional leadership, and learning transfer systems of leaders in Ghanaian basic schools	A mixed-methods concurrent approach was adopted to gather data from three groups of basic school leaders of one rural educational district in Ghana.		(1). Methods of informal and self-directed learning (2) Attending school meetings, visiting other schools, and reading personal materials, and (3) Mentoring from supervisors and peers, as well as workshops and on-the-job experiences	Meetings of school leaders, Workshops, seminars, and forums, learning on the job, Reading (books, newspapers, articles, magazines), Coaching/guidance/advice from colleagues and supervisors, Visits to other schools, Performance appraisal, and Formal university courses
Mestry & Singh (2007)	Continuing professional development for principals: A South African perspective.	A qualitative approach (interview, focus group, document analysis, and feed note compiled by Centre for Education and Policy Development (CEPD), on the delivery of the ACE programme.	Not available	(1)Shared leadership approach based on collegiality, (2)Provision of personal and professional growth opportunities, Improved stakeholders-relationships, (3)Delivery of the ACE curriculum, The benefits of cohort meetings, and (4)The benefits of continuous assessments.	Collegial leadership approach, Personal and professional growth, stakeholders-relationships, ACE programme, Leadership cohort meetings, continuous assessments for school leaders, and two years advance part-time programme.
Chikoko et al (2011)	Leadership development: School principals' portfolios as an instrument for change.	A qualitative research approach using sample from a cohort of the ACE (School Leadership) with 88 portfolio and document analysis were adopted.	Portfolio Approach	(1)Self-understanding (understanding their strength, weakness, and achievements), (2)Value of principals' responsibilities, (3)Not diagnostic in the structure of their portfolio testimony, and (4)Reproductive instead of being transformational.	Group learning/collegial learning, learning by exposure, mentoring and induction, and value-based leadership development approach

Arikewuyo, (2009)	Professional training of secondary school principals in Nigeria: A neglected area in the educational system.	Review of literature on principalship development programme	Peter principle theory	(1)The need for formal leadership training for principals before assuming principalship. (2)Compulsory leadership programmes at the National Institute for Educational Planning and Administration (NIEPA) before they assume managerial positions	Leadership Training, Professional courses,
Mathib (2007)	The professional development of school principals.	A quantitative research approach adopting purposeful sampling technique was used to sample 600 respondents (200 principals, 200 Heads of Department, and 200 educators) in Bojanala East and Bojanala West Regions of Northwest Province, South Africa.	Professionalisation	(1)Capacity building is made serious and important, while change management is weak, (2)Capacity building on linkages between school and its environment. (3)Creating structures for service delivery through self-expression, innovation, communication and motivation. (4)Provision of guidance to staff for optimum utilisation of their potential (5)Promoting teamwork among staff.	Training, Networking, and Coaching
VVOBrwanda (2019)	Integrating ICT in continuous professional development of teachers and school leaders and classrooms in Rwanda.	Report/Concept Note	Not applicable	(1)Inculcating Information and Communication Technology (ICT) into CPDP of school leaders and teachers in Rwanda with the aim of providing cost-effective, flexible, and (2)Individualised learning along with prospects to advance teachers and school leaders' digital literacy for quality education and knowledge-based economy.	National Open, Distance and eLearning; CPD Diploma Programme in Effective School Leadership; CPD Certificate Programme in Educational; Mentorship and Coaching for STEM SSLs/Heads of Department; Certificate Programme in Educational Mentorship and Coaching for School-Based Mentors (SBMs), and Sector Education Inspectors (SEIs)
Bush et al. (2011)	Preparing new principals in South Africa: The ACE School leadership programme.	Pilot study approach with the use of desk research, documentary analysis, observation, interview, surveys, and longitudinal case studies on different phases.	Not available	(1) ACE had impact on school leaders' managerial practices in terms of enhanced confidence, improved self-control, principal-educators' relationships, skills' development (ICT, problem solving, financial planning, and teamwork), school achievement and improvement, School-community relationships, and accountability.	Mentoring, Networking, Assessment, and Material/Module
Asheber et al. (2021)	Principals' perception of postgraduate diploma in school leadership programme as opportunity promoting educational leadership improvement in Madda Walabu University (Ethiopia): A qualitative inquiry.	A qualitative research approach of case study design was adopted. Semi-structured interview and focus group discussion with 16 participants (13 male and 3 female) who have participated in postgraduate diploma in school leadership programme was used.	Grounded theory	(1)The training has equipped the school leaders with instructional leadership competences. (2)Education policy and contemporary issues, management of educational change, (3)Improves professional knowledge of the principals and school effectiveness	Postgraduate Diploma in School Leadership (PGDSL), Module Content, Professional Knowledge, Skills and Attitudes

### **Data Analysis**

This study utilised thematic analysis because it was a qualitative study that used a secondary research approach. The analysis is flexible and based on the review of literature on the area of concern to generate themes (Braun & Clarke, 2013). Thematically, the study identified related literature on the professional development of educational leaders in Africa to answer the research question.

### **Discussion**

What are the continuous professional development programmes available for basic school leaders in literature across Africa? This study aimed to assess evidence based on CPD programmes for basic school leaders in the literature across Africa. The role of CPD in school leadership and development has long been researched globally. Thus, several reviews have been done on school leadership, but this study serves as one of the reviews that synthesises approaches of school leaders' CPD for change in the world of the 4IR. Findings from the review carried out as indicated in Table 1 established that CPD has been adopted to enhance or prepare educational leaders' capabilities for change in Africa (Mestry & Singh, 2007; Mathib, 2007; Arikewuyo, 2009; Chikoko et al., 2011; Bush et al., 2011; Sofu & Abonyi, 2017; Usman, 2016; VVOBrwanda, 2019; Uworwabayeho et al., 2020; Ebot-Ashu, 2020; Asheber et al., 2021).

Uworwabayeho et al. (2020), CPD enhances school leaders' competencies (shared and transformational leadership), confidence, and commitment to roles and tasks. Also, CPD, in terms of coaching and mentoring, was said to have promoted leadership behavioural change (LBC), leadership practices, and school performance. This finding is corroborated by Raza (2010) and Herbert and Rainford (2014), that CPD can improve instructional and professional performance, thereby promoting the school's potential for continued improvement. Therefore, the findings revealed that CPD could be advanced in terms of coaching, mentoring and sharing knowledge to empower school leaders with relevant skills for 4IR.

Moreover, Ebot-Ashu's (2020) study shows that general leadership CPD might not prepare them for effective self-advancing skills, administrative leadership practices, or community liaison activities. Education leaders, however, were found to be interested in CPD that focused on skills related to pedagogy and school health. This aligns with Omogyi (2021), who emphasises the importance of reflective learning, technological skills, and intercultural competencies in CPD for education leaders to navigate the 4IR terrain. Currently, in Ghana, basic school leaders rely heavily on casual personal learning, which prevents collaboration and innovation among school leaders. Thus, school leaders used informal and self-directed development initiatives as a form of CPD practices (Sofu & Abonyi, 2017). In addition, Usman's (2016) study reveals that informal, self-directed learning, school meetings, visiting other schools, reading personal materials, mentoring, and on-the-job learning experiences are forms of CPD adopted for school leaders in Ghana. This is supported by Daniëls et al. (2019) that incidental and informal

learning, deliberate learning, and formal training are forms of CPD that could promote leadership skills, knowledge and competency.

Moreover, Mestry and Singh (2007) submitted that collegiality as a basis for shared leadership provides school leaders with opportunities for personal and professional growth that will enhance stakeholder relationships and school development. In addition, value-based leadership development approach, change management, interrelationships between the school and the environment, innovation, communication, teamwork and motivation were found as the leadership continuous professional development approaches that will facilitate educational leaders' capacity (Mathib, 2007). This is inconsonant with (Fenwick & Pierce, 2002; Raza, 2008) findings that CPD programmes aimed to empower school leaders' roles, improve student success, and supportive reflective practice in the changing world. According to Filipe, (2014), CPD activities improve school leaders' competence, knowledge and skills in management, team building, professionalism, interpersonal communication, technology, teaching, and accountability.

Furthermore, Chikoko et al. (2011) showed that principals' self-understanding, with regard to understanding their strength, weakness, and achievements, and value responsibilities are the benefits derived from the ACE training in South Africa given as a form of CPD using portfolio approach. This implies that CPD will prepare school leaders with reflective insight about themselves for leading schools in fourth industrial challenge. Hence, the leaders' CPD is a structure for supporting school leaders to build their individual and functional skills, knowledge, competencies, and capabilities by increasing value to them towards the attainment of educational objectives in 4IR world (Isabirye & Moloji, 2013; Sarbeng, 2013; Ijaiya, 2017; Awodiji, 2021).

In the same vein, Arikewuyo's (2009) study in Nigeria identified the need for formal educational leadership training before assuming leadership training programme as a form CPD programmes at the National Institute for Educational Planning and Administration (NIEPA). This suggests that school leaders should be exposed to a formal training to prepare them for 4IR beside their initial qualifications. It was discovered that CPD content for educational leaders in Africa should focus on leadership skills, professional ethics, moral education and human rights, management of extra-curricular activities, and emotional intelligence (Uworwabayeho, et al., 2020). Also, personal management, administrative leadership practices, community relationship management and modern pedagogical skills (Ebot-Ashu, 2020) should be included in the CPD module. The findings corroborated with other scholars that CPD such as higher education training, conferences, workshops, mentoring, and more could be used to empower human capital for sustainable development (Mathib, 2007; Tingle et al., 2017; Daniëls et al., 2019; Awodiji, 2021). This implies that formal training such as further education, conferences, and mentoring can be adopted to equip school leaders with 4IR competencies.

Meanwhile, VVOB Rwanda (2019) concluded that the adoption of confidence, self-control, leaders-educators relationships, digital literacy, skills development (ICT, problem-solving, financial planning, and teamwork), school-community relationships, and accountability will promote education leaders' development.



Bush et al. (2011) advocated that contact sessions, mentoring, and networking, among other approaches, will advance school leaders' skills and knowledge.

Lastly, instructional leadership competencies, professional knowledge, skills and attitudes, education policy and contemporary issues, management of e change are suggested to be inculcated in the leadership curriculum (Asheber et al., 2021). In the context of STEM vanguard as forerunner to the 4IR, Uworwabayeho et al. (2020) found that an upgrading in the school leaders' competencies, confidence, and commitment to roles and tasks increased capacity and leadership behavioural change with regularly coaching and mentoring activities for teachers and school leaders. Thus improved in school performance.

Thematically, CPD leadership literature for the African basic school leaders in this study revealed the following approaches (Table 1) as commonly used as leadership professional training courses, conferences, workshops, on-the-job training, informal networks, forums, seminars, book and journal readings, coaching, institutional/ university-based courses, in-service training, networking, part-time/sandwich programme, collegial learning, mentoring, leadership cohort/peer meetings, induction, value-based training, post-graduate/certificate leadership training, self-directed learning, performance appraisal, stakeholders-relationship, and school-based mentoring programme among others. The existing studies corroborated that training, networking, direct instruction by experts or experienced persons, workshops, presentations, conferences, and symposiums are viable approaches to empowering school leaders (Mathib, 2007). Further approaches such as university-based principal preparation programmes, cohort or peer support meetings, and mentoring (Tingle et al., 2017), could be used for school leaders' acquisition of 4IR competencies. Bush et al. (2011) suggest contact sessions, mentoring, and networking, while Daniëls et al. (2019) posit incidental and informal learning, intentional learning, and formal training. Kempen and Steyn (2016), and Reaves (2019) described CPD approaches for education leaders as ongoing, which include courses, speakers, or postgraduate study, collaborative learning, role models and anti-models, coaching, and social media as self-directed learning.

In accordance with Awodiji et al. (2020), CPD provides school leaders with the opportunity to acquire expert qualifications, such as university degrees, formal coursework, conference participation, and informal learning opportunities, so they can be prepared to meet the changing needs of the global economy. Thus, these approaches can be advanced for equipping school leaders with 4IR leadership skills, competences, and knowledge.

## **Conclusion and Implications**

This study has reviewed and analysed literature on school leaders' CPD in Africa and identified the approaches available in the continent that can be used to advance leaders' 4IR skills development. The study identified CPD approaches that could be adopted for preparing basic school leaders for 4.0. The common approaches identified are in-service training, cohort meetings, group learning/collegial learning, learning by exposure, and formal leadership training for

new principals. Furthermore, compulsory leadership courses through the leadership training centre, regular training, networking, coaching, National Open, and Distance and eLearning, diploma programme, certificate programme, mentorship, and postgraduate Diploma in School Leadership.

By implication, it is therefore concluded that CPD programmes for basic school leaders should be emphasised on improving school leaders' competence, knowledge and skills in management, team building, professionalism, interpersonal communication, technology, teaching, and accountability. Likewise, in-service programmes, cohort/ peer meetings, group/collegial learning, exposure, formal leadership training for new education leaders, compulsory leadership courses through the establishment of leadership training centres, regular training, networking, and coaching among others could be used as approaches of CPD to prepare basic school leaders for the 4IR. Therefore, this study has provided a convergent CPD approaches that could be used in Africa to prepare school leaders with relevant 4IR knowledge and competencies to lead effective school.

### Limitations

The study is limited in that there was no evidence for literature on CPD approaches for school leaders in North Africa, as all of the other regions of the continent were represented. There have also been a number of peer-reviewed articles published in other languages about leadership development approaches in Africa, especially in Francophone countries. Languages other than English were excluded from the review. It is therefore possible that the body of evidence is more extensive and complex than this review suggests. Moreover, this review does not assess the quality of the studies. Journal articles, books, thesis/dissertations, and reports based on Africa were used for generalisation and implications. We excluded studies that were not fully accessible. Based on these, further studies could be advanced using qualitative and quantitative research approaches to understand suitable techniques for school leaders to acquire the competencies required to lead in the 4IR.

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## Emotion Regulation and Social Adjustment of Student Teachers

By KR Geetha\* & Fathima M. Parimala<sup>±</sup>

The present study focuses on emotion regulation and the social adjustment of student teachers. A survey method was employed in this present study. The sample of the study comprised 210 student teachers (N=210) from three teacher education colleges located in and around Karaikudi, Sivagangai district, Tamil Nadu, India. A simple random sampling technique was utilized for sample selection. The social adjustment questionnaire with a reliability coefficient of 0.76, was constructed and validated by the researcher and research supervisor, and the standardized Emotion Regulation Questionnaire (ERQ), Gross and John (2003), with Cronbach's alpha reliability coefficient for the scale was calculated as 0.75 for present sample, were administered to the student teachers for data collection. Descriptive and differential statistical analyses were used to analyze the collected data. The findings of the study revealed that the level of emotion regulation and social adjustment of student teachers is favorable, there was no significant difference found in emotion regulation and social adjustment of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age and there exists a strong positive relationship between emotion regulation and social adjustment among student teachers.

*Keywords:* emotion regulation, social adjustment, student teachers, mental state, well-being

### Introduction

Teacher education provides the platform for student teachers to acquire knowledge and practice skills that are necessary for improving their competence as teachers. Every day student teachers are perpetually exposed to extensive arousing stimuli. Student teachers need to accept or regulate both pleasant and unpleasant impulsive emotional situations.

### Emotion Regulation

Emotion refers to a type of mental state that occurs almost all times in human life. Emotions act as a catalyst to life and determine individuals' abilities and competencies. Emotions are responses to situations that are seen as personally relevant and represent the vital driving force of human behavior (Ekman, 1992, p. 180). Emotions are pivotal for social adjustment, interventions based on restorations of the attachment style and cognitive emotion regulation strategies promote social adjustment (Farsijani, Besharat, & Moghadamzadeh, 2022, p. 66). Emotion

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regulation begins with an openness to feelings. The capacity to exercise control over one's emotional state is known as emotion regulation. It could entail actions like evaluating a stressful situation to lessen anger or anxiety, covering up obvious indications of fear or grief, or concentrating on things that make feel joyful or peaceful. Important social functions are served by emotions. As a result, managing emotions should have societal repercussions, and managing emotions differently should have various repercussions. Emotional insights enable the individual to respond appropriately based on the situation. Emotion regulation (ER) aims to govern emotions in ourselves or others (McRae & Gross, 2020, p. 2). Emotion regulation comprises two kinds of processes and strategies, which influence emotion utilization. Primarily, emotion information processing, emotion regulation, and emotion-focused behavior are influenced by the emotionality of the individual. Emotion information processing leads to the cumulation of emotional knowledge and emotion regulation strategy comes from socioemotional learning. Moreover, a lack of emotional information processing alters emotional knowledge and reduces emotion regulation (Izard, Stark, Trentacosta, & Schultz, 2008, p. 160).

### **Neural Bases of Emotion Regulation**

Basic emotion theory revealed that every basic emotion has a particular brain locus. Distinct emotions have different physiological signatures (Gu et al., 2015, p. 43). Neuroscientific research studies revealed that both psychological and neurobiological mechanisms are involved in effective emotion regulation (Ochsner & Gross, 2007, p. 87). Amygdala is a subcortical structure vital for signaling the presence, and modulating the encoding, of emotion-related stimuli (Phelps & LeDoux, 2005, p. 178). Affective responses of the individual are represented by a cortical region insula (Uddin, Kinnison, Pessoa, & Anderson, 2014, p. 11). Gender differences in emotion regulation based on the centro median amygdala indicate that men and women may differ in the neural circuits associated with emotion representation and integration (Wu et al., 2016, p. 6). Regions of the human brain such as the orbital frontal cortex, anterior cingulate cortex, amygdala, and other associated regions form complex circuits that involve the regulation of emotion. The structure and function of this circuit are influenced by both inheritable and environmental factors. Effective emotion regulation is crucial for psychosocial well-being (Berking & Wupperman, 2012, p. 128).

### **Emotion Regulation Strategies**

Gross's (1998, p. 224) process model of emotion regulation emphasizes that people can take action to control their emotions at various times, including before they experience an emotion -antecedent-focused emotion regulation and after they have already started to react emotionally- response-focused emotion regulation. Emotion regulation strategies are of two types namely reappraisal and suppression. Reappraisal reduces negative emotion-expressive conduct in emotionally distressing settings but does not reduce good behavior. In contrast, suppression reduces both negative and positive emotional expression in behavior. This decline in positive

emotion-expressive conduct ought to hinder social interactions and elicit unfavorable responses from other people (Gross, 2001, p. 214).

### **Emotion Regulation Among Different People**

Developmental research studies revealed that emotion regulation ability improves with age. Cognitive control systems are thought to assist in dampening or strengthening both unpleasant and positive emotions as part of the emotion-cognition interaction known as emotion regulation (Martin & Ochsner, 2016, p. 146). Childhood functional and anatomical connections between these brain areas may have been weaker or less structured, which may have contributed to the greater problems with emotion control. Teenagers may have a tougher difficulty controlling their emotions because brain areas linked to cognitive control structures, like the prefrontal cortex, may mature more slowly than those linked to emotional response, such as the amygdala and ventral striatum (Silvers et al., 2015, p. 771, Gabard-Durnam et al., 2014, p. 193). Individuals follow emotion regulation strategies to govern their emotions in daily lives in terms of interpersonal relationships, problem-solving, etc. (Gross & John, 2003, p. 348). Teachers regulate their emotions through problem-directed actions, they differ in their sources of negative thoughts and actions (Talbot & Mercer, 2018, p. 410). Emotion regulation training moderates the mental evaluations and reactions of the individual and thus it results in appropriate cognitive, motivational, and behavioral reactions (Rezaei Dehnavi, Noorian, & Movahedi, 2020, p. 206).

### **Social Adjustment**

According to the American Psychological Association Social adjustment refers to accommodation to the demands, restrictions, and mores of society, including the ability to live and work with others harmoniously and to engage in satisfying interactions and relationships. Adjustment is a notion in psychology that deals orientation of individuals within society. Every person goes through a lifetime-long process of social adjustment where they change how they interact with others and the environment to play a part and function in their lives. Humans are social creatures that cannot survive on their own, they need other members to work together and support one another to accomplish their requirements, including those for personal affiliation, acceptance, and self-recognition (Dude, 2022, p. 45). A person's endeavor to conform to the norms, values, and desires of a society to be accepted is known as social adjustment. Social adjustment is the effort an individual makes to fit in with the expectations, conventions, and values of a community to gain acceptance. People continue to form opinions and live in a society. Individuals purposefully attempt to behave under social norms to blend in. It is challenging, though, because every individual has a distinct organizational structure and mentality. A significant relationship occurs between social adjustment and the emotional maturity of student teachers (Kasirajan, 2019, p. 2454). The above empirical and conceptual review revealed that social adjustment requires every

individual to orient with each other and to enhance the social functioning of the individual constructively.

### **Review of Related Literature**

Kaur and Sharma (2022) conducted a study on gender variation in social adjustment and interpersonal support among 480 undergraduate students. Social adjustment and interpersonal support evaluation scales were used for the study. Results showed that male students had much greater interpersonal support and social adjustment than their female peers. Also, correlation analysis demonstrated that interpersonal support among male students had a positive link with social adjustment, but interpersonal support was discovered to have a non-significant positive association with social adjustment in the case of female students. Because female students participate in fewer social activities and are less likely than male students to discuss their issues or emotions with peers their age. Consequently, interpersonal assistance was crucial in helping university students transition socially.

Farsijani, Besharat, and Moghadamzadeh (2022) examined social adjustment concerning cognitive emotion regulation strategies and attachment styles among adolescents. The Bell Adjustment Scale (Bell, 1934), the Adult Attachment Scale (Hazan & Schiver, 1987), Cognitive Emotion Regulation Scale (Garnefski & Kraaij, 2006) were utilized for data collection. Results indicated that attachment style and cognitive emotion regulation strategies effectively promote social adjustment.

Farsijani, Besharat, and Moghadamzadeh (2021) conducted a descriptive correlation study among high school students to examine social adjustment concerning ego strength and cognitive emotion regulation. Bell Adjustment Inventory (BAI) (Bell, 1961), Ego Strength Scale Besharat (ESS), 2007, and Cognitive Emotion Regulation Questionnaire (CERQ), Garnefski and Kraaij (2006) were utilized for this study. Research indicated that ego strength emotion regulation strategies enhance the social adjustment of the students.

Talbot and Mercer (2018) conducted a study on language teachers' emotional well-being and emotional regulation in the United States, Japan, and Australia 12 semi-structured interviews were conducted among university teachers of English as a second language (ESL), English as a foreign language (EFL), or former ESL/EFL teachers in Japan, the United States and Australia. Results showed that all the teachers regulated their emotions through problem-directed action, they differ in their sources of negative thought and actions.

Darji and Thapa (2013) conducted a study on the adjustment of B.Ed students concerning home adjustment, health adjustment, and social and emotional adjustment among 43 students from the M.S University of Baroda. Bell's adjustment inventory was administrated for data collection. The results revealed that individuals who have not adjusted to their home environment may face additional adjustment challenges, without preparation students have challenges that in turn lack quality of experience in social adjustment.

Mihalca and Tarnavska (2013) examined the social functioning and emotion regulation strategies among adolescents. Emotion regulation strategies such as catastrophizing, acceptance, self-blame, and planning were examined in this study. Results revealed that social functioning problems and related distress are caused by catastrophizing of the individual. Acceptance is considered a dysfunctional cognitive strategy concerning social functioning not with the related distress. Self-blaming leads to distress, not the social functioning of the individual.

McRae et al., (2012) examined Bottom-up and top-down emotion generation: implications for emotion regulation. Results revealed that self-reported effect and cognitive reappraisal were more effective on top-down generated emotions than bottom-up generated emotions. Neurally, the reappraisal of bottom-up generated emotions resulted in a paradoxical increase in amygdala activity. The association between the mode of emotion generation and ensuing regulation needs to be considered into account when comparing the efficacy of different types of emotion regulation, as well as when reappraisal is used to treat different types of clinical disorders.

Hopp, Troy, and Mauss (2011) conducted a study on the unconscious pursuit of emotion regulation: Implications for psychological health among 222 individuals with Stressful life events (SLE). The negative impact of stressful life events, explicit valuing of emotion regulation, Emotion Regulation Questionnaire (ERQ), and Beck Depression Inventory (BDI) were used for the study. Results showed that implicitly valuing emotion regulation is associated with better psychological health for individuals who habitually use cognitive reappraisal. Adaptive emotional control depends on both the nonconscious and conscious processes.

Sheppes, Scheibe, Suri, and Gross (2011) experimented on Emotion-regulation choice among students. Results showed that healthy individuals manage their emotions by flexibly switching between a relative preference for engagement reappraisal, which allows emotional processing when the intensity of negative emotion is low, and disengagement distraction, which blocks emotional processing at an early stage when the intensity of negative emotion is high.

Haga, Kraft, and Corby (2009) showed that individuals from three countries surveyed (i.e., Norway, Australia, and the United States), “differed in their use of emotion-regulatory strategies, but demonstrated similar effects of emotion regulation strategy upon well-being” (p. 283). Findings such as these caution against assuming that the experience of, expression of, and regulation of emotions is the same across cultures.

## **Research Gap**

Emotion regulation and social adjustment are the major constructs, which predominance in the research arena of neuroscience, education, psychology, and behavioral studies. The path of the above research studies revealed the role of cognitive reappraisal as a way of emotion regulation for the psychological health of the individual, how healthy individuals regulate their emotions, in which way language teachers regulate their emotions, the role of cognitive reappraisal on top-

down generated emotions, social adjustment and interpersonal support of male and female undergraduate students, the relationship between cognitive emotion regulation strategies and attachment styles concerning social adjustment of high school students, how home adjustment influence social adjustment. However, research studies have yet to assess and address emotion regulation and social adjustment based on gender, educational qualification, locale, type of institution, marital status, and age and the relationship between emotion regulation and social adjustment among student teachers. Thus, the present research focuses on the level of emotion regulation and social adjustment of student teachers and tries to assess whether there exists any significant difference in emotion regulation and social adjustment of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age and to examine whether there exists any relationship between emotion regulation and social adjustment among student teachers.

### **The Rationale of the Study**

Now a day's teaching profession faces a lot of burnout and attrition (Hong, 2010, p. 1531). Student teachers are supposed to be able to control their emotions, especially fear and anger, in a way that is acceptable to others. Student teachers couldn't crudely express their emotions; they must regulate them productively. Inappropriate, severe, or unchecked emotional reactions to such stimuli cause social incompetence. Positive emotions such as enjoyment and contentment and negative emotions such as worry and anger are often experienced during instruction (Uzuntiryaki-Kondakci, Kirbulut, Oktay, and Sarici, 2021, p. 1131). Therefore, student teachers need to engage in some sort of emotion regulation almost all of the time to overcome overwhelmed emotions in daily life. Social adjustment and emotion regulation involve many psychological processes. People frequently say or do things when emotional control is compromised that they subsequently regret and wish they had been able to regulate their emotions better.

The inability to control one's emotions is a feature of several types of mental illness. It could eventually have a detrimental effect on a person's social interactions and personal well-being. Defective emotion regulation causes impulsive aggression and violence. (Davidson, Putnam, and Larson 2000, p. 591). Emotion regulation was imposed as affective self-regulatory efficacy (Caprara, Alessandri, Barbaranelli, and Vecchione, 2013, p. 859). Research studies strongly support that the ability to regulate one's emotions acts as a baseline of physical and mental health (Silvers & Guassi Moreira, 2019, p. 35). Desired emotional experience ensures the right feeling irrespective of the nature of the feeling (Tamir, Schwartz, Oishi, and Kim, 2017, p. 1448). Regulation is an integral aspect of emotion (Paz, 2018, p. 89). Prospective secondary education teachers have less adjustment and favorable mental health (Srinivasan & Senkolemari, 2016, p. 76).

Numerous research studies have been conducted regarding social adjustment and emotion regulation with some other constructs and previous research findings revealed that altruistic behavior is correlated with the social adjustment of B.Ed

students (Kumar, 2019, p. 975), emotion regulation is associated with sympathy and pro-social behaviors (Eisenberg, 2000, p. 665), teaching competency of prospective teachers related to their adjustment (Sattanathan & Antony, 2022, p. 1651), B.Ed. trainees have a low positive correlation between social and educational adjustment, and moderate correlation between health and educational adjustment, and a considerable positive correlation between home and educational adjustment (Boruwa, 2020, p. 12294). Adolescents with effective emotion regulation have a high psychological adjustment (Parise, Canzi, Olivari, and Ferrari, 2019, p. 363). Emotion regulation is a sequence of versatile emotional circumstances within a social event (Gross & Feldman Barrett, 2011, p. 10). Hence, individuals need to regulate emotions based on the circumstances they encounter. In this regard, the present study intends to assess the level of emotion regulation and social adjustment and to assess the emotion regulation and social adjustment of student teachers with a few demographic variables namely gender, educational qualification, locale, type of institution, marital status, and age, and to find out the relationship between emotion regulation and social adjustment among student teachers.

### **Research Questions**

- In what way the level of emotion regulation and social adjustment among student teachers is to be assessed?
- To what extent does emotion regulation of student teachers differ based on their gender, educational qualification, locale, type of institution, marital status, and age
- To what extent does the social adjustment of student teachers differ based on their gender, educational qualification, locale, type of institution, marital status, and age
- How far emotion regulation and social adjustment among student teachers are related?

### **The objective of the study is**

- To assess the level of emotion regulation and social adjustment of student teachers
- To assess the emotion regulation of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age
- To assess the social adjustment of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age
- To examine whether there exists any relationship between emotion regulation and social adjustment among student teachers.

### **The hypotheses of the study are**

- The level of emotion regulation and social adjustment of student teachers is favorable.

- There will be no significant difference in the emotion regulation of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age.
- There will be no significant difference in the social adjustment of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age.
- There will be no significant relationship between emotion regulation and social adjustment among student teachers.

### Methodology

A survey method was employed for this study. A simple random sampling technique was utilized for sample selection. The sample of the present study comprised 210 student teachers (N=210) from the Alagappa University College of Education, Karaikudi, Arumugam Pillai Seethai Ammal College of Education, Thirupathur, Thavathiru Kundrakudi Adigalar College of Education for Women (TKACEW), Kundrakudi located in and around karaikudi, Sivagangai district, Tamil Nadu, India. The social adjustment questionnaire for the student teachers was constructed and standardized by the researcher and research supervisor. The validity of the tool was ensured by experts, the reliability of the tool was established by the test-retest method and the reliability coefficient is 0.76. The Emotion Regulation Questionnaire (ERQ) was developed by Gross and John (2003) and conducted a pilot study to retain reliability and validity and revealed that the Cronbach alpha reliability of the present sample is 0.75. The questionnaires were given to student teachers and appropriately received their responses for data collection.

### Data Analysis and Interpretation

#### Hypotheses Testing

**Hypothesis 1:** The level of emotion regulation and social adjustment of student teachers is favorable.

Table 1. Emotion Regulation and Social Adjustment of Student Teachers

S.No	Variable	N	Mean	SD
1	Emotion regulation	210	57.40	3.93
2	Social adjustment	210	63.61	10.73

In Table 1, it is found that the mean score of emotion regulation is 57.4 out of an overall score of 70, a score above 50 indicates a favorable level of emotion regulation of student teachers, and the mean score of social adjustment is 63.61 out of an overall score of 75, a score above 53 indicates a favorable level of social



adjustment of student teachers. So, the level of emotion regulation and social adjustment of student teachers is favorable.

**Hypothesis 2:** There will be no significant difference in the emotion regulation of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age.

*Table 2.* Emotion Regulation of Student Teachers Based on Gender, Educational Qualifications, Locale, Type of Institution, and Marital Status

S.No	Variables	N	Mean	SD	t-value	Level of significance	
1	Gender	Male	24	56.33	4.86	0.24	Not Significant
		Female	186	57.55	3.77		
2	Educational Qualification	Under	93	58.05	4.46	0.42	Not Significant
		Post	117	56.91	3.36		
3	Locale	Rural	157	57.12	3.83	0.07	Not Significant
		Urban	53	58.28	4.08		
4	Type of Institution	Govt	87	57.34	4.01	0.81	Not Significant
		Private	123	57.47	3.87		
5	Marital status	Married	85	58.38	3.56	0.002	Not Significant
		Unmarried	125	56.76	4.03		

Level of significance 0.05.

In Table 2 it is found that there is no significant difference in the emotional regulation of student teachers based on their gender, educational qualification, locale, type of institution, and marital status.

*Table 3.* Emotion Regulation of Student Teachers Based on Their Age

Variable	Sources of Variance	Sum of squares	Mean square	F value	Level of significance
Age	Between-group	53.74	26.87	1.75	Not Significant
	Within-group	3161.37	15.27		

Level of significance 0.05.

Table 3 indicates that there is no significant difference in the emotion regulation of student teachers based on their age.

**Hypothesis 3:** There will be no significant difference in the social adjustment of student teachers based on their gender, educational qualification, locale, type of institution, marital status, and age.

*Table 4. Social Adjustment of Student Teachers based on their Gender, Educational Qualifications, Locale, Type of Institution, and Marital Status*

Variables		N	Mean	SD	t-value	Level of significance
Gender	Male	24	58.95	13.66	0.04	Not Significant
	Female	186	65.02	9.11		
Educational status	Under	93	65.42	7.07	0.39	Not Significant
	Post	117	63.09	12.97		
Locale	Rural	157	64.66	9.75	0.15	Not Significant
	Urban	53	62.09	11.85		
Type of Institution	Govt	87	64.05	7.06	0.68	Not Significant
	Private	123	63.50	12.8		
Marital status	Married	85	63.12	10.76	0.54	Not Significant
	Unmarried	125	10.76	10.81		

Level of significance 0.05.

Table 4 shows that there is no significant difference in the social adjustment of student teachers based on their gender, educational qualification, locale, type of institution, and marital status.

*Table 5. Social Adjustment of Student Teachers based on their Age*

Variable	Sources of Variance	Sum of squares	Mean square	F value	Level of significance
Age	Between-group	269.33	134.66	0.70	Not Significant
	Within-group	39779.69	192.17		

Level of significance 0.05.

Table 5 shows that there is no significant difference in the social adjustment of student teachers based on their age.

**Hypothesis 4:** There will be no significant relationship between emotion regulation and social adjustment among student teachers.

*Table 6. Relationship between Emotional Regulation and Social Adjustment of the Student Teachers*

Variables	Mean	SD	R
Emotion Regulation	57.40	3.93	0.08
Social adjustment	63.61	10.73	

Table 6 shows that there is a strong positive relationship between emotion regulation and social adjustment among student-teachers.

## Results and Discussion

The findings of the present research reveal that the level of emotion regulation and social adjustment of student teachers is favorable, emotional regulation and social adjustment of student teachers don't differ based on their gender, educational

qualification, locality, type of institution, marital status, and age and there is a strong positive relationship between emotional regulation and social adjustment among student teachers. The present research findings substantiate the previous studies, and the results reveal that higher levels of emotion regulation are expected to be related to both high levels of social adjustment and the expression of socially appropriate emotions. A significant relationship between emotional, social, and educational adjustment and adjustment on the whole of higher secondary school students concerning academic achievement (Sekar & Lawrence, 2016, p. 29). The present study indicated that the levels of emotion regulation and social adjustment of student teachers are favorable but another research result revealed that the average level of social adjustment among B.Ed students of Don Bosco College of Education (Louis, 2018, p. 78).

The findings of the present study show that the student teachers' social adjustment doesn't change by locale and gender, which supports the previous study by area (locale) doesn't influence adjustment on the other hand it is in contradiction with a previous study in which B.Ed trainees' adjustment is found to be affected by gender and boys' B.Ed trainees have more adjustment than the girl B.Ed trainees (Limbachiya & Shukla, 2021, p. 11), male undergraduate students have higher social adjustment than female (Kaur & Sharma, 2022).

Similar studies revealed that a healthy relationship depends on one's ability to regulate emotions effectively and emotion regulation develops across the life span (Cole, 2014, p. 203), a person with an effective ability of emotion regulation has a healthy relationship with others. To produce a new generation that tolerates the timeless human values of truth, love, and universal brotherhood as well as care and concern for others, teachers have the enormous responsibility of helping their students successfully integrate into their sociocultural environments and develop into responsible, better citizens. These students must also be brave enough to face any challenges or problems that may arise in life with courage and confidence (Sattanathan & Antony, 2022, p. 1657). To achieve this student teachers, need to be an emotionally regulated and socially adjustable person.

### **Limitations and Venue for Future Research**

The study has fewer limitations that need to be addressed here, the study was confined only to the batch of student teachers from three teacher education colleges located in and around Karaikudi, Sivagangai district, Tamil Nadu, India, the study sample is confined only to student teachers and present study does not include strategies-based intervention programs in teacher training colleges. The significance of the present research findings lies in unfolding a greater understanding of emotion regulation and social adjustment and provides valid support for future research direction in the arena of teacher education. Future research could focus on firstly, intervention strategies and training programs to enhance emotion regulation and social adjustment among student teachers at the teacher-training college level. Secondly, future research to concentrate on various dimensions of emotion regulation and social

adjustment for extensive knowledge. Thirdly, it is essential to examine the relationship between emotion regulation and social adjustment among teachers, teacher educators, and school and college students.

### Conclusion

Emotion regulation and social adjustment is a contemporary behavioral study rising to precedence. Emotion regulation and social adjustment are the major psychological construct that differs in various situations based on the individual and nature of the stimuli. Emotion regulation and social adjustment of student teachers exist already to some extent. The present research study adds the findings in the field of educational research are that the level of emotion regulation and social adjustment of student-teachers is favorable, there exists a strong positive relationship between emotion regulation and social adjustment among student-teachers and there was no significant difference found in emotion regulation and social adjustment of student-teachers based on their gender, educational qualification, locale, type of institution, marital status, and age. The findings of the present study recommend that the teacher education program inculcates the importance of emotional regulation and social adjustment in different situations and needs to conduct various training and interventions to enhance emotion regulation and social adjustment among student teachers.

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## Fostering Reading Skills through Simplex Didactics and Music: Creation of an Inclusive Tool for Pupils with Dyslexia<sup>1</sup>

By Alessio Di Paolo\* & Emanuela Zappalà<sup>‡</sup>

During the last decades, prevalence of pupils with Specific Learning Disorder, and more specifically with Dyslexia, is on the increase in Italian schools. It requires both researchers and teachers to investigate, adapt and adopt simplex teaching strategies. that may foster pupils learning process at primary schools by taking account of their educational needs, their learning styles and preferences. According to these premises, the following article aims to create a teaching tool that may support the reading learning process of pupils with dyslexia, during the first years of primary schools, by adopting the simplex principle of detour and the educational potential of music.

*Keywords:* music, simplicity, specific learning disorders, inclusive education, reading skill

### Introduction

During the last decades, prevalence of pupils with Specific Learning Disorder (SLD), and more precisely with Dyslexia, is increased thanks to an awareness about the difficulties and implications on the teaching-learning process of basic skills (reading, writing, and calculating). In the 2018-2019 school year, the 4,9% of the total pupils attending Italian schools have a diagnosis of SLD and pupils with dyslexia represent 3,2% of the total number of pupils attending primary and secondary schools (MIUR, 2020 p.6). Moreover, SLD may be considered as an *umbrella term* (Cornoldi, 2007) because of a wide range of impairments that pupils with these disorders may show related to peculiar cognitive and learning processes, such as the inability to *pay attention* and select stimuli in a useful manner; to *focus* on a specific objective; to *memorize* and to effectively. Therefore, it seems important to reflect on how teachers may adapt their teachings to foster pupils' attention, their ability to select stimuli in a useful manner and to focus on a specific task, during the reading process, using compensatory tools that take up pupils' sensory preferences and their impairments. Inclusive teaching in classrooms with pupils with dyslexia and other SLD should consider these peculiarities and teachers should adapt their teaching process to promote pupils with dyslexia and other SLD learning.

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<sup>1</sup>The article is the result of a collaboration between the authors. However, Alessio Di Paolo wrote paragraphs “2. Promoting reading skills through music and simplex didactics” and “3. Method”; Emanuela Zappalà wrote paragraph “1. Introduction” and “4. Conclusions”.

This awareness requires both the teachers and researchers to select and adapt teaching strategies to address their educational needs, guarantee the right to education also by adopting specific compensatory tools and methods to foster reading skills of pupils with dyslexia and other SLD. In fact, in contrast with other daily life abilities, the reading one requires the use of specific teaching methodologies that consider the biology of pupils with dyslexia learning process, but also the influence of the educational environment. In this sense, consistent with several Italian studies of Didactics (Rossi, 2011; Rivoltella, 2012; Sibilio, 2013; Sibilio & Di Tore, 2014; Sibilio, 2015), it may be considered as a form of adaptation, also when the learning object is that of favouring reading competence (Di Tore et al., 2016), and it requires the teachers to find sophisticated and simplex solutions by using innate laws and tools to regulate their behaviour and teaching action (Aiello, Sharma, & Sibilio 2016; Sibilio 2013). Based on these premises, the theory of simplicity may be considered as

“a possible toolbox that provides a set of solutions which actors in an epistemically complex system such as education, manage to understand the system and accomplish important things from their own perspective. In other words, by taking cognisance of inner capacities and resources, teachers may feel more confident in dealing strategically with the emerging situations they are often faced with in inclusive classrooms” (Aiello, Pace, Sibilio, 2020, p. 3).

This framework may be *a passe-partout to face complexity* (Aiello, Pace, Sibilio, 2020) in inclusive classrooms attended by pupils with dyslexia, doing *detour* (Sibilio et al., 2017, p. 66), choosing non-linear and more complex solutions to make a problem simpler to resolve (Aiello, Pace, Sibilio, 2021) by selecting efficient strategies to support the pupils on developing reading skills:

- recognizing their learning preferences,
- respecting their needs and learning rhythm yet more efficient methods of assisting students in learning new information and skills.

Thus, it becomes clear that didactics should consider the principles that underlie adaptation and simplex didactics (Sibilio, 2013, p. 86) may be a proper theoretical framework to meet it. Sibilio (2015) sustains that:

“In this framework, teaching represents an activity able to find a common ground for interaction among the different *umwelten* of the actors involved in the process: ‘We should think about learning environments in terms of the students’ *umwelten*, because these contain the structures that students perceive and act towards. It is these *umwelten* that change as students interact with their peers, teachers, and material structures’. Hence, always within the field of didactics, simplicity could be defined as an adventure between the simple and the complex; a set of principles and rules which do not dissolve the complexity of their own object. More specifically, this means responding to the need of new interpretative schemes, new modalities of adaptation and problem-solving practices which have never been used [author trad.]” (p. 489).

Hence, the use of the theoretical framework of Simplex Didactics seems to be appropriate to develop a compensatory tool that may foster pupils reading skills

development: the *graphic-musical alphabet*. More specifically, its development follows the didactics principle of *detour* and the educational potential of music. In Didactics this principle may be viewed as an example of creative thinking that may provide teachers with a wide range of options, as it may support to identify educational strategies and various teaching methods that would benefit the learning process in a vicarious way (Sibilio, 2020; Sibilio, 2017; Zollo, Sibilio, 2016). In this sense, music may be a possible non-linear and creative trajectory not only for its enjoyable and engaging characteristics that may foster pupils' participation at the teaching-learning process. Furthermore, music also shows educational potential for the development of several skills, such as: social and communication skills (Chiappetta Cajola & Rizzo, 2016); reading (Darrow, 2008), writing (Morais et al., 2020) and spatial orientation skills (Rauscher et al., 1997; Aintila, 2020). For that reason, it seems appropriate on reflecting on a possible connection between the Simplex Didactics and the music, but also on creating a new tool that may be aligned with it and be tested to examine its effectiveness.

### **Promoting Reading Skills through Music and Simplex Didactics<sup>2</sup>**

Several studies showed how performing arts have a Didactic potential, especially in class attended by pupils with special educational needs (Derby, 2011; Sack et al. 2019; Hatzer et al. 2019). Music seems to be a useful tool to improve language and social skills since its structural characteristics are recognizable and easy to detect for its uniqueness (Adamek & Darrow, 2005). It may also be adopted in all classrooms to support social and communication skills development (Chiappetta Cajola & Rizzo, 2016), and to reduce emotional stress (Lucisano, Scoppola & Benvenuto, 2012) by proposing transdisciplinary and transversal activities. Furthermore, music may be considered as an educational mediator that may foster the acquisition of basic skills, such as reading (Darrow, 2008) and writing (Morais et al., 2020), as well as spatial orientation skills (Rauscher et al., 1997; Aintila, 2020). Music and language are both characterize by components that may equally compared because of the influence of frequency, *duration*, *intensity*, and *timbre* on the *morphological*, *phonological*, *semantic*, and *pragmatic level* (*language components*), and on *rhythm*, *melody*, and *harmony* (music constituents). For example, the practice of singing is used to foster accents assimilation and rhythm (*tactus*). Rhythm also represents a characteristic component of spoken language to improve both sound articulation and vocal emission (Andrenelli et al, 2018; Azewaka & Lagasse, 2018; Schellenberg, 2005). As pointed by Minsky (1982) and the group of Eskine (2020), a good sound emission leads to a greater understanding of the meaning of the word itself. These abilities are pivotal also when pupils are learning to read since phonological awareness is pivotal to foster expressive, verbal language abilities and text comprehension (Preis et al., 2016; Zumbansen & Tremblay, 2019; Baigina, 2019).

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<sup>2</sup>The following readings are recommended to go to deepen the topic of Simplexity and its relation to Didactics: Aiello (2013; 2018; 2021); Sibilio (2013; 2015; 2017; 2020).

Having awareness on these topics may be useful when considering difficulties that pupils with dyslexia may show while developing basics skills, such as reading, whose impairments are also related both to language and executive functions impairments (Di Tore, 2016; Di Tore et al., 2016). In fact, pupils with dyslexia may show difficulties on decoding some letters, recognizing words, reconstructing the overall phonetic representation of the word read and, eventually, accessing its semantic content, because of an impaired “serial processing [used] to convert each grapheme into the corresponding linguistic sound (syllable and phoneme) [author trad.]” (Franceschini, 2012, in Di Tore, 2016, p. 38). Additionally, children with dyslexia may also manifest impairments on the graphic sign discrimination and, consequently, a difficulty on associating a sound with it or on correctly reproduce the sound associated with a letter (Gosse & Van Reybroeck, 2020; Galliussi et al., 2020). Hence, it would be important to reflect on how music may be used to promote the teaching-learning process of pupils with dyslexia by using specific compensatory tools and design activities to improve reading skills (MIUR, 2011, p. 5).

Sharing the assumption that “reading is an ability that does not form part of the natural development of the individual but needs to be learnt; hence is considered as an adaptive strategy” (Berthoz, 2009, in Di Tore et al., 2016, p. 1), its development may be supported by using teaching approaches based on the principles of adaptation, as simplex Didactics does (Sibilio, 2013), taking into account the *educational potential* (Frauenfelder et al., 2004; Sibilio, 2013) of pupils with dyslexia. In fact, Simplexity improvement into the didactic field would be outlined as the assumption of an operational trajectory that attempts to combine elements such as *complexity, simplicity, theory, praxis*, through a synergy between *epistemology* and *pragmatics* (Sibilio, 2013, p. 79). According to this operational perspective, “Studies on didactic action are strictly connected to the concept of Simplexity, whose meaning refers to the intentional dimension of the act and that is considered as the minimum “simplified” unit of the didactic system) [author trad.]” (Sibilio, 2012, p. 11). The importance of simplifying action is threefold. Firstly, it aims to search for strategies for deciphering educational complexity; secondly, to search for ways through which intervene from a design perspective to deal with complexity; finally, through action, to intervene on complexity actively not to eliminate complexity itself, but rather to be able to manipulate it, to manage it concretely without attempts at exemplification, but rather through flexible adaptation actions. Furthermore, it also requires the teachers to be able to constantly *redesign* their action due to the constant changes occurring in the educational system, which may be considered as an unpredictable system where the emerging characteristics of the context appear to be strongly influenced by the *present* and *past* where they belong to (Sibilio, 2013, p. 86). Thus, the ability to design by adapting the practice to the environmental needs require the use of six properties (tools) and six principles (laws) that may orient teachers’ actions.

Simplex properties are:

- *specialisation and modularity*, which in didactics is understood as a function that allows the teacher to use only one communication channel in

a well-defined time module (hourly unit) to be able to act with his or her students;

- *speed*, which in didactics indicates the teacher's ability to respond in a timely manner to the continuous feedback received from students;
- *reliability*, which didactically implies the full correspondence between the objective to be achieved and the actual action that enables the teacher to do so;
- *flexibility, vicariance and adaptation to change*, which are essential to be able to select the right strategy from a repertoire of choices to resolve a problem, and perceive, capture, decide, or act depending on the context the system finds itself in.
- *memory*, as the characteristic on which present action relies to predict the future consequences of an action;
- *generalization*, the final property of complex adaptive systems, which refers to the competency of capitalising patterns of interactions, and transferring these from one context to another, even if they are not two completely analogous situations (Aiello et al., 2021, p. 7).

All these rules are fundamental in decision making, problem solving, creative thinking, coping with stress and emotions, initiative taking and the spirit of entrepreneurship.

With regards to the rules, they are:

- *inhibition and the principle of refusal*, which didactically implies the possibility for the teacher to follow didactic trajectories by resorting to some actions rather than others, respecting the characteristics of individual learners;
- *specialisation and selection*, which implies the possibility for the teacher to analyse, to examine each individual aspect of his or her learner, his or her perceptual bubble, finding useful operational strategies to create effective didactic proposals that respect the individual's individuality;
- *probabilistic anticipation*, which didactically envisages the possibility for the teacher to anticipate didactic actions based on previous experiences that allow the teacher to already understand the consequences of what is being carried out;
- *detour*, which didactically implies the possibility for the teacher to choose *non-linear* operational trajectories, capable of leaving room for creativity, novelty, experimentation with his or her students;
- *cooperation and redundancy*, which didactically implies the use of several coordinated systems in order to structure didactic actions;
- *meaning*, which in didactics corresponds to the law that establishes the link and the functionality between meaning and the act itself (Aiello et al., 2021, p. 7).

All simplex tools and rules may be adapted to both music and inclusive teaching but, in this investigation, we have chosen the *detour* defined by Berthoz (2009) as a system that organisms possess for *non-linear problem solving*.

Sometimes, simplification results precisely from detour in this non-linear domain. In didactics, this mechanism translates into the attempt to search for different ways of didactic transposition that offer the teachers a plurality of solutions to ensure greater control of the system (Sibilio, 2013). It means that the transmission of a given concept or the pathway for the acquisition of a skill may pass through a plurality of possible systems, and that they still allow the attainment of the set goal. Such solutions, although seem simple, are characterised by flexible paths that are open to change. It involves, for example, posing problems in different ways according to the cognitive styles of the learners, preparing complex teaching material to make the explanation simple in the teaching action, and realising branched teaching plans that allow, through flexible and differentiated learning paths, to marry the needs of each individual learner.

## Method

### Objective

The aim of this contribution is to design a teaching tool that may foster the reading learning process of pupils at risk of dyslexia during the first years of primary schools.

### Instrument

The graphic-musical alphabet is structured considering the theoretical framework of simplex didactic and, more particularly, of the principle of *detour* (Berthoz, 2009, p. 20; Sibilio, 2013, p. 89). In fact, the tool aims to offer multiple sensory stimuli to address the educational potential of pupils with dyslexia, their peculiar cognitive styles, and music, too. The combination of graphic sign with the auditory stimuli may support those who prefer learning through the auditory, visual stimuli, or the mix of both. To address this purpose the research group use *@Scratch.mit.edu*, which is an open-source web platform easily accessible and usable both by teachers and students, to create the tool. This choice is related to the awareness of technological power of mediate multiple stimuli simultaneously using multiple mediators thanks to its multimedia.







The design of the tool was articulated on three phases:

- bibliographic analysis with respect to Specific Learning Disorders, the methods of intervention already carried out, the relationship between music and Specific Learning Disorders and the advantages that music can have in the teaching-learning process.
- alphabetical design
- practical experimentation of the alphabet and analysis of the collected data.

The starting point for the work was the analysis of the letters of the alphabet. As each letter is generally composed of the union of straight and curved lines, the preliminary study focused, firstly, on the prevailing lines and their frequency of use

for the construction of each letter. About the area of straight lines, the straight line with downward orientation has a frequency of use of 15/43, while the straight line with right-hand orientation has a frequency of use of 13/43. Regarding the use of straight lines with oblique orientation, the straight line with top right orientation has a frequency of use of 5/43, the straight line with bottom right orientation of 9/43, the straight line with left orientation of 1/43. Shifting our attention to the curved lines, we note that the left-facing curved line has a frequency of use of 7/12, the right-facing line 4/12. The downward-facing curve has an orientation of 1/12, the curve starting at the top left and converging at the top right has a frequency of 1/12. Based on the frequency, musical notes were assigned within the diatonic musical scale and connected to generate major-type chords. In fact, the students are particularly inclined to listen to major rather than minor chords, collected according to triads, intervals of fourths and fifths. Specifically, the association made is as follows:

*Table 1.* Association between Lines Forming the Letters of the Alphabet and Musical Notes

Line	Associated note
	D
	G
	C
	E
	G#
	F#





letter with a melody. However, it seems that there are any tools that associate a note with each individual line that makes up the letter. At a later stage, studies were carried out on the actual possibility of being able to connect a note to each individual line of the letter, to form the triad. It emerged that students, even with dyslexia, tend to learn with the aid of musical triads, especially if these are major rather than minor (Proverbio, 2019). Based on this scientific evidence, an initial prototype was made, starting with those letters of the alphabet that consist of straight lines. This is because the Scratch system makes working on curved lines more time-consuming and difficult, as it consists of a Cartesian graph at its base, which therefore requires the input of precise coordinates to be able to generate the graphic sign.

Moreover, the alphabet is realised according to a *visual* and *auditory* system. In fact, a demo-pencil traces in three/four times each line used to make the letter of the alphabet, depending on the number of lines that make up the letter itself. As the pencil-demo traces each sign, it reproduces a musical note that, together with the other notes associated with the other signs, generates a chord. Once the pencil traced the entire letter and played the three notes separately, the system repeats the sound as a final chord, so that the triad can be memorised more easily. This way of functioning relay on the volunteer of the researcher to personalize the tool on the peculiarities of the pupil, to its individual cognitive styles, to avoid asking the pupil only to focus on visual stimuli using a *non-linear trajectory*, by also stimulating the auditory channel. In fact, as stressed by Gardner (1987), a student may have multiple intelligences, and the teachers should properly choose the most proper teaching strategies according to students' personal cognitive styles. In the case of graphic-music alphabet, the pupil will not only mechanise the graphic sign that, combined with other signs, gives life to the letter, but can also resort to memorising the note or the triad of musical chords linked to it. The paths traced to achieve the same objective are multiple within a single instrument, just as multiple are the ways of learning of different students within class groups.

Taking account about that, some Simplex principles, and properties of Berthoz' and Sibilio's framework were adopted to personalize the tool during its development. For example, the principle of *specialisation and modularity*, offered the opportunity to use specific buttons to choose between the use either the visual or the auditory channel to support the learning process of the letter. The principle of *inhibition* is promoted giving the pupil the chance to autonomously choose whether to memorise the letter using the graphic or musical stimulus and vice versa. The possibility of choice, of selecting one stimulus rather than another, is a symbol of greater autonomy and self-determination for the student who should use his/her metacognitive abilities to accomplish to this task. At last, it is also consistent with the principle of *meaning*, which implies that the action match to the learning goals, previously set by the teacher who propose the tool.

To date, the creation of the tool is still in progress. Right now, it only consists of letters made up of the union of straight lines. The making of the prototype letters, as mentioned above, are set up according to a demo-system in which a pencil encourages the pupil to learn the letters of the alphabet with music, inviting him to see how they can be made. The student can therefore watch how the pencil

makes the letter, while also listening to the chords connected to it. In a subsequent phase, the learner is expected to realise and recognise the letter independently with the support of the associated musical notes.

### Conclusions

In conclusion, the use of the alphabet may offer the opportunity to use *non-linear trajectories* to support the learning process of pupils with dyslexia respecting their peculiar cognitive styles and by foster their engagement. Actually, because of its multimedia characteristics and in line with the inclusive principle of full inclusion (Sibilio & Aiello, 2015; Aiello & Pace, 2020) this tool may be useful to foster learning of every pupil by respecting their peculiar learning style (Di Gennaro et al., 2018). In fact, the alphabet may promote the association of a letter to a specific sound, offer a second way to connect a graphic input and the sound thanks to a direct link of a specific sign with a musical chord. Moreover, through a specific auditory stimulation, resulting from listening to the chords linked to individual letters, pupils may improve letter comprehension, as the sound-letter interconnection becomes a phonological as well as auditory support element of auditory-graphic association, also useful to improve reading skills. However, to date, it is not possible to estimate the extent of the benefits for pupils with dyslexia. According to the literature review it could be an effective means of working with children with these impairments by considering their personal needs and individual learning styles. But further studies need to be done to test it. Although it has not yet been tested in practice, it intends to answer the following questions: “How is it possible to guide the pupil with dyslexia, during the Primary Education period, in order to enhance reading skills?”; “What tools can be used to implement educational action in this regard?”; “How can music be integrated with the virtual to improve this basic skill?” The hope is that such a tool will in some way be useful to intervene not only to support the student in memorising letters better by associating the relative musical triad with them, but also to reinforce the area of motivation, by proposing a technological tool that can generate interest in the student towards learning, integrating the technological medium with the musical.

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## Appreciative Inquiry for Inclusive Schools: Preliminary Results from a Scoping Review on Virtual Learning Environment (VLE)<sup>1</sup>

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Inclusion is widely recognized as one of the founding principles for the quality of educational institutions and it is strictly related to the ICF perspective. Actually, the conceptualization of educational needs is associated to the enhancement of everyone's strengths and potential, and to the influence the (physical and social) environment may have. For these reasons schools should pay attention on these factors and on what is positive to lead to transformative and generative processes that may promote inclusion. In this sense, a useful framework may be that of the Appreciative Inquiry as it is strength-based process through which people act in partnership to determine and co-create how to move an organization forward. Based on this premises, this contribution aims at exploring existing literature on the adoption of this strength-based approach in the inclusive educational field and presenting preliminary results of a Scoping review. The PRISMA-ScR checklist will be used to report the review and five databases and global search engines. As a final point, this preliminary investigation will pay special attention to the adoption of the Appreciative Inquiry to encourage full participation and learning process of students who use Virtual Learning Environment at school. Results show that only few studies adopt the AI in this specific educational field, but an interesting investigation propose the adaptation of the Appreciative Learning. Hence, more studies should be done to make clear how this process may support inclusive process.

*Keywords:* appreciative inquiry, inclusion, virtual learning environments, scoping review

### Introduction

In contemporary education, inclusion is a fundamental goal for establishing fair and high-quality learning experiences. It ensures that every student, regardless of their background or abilities, has access to education according to their individual needs. Inclusive practices are linked with positive academic and social outcomes for all students, not only those with special educational needs or disabilities (Booth & Ainscow 2014; Aiello & Pace, 2020; Stainback & Stainback, 1990; UN, 2015). These practices foster a sense of belonging, respect for diversity, and readiness for life.

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An approach that may support schools in addressing these purposes is Appreciative Inquiry (AI; Cooperrider, Whitney, & Stavros, 2008), a strength-based approach that involves stakeholders in a collaborative effort to promote meaningful organizational change. Originating in organizational and management sectors, AI has been applied in education, providing a new perspective on addressing the educational community's needs. This approach emphasizes recognizing and utilizing the positive aspects and successful strategies within an educational environment. By doing so, it aims to initiate transformative and developmental processes, which align with the goals of inclusive education. Furthermore, AI may enable educators and institutions to recognize and build upon each student's unique contributions and potential, ensuring accessible, engaging, and individualized education. Hence, by focusing on effective practices, AI can create a positive, collaborative, and innovative learning environment that adapts to the diverse needs of all students.

Moreover, with the increasing use of technology in educational settings, AI may be employed to develop and enhance learning environments that are both effective and inclusive. In fact, the technological component, particularly the integration of multimedia and the adaptation across various digital platforms, plays a critical role in this context. The incorporation of AI into Virtual Learning Environments (VLEs) is designed not only to improve the educational process but also to address both the diverse learning preferences and needs of students, and to foster greater engagement.

Based on these premises, the aim of this contribution is that of exploring the use of Appreciative Inquiry's (AI) strength-based approach in inclusive education, specifically in the setting of Virtual Learning Environments (VLEs). The study's goal is to look at how AI might be utilized to improve the learning process and encourage students to fully participate in VLEs at school, with a particular emphasis on providing preliminary results from a scoping review. This research is founded on the idea that AI, as a strength-based process, may significantly contribute to transformative and generative processes that promote inclusion in educational contexts.

### **Theoretical Framework**

To date, the principle of inclusive education, which firstly gained worldwide attention with the Declaration of Salamanca in 1994 (UNESCO, 1994), spreads the light to the importance of giving all students the possibility to learn together, wherever possible, regardless of any difficulties or differences they may have. Consistent with it, the Italian educational policy anticipated these initiatives, because it provided for a unitary education system aimed at overcoming the dual track system (special schools and ordinary schools) to enhance the differences since 1970 (Aiello, 2015). Working in a single-track system require inclusive teachers and educational community to change their perspective on people with disabilities and other special educational needs, to adapt the context to their potentials and considering that their needs may arise because of various factors



related to the individual, but also to the environment (social and physical). Therefore, it may be inferred that there is a strictly connection between this perspective and the way the International Classification of Functioning, Disability and Health (WHO, 2001). It is fundamental in inclusive educational context as explains disabilities by using bio-psychosocial model. More specifically, according to this paradigm, student with disabilities should not be labelled with their disease or disorder; whereas teachers and other professionals should consider how their full participation and learning process may be hindered (or not) by the context.

This hermeneutic approach bases its originality on a close link between personal factors and environmental one, in a holistic and systemic perspective, with the full enhancement of diversity, understood as values and resources. These considerations lead politics (UNESCO, 2005; UN, 2006) and researchers (Booth & Ainscow 2014, Aiello & Pace, 2020; Stainback & Stainback, 1990) to stress it and to point out that inclusion is a right of everyone, as everybody is entitled to a quality education, to actively participate to all the activities proposed within everyday life environments. To date, it has also become a crucial theme and objective of the Agenda 2030, specifically the 4th which invites to “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (UN, 2015).

Moreover, as stated by Booth and Ainscow (2014, p. 18):

The challenge posed by inclusion [...] implies not simply «making room» for differences - in the name of an abstract principle of tolerance of diversity - but rather affirming them, put them at the center of educational action as the generative nucleus of life processes.

Actually, these principles emphasize the need to guarantee everyone the right to equity and accessibility to effective and quality training, regardless of disadvantaged situation. But it also means that who want to act inclusion should develop everyone potential, not just focusing on their disabilities or difficulties and let them be physically part of the environment but letting them be main character of its learning process, too.

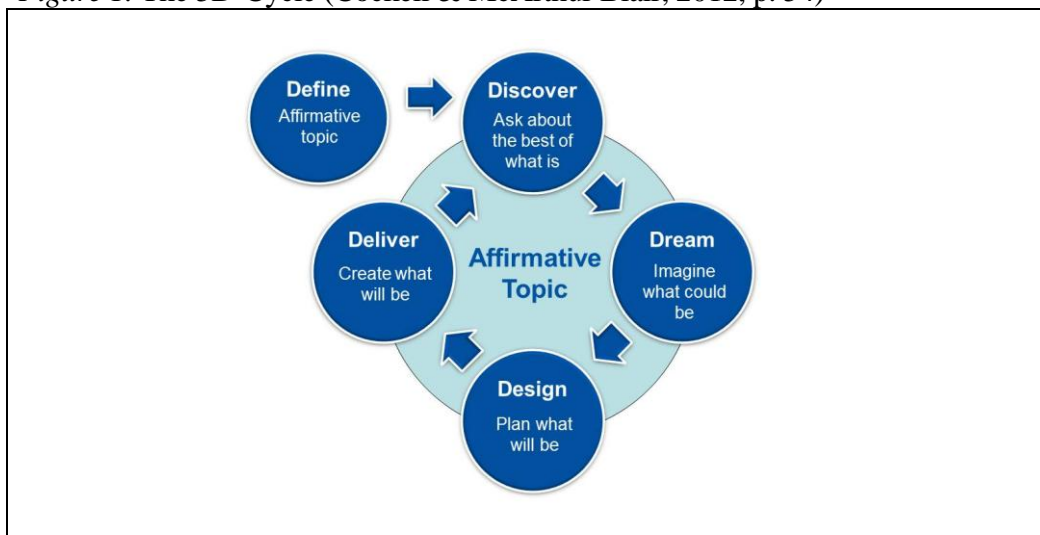
In this sense, schools *in primis* serve a pivotal role. It clearly emerges the need for teachers to plan and realize both well-structured and accessible learning environments (both in classrooms and within virtual environments) that suites peculiars and preferences of their students. Increasingly important is the idea that it is necessary to pursue forms of inclusive planning aimed at eliminating barriers to students' development and participation, as emphasized by the Universal Design for Learning (CAST, 2011; Hall, Meyer, & Rose, 2012). According to this approach, attention should be paid to the potential of new technologies too, because of their multimedia characteristics that may be useful to support every different learning style, but also for their accessibility, thanks to the extreme flexibility and plurality of languages (European Agency for the Development of Education for Disabled Pupils, 2013). In fact, the use of technologies within Virtual Learning Environment (VLE) would facilitate both social participation and learning process (Calvani & Vivianet, 2014; Hamburg & Bucksch, 2015) if the

teachers choose them by considering students' preferences, interests and opinion about it. In this regard, there is a rich national and international scientific literature on VLE (such as: augmented or virtual reality, serious game, edugame) that highlights the potential of these in offering educational opportunities, for instance to satisfy a variety of special educational needs, to develop several skills, to promote educational and social inclusion (Eow, Wan Zah, Rosnaini, & Roselan 2010; Astuti et al., 2021). Nonetheless is important to clarify that it may be possible only if the teachers are aware that a practice is effective, not only when it is adopted and implemented by properly trained teachers, but also when there is an active involvement of the students (Eow, Wan Zah, Rosnaini, & Roselan 2010).

Based on these premises, the Appreciative Inquiry (AI; Cooperrider, Whitney, & Stavros, 2008) may be considered a potentially useful approach, because it is based on the analysis of the strengths, of what is positive within an organization to design a project aimed at changing, transforming and improving its practices. Even if it origins in the organizational and managerial field (Cooperrider-Strivastva, 1987) it is even used within the educational field (Cooperrider & Whitney, 2005). This hermeneutic approach begins with the analysis of the strengths of an organization and then builds a project aimed at change and transformative and improvement processes. According to it, the issue should be "what is working" or "when the organization was at its finest", rather than starting with "what is wrong" (Cooperrider-Strivastva, 1987).

The adoption of the AI is guided through two different phases. The first is the theoretical one and it is characterized by four principles: Constructionist; Simultaneity; Poetic; Anticipatory; Positiv of a social and collaborative co-construction of learning. The second is the operational phase. Either the first or the second underline the nature of the investigation for transformative purposes and are based on a circular process, known as "4D cycle" as it originates from the name of the individual corresponding phases, later integrated with one more preliminary phase (Cockell, & McArthur Blair, 2012) that take rise to the 5D-Cycle:

Figure 1. The 5D-Cycle (Cockell & McArthur Blair, 2012, p. 54)



The AI approach actively involves participants to the investigation as they are asked questions in a positive and rational way searching for improvements. Because of that, it is often used to change something in people and their behavior by defining the problems to be solved. Moreover, according to Cooperrider and Whitney (2005) appreciative research practices focus on the past and present capacities of the subjects to create possible future (Cooperrider et al., 2008). Hence, it seems to be an interesting and useful method to employ, especially in relation to the construction of inclusion. According to it, it seems important to investigate if there are studies which have already explored the potential of AI to select and design VLE while adopting educational technologies to promote the teaching process-learning and inclusion of all students.

## **Methodology**

### **Objectives**

This review aimed to examine international research that made use of the AI to promote the teacher-learning process within VLE. At the same time, as reported in the theoretical framework, it aimed to investigate the opportunities arising from the adoption of this approach to improve the involvement of students who use digital artefacts, with the prospect of recognizing opportunities for promoting collaborative and inclusive processes.

### **Study Design**

Given the exploratory nature of the objectives, the preliminary investigation was conducted by adopting the methodology of the Scoping Review (Arksey & O'Malley, 2005; Ghirrotto, 2020; Heyvaert, Hannes, & Onghena, 2016). It consisted of a literature review aimed at detecting the state of the art in terms of breadth and depth of a phenomenon or a theme within a specific disciplinary field (Arksey & O'Malley, 2005; Ghirrotto, 2020; Heyvaert, Hannes, & Onghena, 2016). This review process is used to assess the degree of evidence that is available, classify it and identify any gaps to detect the state of the art in terms of extensiveness of a phenomenon or a theme within a specific disciplinary field.

The review was carried out following the PRISMA-ScR protocol (Tricco et al., 2018) with the purpose of mapping key concepts, types of evidence and gaps in the AI area, systematically researching, selecting and synthesizing what exists as suggested by Colquhoun et al. (2014). The review was conducted following five phases: searching, screening, data extraction and charting, analysis and synthesis. The study's content and technique qualify it as mixed-methods research since the methodology employs a Scoping Review process, which combines parts of qualitative and quantitative research. This method was chosen because it is suitable for researching a wide range of literature, providing for an in-depth understanding of the issue and detecting gaps in previous research.

### Search Strategy and Inclusion/Exclusion Criteria

The systematic search was carried out using five international databases and search engines which are the most representative for the topic: ACM Digital Library, Google Scholar, ScienceDirect, Worldcat. Moreover, the search was limited to studies published in English from 2000 and January 2022.

The key search terms were established iteratively as the reviewers became more acquainted with the topic. This search included the combination of: “Appreciative learning”, “virtual learning environment”, “videogames”, “student agency”, “educational technology”, “edugame”, “serious game”, “virtual environment”, “computer game”, “technology-enhanced learning”, “inclusion”, “student engagement”. The terms were combined using boolean operators “AND” and “OR”.

Moreover, to be included, studies should meet at least one of the following criteria:

- adoption of Appreciative Inquire to promote inclusion within *Virtual Learning Environment*;
- adoption of Appreciative Inquire related to the use of edugame to foster skills development;
- research design: empirical research conducted in group, single case, use of qualitative and/or quantitative methods.

At last, gray literature (proceedings, thesis, doctoral dissertations, ...), books, or studies published in other languages than Italian and English were not included for this preliminary research.

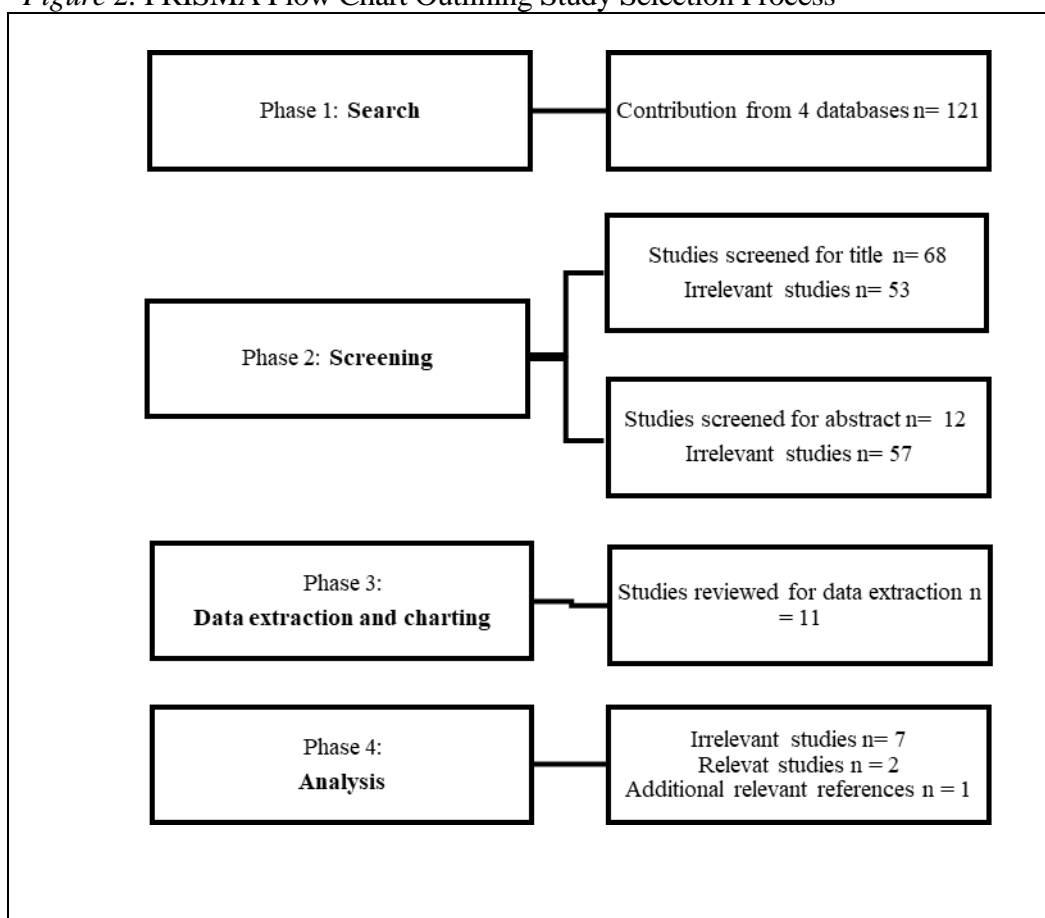
### Selection Process, Data Charting and Extraction

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Liberati et al., 2009) flowchart (Figure 1) was created to clearly indicate how the included studies were chosen.

The search led to 121 contributions, screened by the researchers employing the inclusion criteria. It supported to assess the eligibility of the selected and identified studies. Later, the articles were screened according to title and abstract data (Prahlahd, & van Wyk, 2020) and it led to select 12 relevant studies (Figure 2).

After that, full-text screening of all eligible articles, as Badger et al. (2000) pointed out, it was important to go further by reading the full text of the selected papers as abstract and title might not be representative. Then, a manual search was used to find studies that might not have been found in the primary searches (Hopewell et al., 2007). This required going over the reference lists from the screened studies.

Figure 2. PRISMA Flow Chart Outlining Study Selection Process



It led to the next phase: the data extraction of studies included (n. 11). This process was supported using a charting strategy based on the completion of a table (Table 1) where the researchers noted, for the relevant studies (n. 3):

- bibliographic information (author/s, year of publication)
- aims/purpose,
- study population and sample size (if applicable),
- methodology/methods,
- technology or VLE used (if applicable)
- key findings that relate to the scoping review question/s.

This charting procedure was useful to synthesize and interpret qualitative data cataloging and ordering the information in an analytical way according to key-themes (Arksey & O'Malley, 2005).

Table 1. Description of the Included Article

Bibliographic information	Aims/ purposes	Study population and sample size	Methodology/methods	Technology or VLE used	Key findings that relate to the scoping review question/s.
Haryanto, Harisa, & Gamayanto (2021).	Appreciative Learning (AL) is used to design immersive experiences of games. Actually, these usually consist of sensory, imaginary and challenge-based immersion.	Not applicable	Overview of the Game Reward Model and AL for Reward System to develop an edugame prototype on Entrepreneurship Education with Role Playing Game (RPG) Genre.	Educational game	The researchers developed immersive experiences that may be characterized as sensory, creative, or challenge based. Adopting the AL they prepared a questionnaire that was given both to teachers and students who played the game to evaluate their experiences.
Eow, Wan Zah, Rosnaini, & Roselan (2011).	The study investigates the combination of the Appreciative Learning (AL) approach and Computer Game Development in enhancing students' creativity, in terms of the products created.	36 students randomly chosen from two schools in Kuala Lumpur (the capital of Malaysia).	This study employs three phases and both an action research technique (Greenwood & Levin, 2007) and a control group experimental design. The first phase explores the impact of the Appreciative Learning approach and Computer Game Development on the creativity of student output. The second and the third phase extend the examination of the influence of AI methods on the creation of computer games.	Computer-based learning tools	In this action research study, the importance of computer game development and AL was underlined as an efficient combination for encouraging students to think and act creatively. Thanks to the combination of AL and computer game production, students in the treatment group were able to develop much better game frameworks, game content, and game polishing than students in the control group. This may be explained by the fact that therapy group participants had more developed creative perception and creative processes. According to statistical analysis, evaluators students found that the treatment group's computer games in Phase I offered more novelty, arousal, and centrality qualities than the control group did. Except for the arousal dimension during Phase III in this study, results showed statistically significant increases in mean scores on all dimensions as evaluated by student evaluators from phase to phase. When given the chance, students proved their ability to come up with appealing and original ideas. In conclusion, it was found that the AL approach and game development had the potential to give students opportunities to express themselves creatively via the games they create.
Eow & Baki (2010).	The contribution aims to look at a combination of technology, pedagogy, and creativity through computer games development and Appreciative Learning (AL) approach.	36 Malaysian students (13-14 years old). Sample strategy used: randomized subjects.	The rationale for employing control group experimental design derived from an effort to assess the efficacy of an AL technique employed in a computer game creation activity with the objective of developing students' creative perspectives. The overall Creative Perception Index (CPI) score, WKOP (What kind of person are you?), and SAM (Something About Myself) score were computed using a modified Kolmogorov-Smirnov statistical test for normality.	Computer-based learning tools	Students in the AL approach group (treatment) exhibited a significantly higher Creativity Perception Index as compared to the control group. The facilitator's learning environment, which placed an emphasis on supportive, helpful and unrestricted directed autonomy for students to grow with more self-fulfillment, may be responsible for the treatment group's significantly higher score. Further studies might evaluate a wider range by setting the proportion of male and female participants to be even before the trial begins. Second, the study was rather condensed (4 weeks or 16 hours of interaction). The arrangement should be longitudinal.

## Results and Discussion

The analysis showed that the most cited author was Barrett (1995) who explained that an appreciative approach may foster several specific skills, all linked to the dimension of the positive, generativity and collaboration between members of an organization, while using action-research methodology. Moreover, Drew et al. (2014) emphasized the coherence of AI to the principles of positive psychology, (Seligman, 1996) of leadership and complex systems theory, too. According to the objectives of this contribution three main themes were identified: *Conceptualization and Appreciative inquiry framework; Appreciative inquiry, technologies and VLE; Appreciative inquiry inclusion and education.*

### Conceptualization and Appreciative Inquiry Framework

Eow, Zah, Rosnaini, and Roselan (2011) analyzed the potential of AI in the educational field. More specifically, they explained how its phases may be adopted to promote the learning process. In fact, the relevance of this study depended on the opportunity to *recalibrate* the learning approach, enhancing students' potential and motivations, putting them at the center of their training process by adopting the AI as a new pedagogical alternative.

According to Eow, Wan Zah, Rosnaini, and Roselan (2011) it may be possible to implement the 4D cycle to promote greater flexibility to face the technological advancement. Moreover, they decided to add three more theoretical principles, taking account to further research on this topic (Preskill & Catsambas, 2006), which are the:

- *Wholeness Principle,*
- *Enactment Principle,*
- *Free Choice Principle.*

The last one was considered by the authors as the most useful and suitable within Asian educational context, where there are specific conventional methods to teach and learn that sometimes give rise to disciplinary problems.

Appreciative learning approach proposed by the authors as a new pedagogical option for educational setting is based on AI. There are a number of applications of this approach in the educational field (Morsillo & Fisher, 2007; McAdam & Mirza, 2009; Yballe & O'Connor, 2000; Filleul & Rowland, 2006). Empirical evidence therefore demonstrates how appreciative inquiry is applied to the school world involves both an increase in knowledge and a changing behaviors and attitudes. Indeed, the appreciative inquiry can provide an alternative paradigm for creating teaching experiences generative and positive. In this way the didactic action is constantly redefined by the teacher and yes responds to the needs of the individual by making him a participant and involved. The students feel part of a project designed by them and for them.

### **Appreciative Inquiry, Technologies and VLE**

Interesting results were about the adoption of the AI in combination with videogames with the aim of promoting: learning process and participation. Above all, Haryanto's research group (Haryanto, Ardiawan & Gamayanto, 2021; Haryanto, Rosyidah, & Kardianawati, 2019) used the AI framework to implement role-playing videogames with educational purposes. Their research projects aimed to foster learning, while using serious games and adopting the AL. This peculiar framework was actually used to design immersive experiences using all the four phases of the 4D model to let the players practice sensory, imaginary, and challenge-based experiences that supported them on focusing on positive elements, such as achievements and opportunities. The authors found out that the appreciative approach showed its effectiveness in modeling and categorizing reward behavior.

Likewise, Eow, Wan Zah, Rosnaini, and Roselan (2011) investigated how to improve students' creativity by implementing the appreciative learning approach. Its 4D cycle was employed as a pedagogical strategy to improve the students' perception of their creativity. The sample was composed of 69 Malaysian students, between 13 and 14 years of age, which was divided into two groups. With the treatment group the Appreciation-Based Learning (AI) approach was used, whereas a self-learning approach was applied with the control group. Results showed that the students of the treatment group achieved a mean score of 71.82, which was significantly higher at a significance level of 0.05 than the mean score of 50.49 exhibited by the control group. According to the authors, the stages of the appreciative learning approach may have encouraged students in self-awareness and freedom of self-expression.

Later, the scholars (Eow, Wan Zah, Rosnaini, & Roselan 2011) conducted another study with the aim to investigate the combination of the appreciative learning approach and the development of computer games to foster creativity skills development. The sample consisted of 36 pupils from two Malaysian schools, with some similar characteristics in terms of age, gender, computer proficiency, years of experience playing computer games, time spent a week playing virtual games and creative perception. Compared to the previous study, the steps of the 4Ds were modified with the intention of leaving students freer to express the awareness of their own actions in an autonomous and personal way. Alternative tools to support group discussion of 10 minute, such as the logbook, were used to preserve privacy and accommodate students with greater intrapersonal reflection skills. During the phase three of the 4D cycle, it was preferred to replace the discussion time to encourage collaboration through small group work. In general, the effectiveness of the AL was proved when the students were asked to highlight the positive aspects.

### **Appreciative Inquiry Inclusion and Education**

At last, two studies conducted by Ronald Calabrese (2006, 2008) were considered relevant to the purpose of this investigation. The first one was cited into



Eow, Wan Zah, Rosnaini, and Roselan (2011) contribution because the researchers employed the AI to investigate how much social inclusion may be encouraged while adopting the *Circle of Friends Program* (COFP) for students with disabilities. The COFP (2006) is an initiative aimed to improve social inclusion through a mentoring program that involve young people with disabilities and peers. The study involved six schools, four school districts in the Midwestern state, ten school sponsors, eight mentors and friends as well as parents of children served by COFP. The results of this study showed an improvement of social inclusion of students with disabilities. Furthermore, parents felt more integrated and less isolated, and it supported change process. Finally, the last study of Calabrese (2006) envisaged the application of the AI in relation to the relationship between school and university in American contexts. This research aimed to explore the ecology of collaboration between schools and universities through an appreciative inquiry-theoretical perspective, to demonstrate how it increases social capital in school and university partnerships. Results highlighted that the application of appreciation inquiry as a theoretical perspective improved public school-university relationships and promoted sustainable partnerships as it reduced focuses on issues and ab attention to on human potentials.

### Conclusion

The scoping review's findings indicate that despite its limited current usage in this educational sector, Appreciative Inquiry's employment in Virtual Learning Environments shows promise for boosting student involvement and creativity. This is particularly apparent when AI is merged with educational technologies like serious games and immersive experiences, which have proven effective in advancing learning and inclusivity. However, as the research is still in its emerging stages, there is a call for more exhaustive investigations to thoroughly understand AI's impact on enhancing inclusive education and in VLEs, with a special focus on expanding this research within European contexts.

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## Nursing Students' Perceptions about Perinatal Mental Health Issues

By *Fatbardha Osmanaga\** & *Kilda Gusha<sup>‡</sup>*

The mental health of women in the perinatal period is the focus of attention around the world. Many studies emphasize the problems that women experience during pregnancy or after childbirth, also focusing on mental health problems. In this context, the attention towards the woman, both during pregnancy and after birth, should be very great, especially from the health professionals. The paper aims to explore the perception of students enrolled in the professional master's study program in Health Psychology at "Luigi Gurakuqi" University, Shkodër, Albania regarding their knowledge of perinatal mental health problems, and their ability to identify and managing these problems. Nursing students have high levels of awareness related to perinatal mental health issues. Their perceptions of their knowledge regarding perinatal mental health issues, as well as their confidence in identifying and in managing them, is positive. Students believe that they have the appropriate skills to assess and care for women with mental health problems, both during pregnancy and after, but, also, they need further training to improve their skills. It is necessary to carry out more extensive studies on this topic in our country to shed light on the Albanian reality. Also, it is necessary to revise the curricula, especially in general nursing education program, and to provide training for nurses on the problems of perinatal mental health issues.

*Keywords:* perinatal mental health, awareness issues, curricula revision

### Introduction

The perinatal period, including pregnancy through childbirth and the first year postpartum, is a time of high vulnerability for mental health (Bottemanne et al., 2022).

Many women experience changes in their mental health during pregnancy and during the year after the birth. 1 in 5 women will experience a mental health condition during pregnancy or in the year after the birth (WHO, 2022).

Worldwide about 10% of pregnant women and 13% of women who have just given birth experience a mental disorder, primarily depression. In developing countries this is even higher, i.e., 15.6% during pregnancy and 19.8% after child birth. In severe cases mothers' suffering might be so severe that they may even commit suicide (WHO, 2024).

High-quality perinatal mental health care ideally results in earlier detection of mental health problems, improved parent-child interaction, optimal treatment of

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perinatal mental illness and fewer hospital admissions, and also has clear economic benefits (HTA, 2022).

As Howard and Khalifeh (2020) cited, there is a large evidence base on associations between perinatal mental disorders and childhood adverse mental health outcomes, particularly for perinatal depression and antenatal alcohol misuse.

Therefore, it is very important that mental health problems during the perinatal period to be managed properly and accurately. The perinatal health professionals as well as nurses have a great role.

Nursing is both an art and a science. It requires the understanding and the application in practice of specific nursing knowledge and skills, which, wherever possible, are research- and/or evidence-based. It draws on knowledge and techniques derived from the humanities, from the physical, biological and behavioural sciences, from management and leadership theories and from theories of education (WHO, 2001).

All women and newborns have a right to a quality of care that enables a positive childbirth experience that includes respect and dignity, a companion of choice, clear communication by maternity staff, pain relief strategies, mobility in labour and birth position of choice. Midwives are essential to the provision of quality of care, in all settings, globally (WHO, 2024).

Considering the literature data, the role of nurses caring for pregnant women holds special importance. Naturally, questions arise: Are our nurses prepared for this specialized care? How much do they know about mental health problems?

Strengthening midwifery education to international standards is a key step to improving quality of care and reducing maternal and newborn mortality and morbidity (WHO, 2024).

### **Theoretical Approach**

Maternity and pregnancy involve significant biopsychosocial changes in the lives of women (Adalia et al., 2021).

During the perinatal period, women experience changes in body, selfimage, expectations and relationships. They are also faced with new challenges and responsibilities. It is a major life transition, which can be stressful and make mothers very vulnerable to mental illness. This is why pregnancy and childbirth can be very difficult times for women (Flisher, 2013).

Between 15% and 25% of women have a mental health problem during the perinatal period (Coates & Foureur, 2019). Depression is the most common psychiatric disorder associated with pregnancy. Pregnant women may also suffer from anxiety disorders, such as panic disorder, obsessive-compulsive disorder, and eating disorders (Carter & Kostaras, 2005).

Mental disorders in the perinatal period have some important specificities. The knowing process can be more complex due to the masking of symptoms, linked to the mother's difficulty in expressing moods of discomfort and emotional suffering for fear of stigma; relapses involve not only the woman but also the fetus/child, the partner and the family context. The impact of the disorder may require more urgent

intervention due to the potential effect on the fetus/child, on the physical health of the woman or on her ability to cope with family care functions (Guidomei et al., 2019).

As Martin, Jomeen, and Jarrett (2017) cited “PMHP are demonstrated to have a significant impact on women’s well-being, long-term mental health, obstetric outcomes, partner, and quality of family relationships. It might also affect fetal health and child development in the short and long term”.

High levels of childbirth fear impact birth preparation, obstetric outcomes and emotional wellbeing for around one in five women living in developed countries. Higher rates of obstetric intervention and caesarean section (CS) are experienced in fearful women (Fenwick et al., 2015).

If a mother is stressed while she is pregnant she may well be stressed postnatally and this could affect her parenting.

Good evidence shows that the emotional state of the mother during pregnancy, as well as in the postnatal period, can have long-term effects on her child, especially on neurodevelopmental outcomes (Glover, 2014).

Striebich, Mattern, and Ayerle (2018) arguments that in recent years the focus of research has increasingly been the analysis of midwifery care for women with high or severe FOC, initially in Scandinavian countries and concluded that midwife-led counselling for FOC is routinely offered in obstetric clinics in Sweden, but standards are lacking.

Pariante (2023) pointed out that women who suffer from a mental disorder, even if preceding pregnancy, have difficulties in the interaction with their infant in the first year of life, which then continues to be present 7-9 years later

The impact of maternal mental health problems goes further. The symptoms may lead to poor bonding with the baby and difficulties with breastfeeding (which can itself lead to distress, anxiety and low mood). Maternal depression can have far reaching consequences on the development of the baby, with problems extending into childhood and adolescence. Research has shown potential impacts on cognitive development, including language development, conduct and school performance (Chew-Graham, 2018).

Decades of epidemiological, clinical translational, and preclinical animal research have converged, demonstrating that maternal prenatal distress affects fetal brain-behavior development and influences children’s neurobehavioral trajectory, often increasing their risk for psychopathology (Monk, Lugo-Candelas, & Trumppf, 2019).

Rondung, Thomtén, and Sundin (2016, pp. 84-85), based on several studies, have mentioned these physiological manifestations of childbirth fear: *sleep disturbances, tachycardia, tenseness, restlessness and nervousness, nightmares and stomach pains*. However, the potential role of these symptoms or experiences in the development and maintenance of fear has not been established. Among the cognitive aspects they singled out the ideas about cognitive beliefs and expectations relating to pregnancy and childbirth. These authors, too, examining the reported objects of fear in pregnant women, found information about two cognitive concepts, self-efficacy and pain catastrophizing and they obtained data from a study that identifies the lower sense of coherence as direct cause of childbirth fear.

Giving birth physiologically is an intense and transformative psychological experience that generates a sense of empowerment. The benefits of this process can be maximised through physical, emotional and social support for women, enhancing their belief in their ability to birth and not disturbing physiology unless it is necessary. Healthcare professionals need to take cognisance of the empowering effects of the psychological experience of physiological childbirth (Olza et al., 2018).

Midwives are integral to the success of maternal mental health assessment and screening during pregnancy due to their pivotal role in antenatal care (Mellor et al., 2019).

## **Materials and Methods**

### **The Purpose of the Paper**

The paper aims to explore the perception of students enrolled in the professional master's study program in Health Psychology at "Luigj Gurakuqi" University, Shkodër, Albania regarding perinatal mental health problems.

### **Objectives**

1. Obtaining students' opinions (future nurses) on their level of knowledge concerning perinatal mental health problems.
2. Obtaining students' opinions (future nurses) concerning their ability to identify these problems.
3. Obtaining students' opinions (future nurses) regarding their ability to manage perinatal mental health problems.
4. Exploring the relationship between students' perception and their age.
5. Exploring the relationship between students' perception and their bachelor study program.
6. Exploring the relationship between the perception of students and their residence.

### **Various Studies**

Numerous comparable studies have been conducted and a selection of them will be highlighted.

13 obstetric staff at a tertiary maternal hospital in Shenzhen in China, including two obstetricians, three midwives, and eight nurses participated at the study made by Xiao et al. (2023). The authors concluded that medical staff lacked sufficient knowledge and skills in perinatal psychological health and were not well prepared for the task of screening pregnant women for mental health disorders. The medical staff who were interviewed shared their skills in identifying women with mental health disorders. They would observe their behaviors and facial expressions. By communicating with the women, their intuition would tell them the ones they should



pay attention to. Medical staff suggested that medical institutions systematically train medical staff about pregnancy psychology, to improve their understanding of pregnancy psychology.

Hammond (2020) explored midwives' perspectives on perinatal mental health screening during pregnancy in maternity facilities in the Cape Metropole in South Africa. The findings reflected that midwives were able to identify women at risk of perinatal mental illnesses based on their experience and intuition. The midwives furthermore acknowledged the need for routine perinatal mental health screening. However, the participants felt that they lacked the relevant competencies to screen and counsel women. Numerous barriers which may compromise routine perinatal mental health screening efforts were identified in the study. As primary caregivers, midwives should receive ongoing training and clinical supervision in view of perinatal mental health screening.

Mellor et al. (2019) made a study with the participation of 27 Lead Maternity Care (LMC) midwives that worked in a variety of settings in the Auckland region in New Zealand. They concluded that the midwives acknowledged their pivotal role in the assessment of maternal mental health in the antenatal period. When having to plug the gap between women's maternal mental health needs and available services, many of the midwives felt ill-prepared to provide appropriate care.

The studies made by Noonan, Jomeen, Galvin, and Doody (2018), and Noonan, Galvin, Jomeen, and Owen (2019) resulted that the Irish public health nurses reported good levels of knowledge and confidence in recognising women experiencing stress, anxiety and depression. They indicated less confidence in caring for women (43.9%). Midwives desire education on the spectrum of perinatal mental health problems.

The results of the study made by Higgins et al. (2017) in Ireland indicated that midwives and primary care nurses encounter many organisational and practitioner related barriers that negatively impact on their ability to incorporate mental health care into their practice. Organisational barriers included lack of perinatal mental health services, absence of care pathways, heavy workload, lack of time, lack of privacy and not seeing women regularly enough to build a relationship. Practitioner related barriers included lack of knowledge on perinatal mental health and cultural issues; lack of skill, in particular, skills to respond to a disclosure of a mental health issue; and fears of causing women offense and distress. Findings also indicated that the context of care and education influenced the degree to which participants perceived certain items as barriers.

According to the study made by McGookin et al. (2017) they conclude that "Although a small study, the results highlight the need for education to be improved in order to best prepare student midwives for cases of ANA (antenatal anxiety), with emphasis on integrating psychology and mental health information into teaching as well as time spent in clinical practice. Midwives are key in the screening of women for ANA and are in an ideal position to signpost for specialist care".

Carroll and her colleagues made a similar study in 2016 with a sample of 438 midwives in the Republic of Ireland. The findings of this study were "The majority of midwives cared for women with perinatal mental health problems in their clinical practice; however, beyond depression and anxiety, their knowledge of perinatal

mental health problems was quite limited. Similarly, midwives reported a lack of skill in opening a discussion with women on sensitive issues, such as sexual abuse, intimate partner violence and psychosis, and providing information to women's partners/families. The findings indicated that midwives adopted a selective approach to screening for perinatal mental health problems, with a tendency not to inquire about sensitive topics, or address them only with women deemed at-risk”.

According to the study made by Hauck et al. (2015) made with 238 midwives employed in the only public tertiary maternity hospital in Western Australia from March to June 2013, Midwives accept it is their role to assess the mental health status of women but many feel ill-equipped to do so and express a strong desire for further knowledge and skills across a range of perinatal mental health topics.

Jarrett (2014) made a study with students of Bachelor of Science (BSc) in Midwifery programme in the UK. Most students reported being confident in asking women questions about their mental health and they reported feeling comfortable in defining a wide range of serious perinatal mental health problems that affect women.

McCauley, Elsom, Muir-Cochrane, and Lyneham (2011) made a study with the midwives in Australia, in which, among other findings, they found that “The majority of midwives (93%) surveyed in this study indicated they could be better prepared to provide mental health intervention for women. Their comments regarding this reflected a strong opinion about the need to improve their own, and other midwives', skills and knowledge regarding identification of mental health and illness in antenatal and postnatal women, and in specific care provision and mental health interventions.

### **The Method Used**

This study is quantitative research. It is based on the survey method. The researchers employed a descriptive approach. As Stockemer (2019) argues, quantitative methods not only allow us to numerically describe phenomena, but they also help us determine relationships between two or more variables.

Two questionnaires were distributed to the students participating in the study. The first is the Perinatal Mental Health Awareness (PMHA) scale.

The PMHA scale items were developed by an expert panel for initial use in a study exploring knowledge and confidence of health visitors about PMH. Its purpose was to represent, with brevity, key attributes of awareness related to perinatal mental health issues. The key attributes ascribed were (i) knowledge, (ii) confidence in identification and (iii) confidence in the management of more common PMH presentations such as stress, anxiety and depression (SAD), with one question per attribute scored on a 0-3 Likert scale, where a greater score endorsement indicated greater awareness (Martin, Jomeen, & Jarrett, 2017).

It was considered necessary to develop a second questionnaire, in order to obtain additional information regarding the opinion of the students about the quality of their university education in terms of recognizing and managing mental health problems of pregnant women. The second questionnaire was designed based on the study made by Jones (2009, pp. 216-217).

## Sampling

The population of the study comprises all the students of the professional master's study program in Health Psychology. This study program is offered to students who have successfully completed the first cycle of study in Nursing, specifically: a) general nursing; b) midwifery; c) physiotherapy. These three bachelor programs are offered at "Luigj Gurakuqi" University, Shkodër, Albania. The master's study program in Health Psychology has 60 ECTS and lasts 1 academic year.

Out of a total of 67 students, 46 participated in the study, resulting in a representation rate of approximately 67.6%. The criterion for the inclusion of students in the study was that they were students of the professional master's degree in health psychology. The students were free to participate in the study, and they were informed in advance about the purpose of the study and about the fact that the questionnaires are anonymous.

4 students (8.7%) are male, while 42 (91.3%) are female. The age of the participants in the study varies from 21 years (10 students or 21.7%) to 55 years (1 student or 2.2%). The average age of the participants in the study is 23.8 years. 24 (52.2%) participating students live in the city, while 22 students (47.8%) live in the village. 19 students (41.3% of the participants in the study) have completed their bachelor's studies in General Nursing, 18 students (39.1%) have completed the bachelor's degree in Midwifery, while 1 student (2.2%) has completed the bachelor's degree in Physiotherapy, 8 female students (17.4%) did not say which study program of the first cycle they finished, that is, they did not specify if they have bachelor degree in General Nursing, Physiotherapy or in Midwifery.

## Statistics

The questionnaires were administered in March 2022, during the second semester. The month of March was chosen, because this period coincides with the completion of studies in the auditorium for students, after which they begin their teaching practice in institutions. Currently, students have mastered the theoretical concepts throughout classroom instruction and can provide accurate opinions regarding their understanding and knowledge of mental health problems.

The data obtained from the questionnaire were analyzed with Statistical Package for the Social Sciences (SPSS), version 20.0. The data analysis has included descriptive and inferential statistics. The analysis of data, including relative and absolute frequencies, as well as measures such as mean, median, mode, standard deviation was employed to assess students' overall perception of perinatal mental health issues, their level of knowledge, and their confidence in identifying and managing of more common PMH presentations.

The piloting phase was carried out by professionals in the field of psychology. Three focus groups were conducted with students to gather their feedback on the translation of the items of the PMHA scale into Albanian. No problems were found in the translation process. The Cronbach's alpha is 0.733 for the PMHA scale.

It was used analysis of variance (ANOVA) to examine the relationship between students' residence and their general perception about the perinatal mental health issues, between students' residence and their perceptions regarding their level of knowledge, regarding their confidence in identification and their confidence in management of the perinatal mental health problems.

Analysis of variance (ANOVA) was used to examine the relationship between students' bachelor study program and their general perception of perinatal mental health issues, their level of knowledge, as well as regarding their confidence in identification and management of perinatal mental health problems.

The study employed correlation analysis to explore how students' age relates to their perceptions across various dimensions of perinatal mental health issues, including their overall understanding of the issues, perceived knowledge levels, and confidence in both identifying and managing perinatal mental health challenges.

The dependent variable is *students' perception* and the independent variables are: *students' residence*, *students' bachelor study program* and *students' age*.

## Results

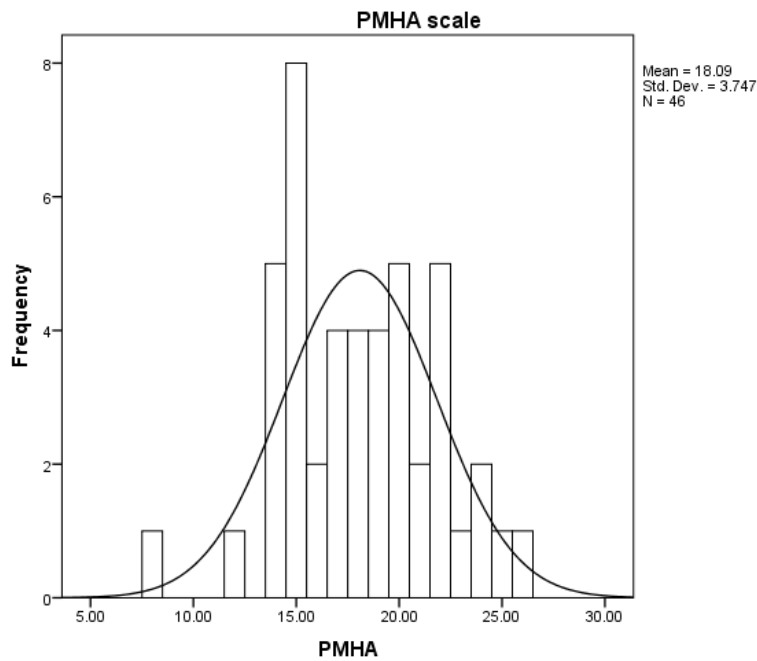
### Data Related to the Perinatal Mental Health Awareness (PMHA) Scale

Table 1. Data Related to the Perinatal Mental Health Awareness (PMHA) Scale

Scale	N	Minimum	Maximum	Mean	Mode	Std. Deviation
PMHA	46	8	26	18.08	15	3.74656
Knowledge	46	2.00	9.00	6.43	6	1.34416
Confidence in identification	46	3.00	9.00	5.93	6	1.55495
Confidence in the management of more common PMH presentations	46	3.00	9.00	5.7174	6	1.40891

The PMHA Scale comprised three sub-sections: a) Knowledge subscale; b) Confidence in identification subscale and c) Confidence in the management of more common PMH presentations. Each subscale contains three items. The items on the PMHA Scale are scored on a 0-3 Likert scale, where a higher score indicates greater awareness. As shown in Table 1 and Graph 1, the values for general perception range from 8 to 26, with a mean of 18.08 and a mode of 15. From these results, it can be concluded that students' perception of their knowledge regarding perinatal mental health issues is positive.

Graph 1. Data Related to the PMHA Scale



According to Table 1, students' perception of their knowledge about perinatal mental health issues ranges from 2 to 9, with a mean of 6.43 and a mode of 6. Overall, nursing students' perception of their knowledge in this area can be considered positive.

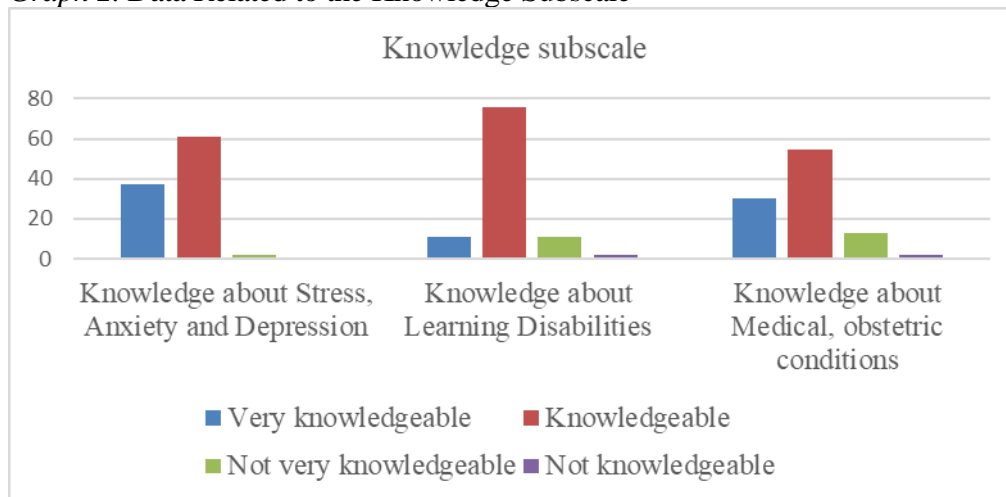
In terms of their confidence in identifying perinatal mental health issues, the values range from 3 to 9, with a mean of 5.93 and a mode of 6. Overall, Nursing students' perception of their confidence in identifying these issues can be considered positive. Similarly, regarding their confidence in managing more common perinatal mental health presentations, the values range from 3 to 9, with a mean of 5.71 and a mode of 6. Therefore, the perception of Nursing students regarding their confidence in managing these presentations is also positive.

### Knowledge Subscale

Table 2. Data Related to the Knowledge Subscale

Knowledge subscale	N	Minimum	Maximum	Mean	Mode	Std. Deviation
Knowledge about Stress, Anxiety and Depression	46	1	3	2	2	0.52
Knowledge about Learning Disabilities	46	0	3	2	2	0.55
Knowledge about Medical, obstetric conditions	46	0	3	2	2	0.71

Graph 2. Data Related to the Knowledge Subscale



The mean and the mode is 2 for each item of the Knowledge subscale (Table 2). Regarding their knowledge about Stress, Anxiety and Depression, most of the students affirm that they are Knowledgeable (60.8%), 37% affirm that they are Very knowledgeable and 2.2% affirm that are Not very knowledgeable.

Regarding their knowledge about Learning Disabilities, most of the students affirm that they are Knowledgeable (76%), 10.9% affirm that they are Very knowledgeable, a small part (10.9%) affirms that is Not very knowledgeable and 2.2% affirms that is Not knowledgeable.

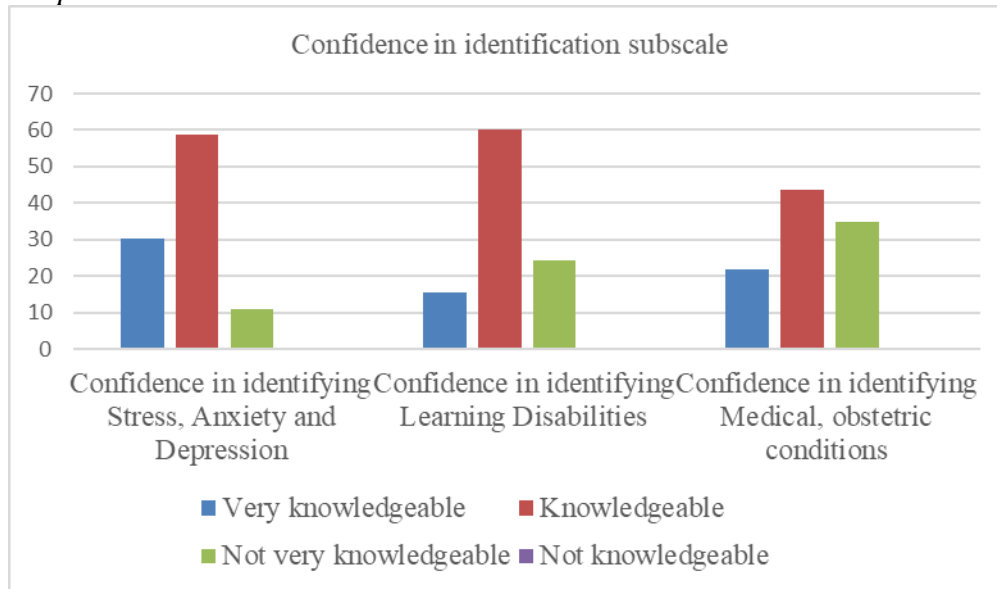
Regarding their knowledge about Medical, obstetric conditions, most of the students affirm that they are Knowledgeable (54.4%), 30.4% affirm that are Very knowledgeable, a small part (13%) affirms that is Not very Knowledgeable and 2.2% affirms that is Not knowledgeable (Graph 2).

### Confidence in Identification Subscale

Table 3. Data Related to the Confidence in Identification Subscale

	N	Missing	Minimum	Maximum	Mean	Mode	Std. Deviation
Confidence in identifying Stress, Anxiety and Depression	46	-	1	3	2	2	0.61
Confidence in identifying Learning Disabilities	45	1	1	3	2	2	0.63
Confidence in identifying Medical, obstetric conditions	46	-	1	3	2	2	0.74

Graph 3. Data Related to the Confidence in Identification Subscale



The mean and the mode are 2 for each item of the Confidence in Identification subscale (Table 3). Regarding their confidence in identifying Stress, Anxiety and Depression, most of the students affirm that they are Knowledgeable (58.7%), 30.4% affirm that they are Very knowledgeable and 10.9% affirm that are Not very knowledgeable.

Regarding their confidence in identifying Learning Disabilities, most of the students affirm that they are Knowledgeable (60%), 15.6% affirm that they are Very knowledgeable and 24.4% affirm that they are Not very knowledgeable.

Regarding their confidence in identifying Medical, obstetric conditions, 43.5% affirm that they are Knowledgeable, 21.7% affirm that they are Very knowledgeable and 34.8% affirm that they are Not very knowledgeable (Graph 3).

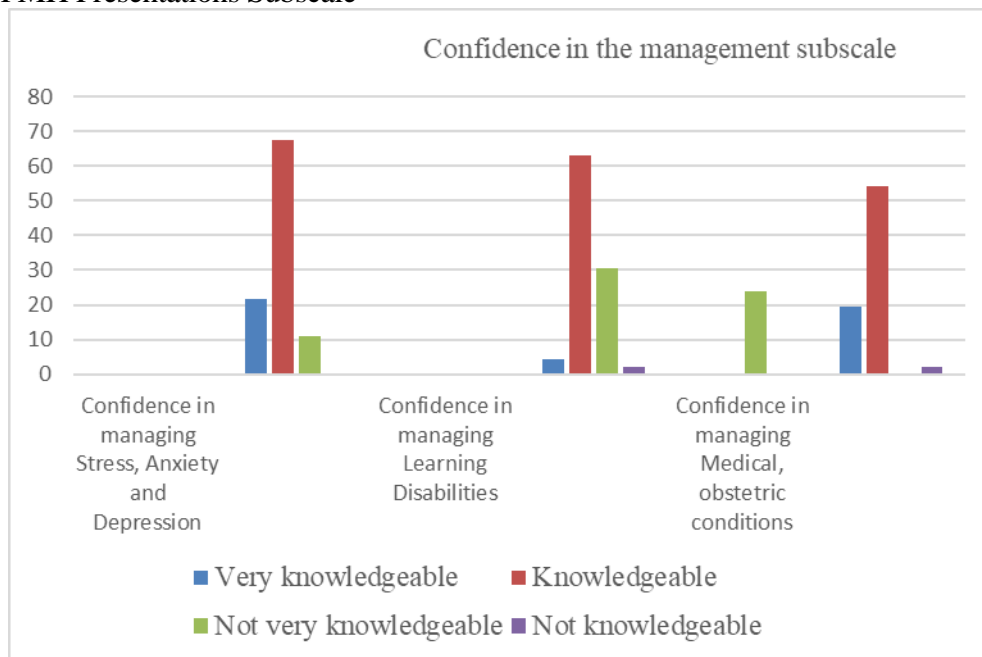
### Confidence in the Management of More Common PMH Presentations Subscale

Table 4. Data Related to the Confidence in the Management of More Common PMH Presentations Subscale

	N	Minimum	Maximum	Mean	Mode	Std. Deviation
Confidence in managing Stress, Anxiety and Depression	46	1	3	2	2	0.56
Confidence in managing Learning Disabilities	46	0	3	2	2	0.59
Confidence in managing Medical, obstetric conditions	46	0	3	2	2	0.72

The mean and the mode are 2 for each item of the Management of More Common PMH Presentations subscale (Table 4).

Graph 4. Data Related to the Confidence in the Management of More Common PMH Presentations Subscale



Regarding their confidence in managing Stress, Anxiety and Depression, most of the students affirm that they are Knowledgeable (67.4%), 21.7% affirm that they are Very knowledgeable and 10.9% affirm that are Not very knowledgeable, as we can see from the Graph 4.

Regarding their confidence in managing Learning Disabilities, most of the students affirm that they are Knowledgeable (63%), 4.4% affirm that are Very knowledgeable, 30.4% affirm that are Not very knowledgeable and 2.2% affirms that is Not knowledgeable.

Regarding their confidence in managing Medical, obstetric conditions, 54.3% affirms that are Knowledgeable, 19.6% affirm that are Very knowledgeable, 23.9% affirm that are Not very knowledgeable and 2.2% affirms that is Not knowledgeable, as we can see from the Graph 4.

### The Relationship between PMHA and Students' Residence

It was used analysis of variance (ANOVA) to examine the relationship between students' residence and their general perception about the perinatal mental health issues, as well as their perceptions regarding their level of knowledge, confidence in identification, and confidence in management of these problems (Table 5).



Table 5. The Relationship between PMHA and Students' Residence

Residence		PMHA scale	Knowledge subscale	Confidence in identification subscale	Confidence in the management subscale
City	Mean	18.7917	6.6250	6.2083	5.9583
	N	24	24	24	24
	Std. Deviation	4.14917	1.46888	1.66757	1.42887
	Minimum	8.00	2.00	3.00	3.00
	Maximum	26.00	9.00	9.00	9.00
Village	Mean	17.3182	6.2273	5.6364	5.4545
	N	22	22	22	22
	Std. Deviation	3.16809	1.19251	1.39882	1.37069
	Minimum	14.00	3.00	3.00	3.00
	Maximum	24.00	8.00	8.00	8.00
Total	Mean	18.0870	6.4348	5.9348	5.7174
	N	46	46	46	46
	Std. Deviation	3.74656	1.34416	1.55495	1.40891
	Minimum	8.00	2.00	3.00	3.00
	Maximum	26.00	9.00	9.00	9.00

The students who live in the city have a more positive perception compared to the students who live in the village, but this relationship is not statistically significant (Sig=0.18).

The students who live in the city have a more positive perception compared to the students who live in the village regarding their level of knowledge, but this relationship is not statistically significant (Sig=0.32).

The students who live in the city have a more positive perception compared to the students who live in the village regarding their confidence in identification, but this relationship is not statistically significant (Sig=0.21).

The students who live in the city have a more positive perception compared to the students who live in the village regarding their confidence in management, but this relationship is not statistically significant (Sig=0.23).

### The Relationship between PMHA and Students' Bachelor Study Program

Analysis of variance (ANOVA) was utilized to investigate the relationship between students' bachelor study program and their general perception of perinatal mental health issues, as well as their perceptions regarding their level of knowledge, confidence in identification, and confidence in management of these problems. The results are given at the Table 6.

Table 6. The Relationship between PMHA and Students' Bachelor Study Program

Bachelor study program		PMHA scale	Knowledge subscale	Confidence in identification subscale	Confidence in the management subscale
General nursing	Mean	17.7895	6.3684	5.7895	5.6316
	N	19	19	19	19
	Std. Deviation	3.73540	1.42246	1.43678	1.49854
	Minimum	12.00	3.00	3.00	3.00
	Maximum	25.00	9.00	8.00	8.00
Midwifery	Mean	18.8889	6.7222	6.2778	5.8889
	N	18	18	18	18
	Std. Deviation	4.33710	1.48742	1.84089	1.49071
	Minimum	8.00	2.00	3.00	3.00
	Maximum	26.00	8.00	9.00	9.00
Physiotherapy	Mean	20.0000	7.0000	6.0000	7.0000
	N	1	1	1	1
	Std. Deviation	.	.	.	.
	Minimum	20.00	7.00	6.00	7.00
	Maximum	20.00	7.00	6.00	7.00
Total	Mean	18.3684	6.5526	6.0263	5.7895
	N	38	38	38	38
	Std. Deviation	3.97574	1.42748	1.61892	1.47333
	Minimum	8.00	2.00	3.00	3.00
	Maximum	26.00	9.00	9.00	9.00

Midwifery students have a more positive perception compared to other students, but this relationship is not statistically significant (Sig=0.65).

Midwifery students have a more positive perception, compared to other students, regarding their level of knowledge about perinatal mental health issues, but this relationship is not statistically significant (Sig=0.72).

Regarding their Confidence in identification of perinatal mental health problems, the students that have completed the Midwifery bachelor study program have a more positive perception, compared to other students, but this relationship is not statistically significant (Sig=0.66).

Midwifery students have a more positive perception, compared to other students, regarding their Confidence in management of perinatal mental health issues, but this relationship is not statistically significant (Sig=0.62).

### The Relationship between PMHA and Students' Age

There is a negative correlation between the age of the students participating in the study and their perception of perinatal mental health issues (Pearson Correlation is -0.191).

There is a negative correlation between the age of the students participating in the study and their perception about their level of knowledge regarding perinatal mental health issues (Pearson Correlation is -0.197).

There is a negative correlation between the age of the students participating in the study and their perception about their confidence in identification of perinatal mental health issues (Pearson Correlation is -0.345).

There is a positive correlation between the age of the students participating in the study and their perception about their confidence in management of perinatal mental health issues (Pearson Correlation is 0.060).

### Data Related to the Second Questionnaire

**Item 1.** How adequate did your nursing education program prepare you in the assessment and management of perinatal mental health issues?

37% of participants think that their education programs in nursing (bachelor and master's degree) prepare them *Somewhat adequate*, 58,7% of them think that their education programs in nursing prepare them *Adequate*, whereas 4.3% of them are *Unsure*.

**Item 2.** During your nursing education, how much emphasis was placed on the assessment and management of women with mental health problems, both during pregnancy and after?

2.2% of students think that their nursing education placed *No emphasis*, 28.3% think that their nursing education placed *Too little emphasis*, 50% think that was placed *Adequate emphasis* and 19.5% think that was placed *Too much emphasis*.

**Item 3.** Do you think you have the appropriate skills to assess and care for women with mental health problems, both during pregnancy and after?

41.3% of the participants think that they have appropriate skills and further training might be useful and beneficial and 58.7% of the participants think that they need further training to improve their skills.

**Item 4.** How could your nursing education program have better prepared you for your role in the screening and management of women with mental health problems, both during pregnancy and after?

There were obtained some suggestions from the participants. They need: more practice in assessing mental health problems of both during pregnancy and after birth women (13%); more practice in managing mental health problems of both during pregnancy and after birth women; more practice in assessing mental health problems of both during pregnancy and after birth women, more knowledge in the treatment techniques and more practice in managing these problems (10.9%); more lecture time on mental health problems of both during pregnancy and after birth women (8.7%); more lecture time on mental health problems of both during pregnancy and after birth women and more practice in managing these problems (8.7%); more practice in assessing mental health problems of both during pregnancy and after birth women and more knowledge in the treatment techniques (8.7%); more practice in assessing mental health problems of both during pregnancy and after birth women and more practice in managing them

(8.7%); more knowledge in the treatment techniques and more practice in managing mental health problems of both during pregnancy and after birth women (8.7%); more knowledge in the treatment techniques (6.5%); more lecture time on mental health problems of both during pregnancy and after birth women and more practice in assessing them (6.5%); more lecture time on mental health problems of both during pregnancy and after birth women, more knowledge in the treatment techniques and more practice in managing these problems (4.3%); more lecture time on mental health problems of both during pregnancy and after birth women, more practice in assessing these problems, more knowledge in the treatment techniques and more practice in managing these problems (2.2%).

## Discussion

Many studies have been conducted worldwide to assess midwives' levels of knowledge and skills in managing mental health problems during pregnancy. In general, researchers have concluded that midwives generally do not have the necessary knowledge and skills in perinatal psychological health (Xiao et al., 2023); they lacked the relevant competencies to perinatal mental health screening and counsel women (Hammond, 2020); the midwives felt ill-prepared to provide appropriate care for women's maternal mental health needs (Mellor, Payne, & McAra-Couper, 2019); the Irish public health nurses reported good levels of knowledge and confidence in recognizing women experiencing stress, anxiety and depression, but they indicated less confidence in caring for women (Noonan, Galvin, Jomeen, & Owen, 2019) and the midwives and primary care nurses encounter many organizational and practitioner related barriers that negatively impact on their ability to incorporate mental health care into their practice (Higgins et al., 2017); midwives reported a lack of skill in opening a discussion with women on sensitive issues, such as sexual abuse, intimate partner violence and psychosis, and providing information to women's partners/families (Carroll et al., 2016).

According to McGookin, Furber, and Smith (2017), it is essential to improve education to better prepare student midwives for cases of antenatal anxiety, emphasizing the integrating of psychology and mental health information into teaching, along with ample time dedicated to clinical practice. Most students in Midwifery programme in the UK reported being confident in asking women questions about their mental health and they reported feeling comfortable in defining a wide range of serious perinatal mental health problems that affect women (Jarret, 2014). The majority of midwives in Australia indicated they could be better prepared to provide mental health intervention for women (McCauley, Elsom, Muir-Cochrane, & Lyneham, 2011).

In our study, we can say that students perceive their knowledge of perinatal mental health issues to be good, their confidence in identifying these issues to be good and their confidence in managing common PMH presentations to be high.

Regarding their knowledge about Stress, Anxiety and Depression, Learning Disabilities and about Medical, obstetric conditions, most of the students affirm

that they are Knowledgeable, but a small part of them affirms Not very Knowledgeable and Not knowledgeable.

Regarding their confidence in identifying Stress, Anxiety and Depression, Learning Disabilities and Medical, obstetric conditions, in general the students affirm that they are Knowledgeable, but a small part of them affirms Not very Knowledgeable and Not knowledgeable.

Regarding their confidence in managing Stress, Anxiety and Depression, Learning Disabilities and Medical, obstetric conditions the students affirm that they are Knowledgeable, but a small part of them affirms Not very Knowledgeable and Not knowledgeable.

The data obtained from our study show that, in general, Nursing students have knowledge about the PMH presentations and are able to identify and manage these problems, but not all of them think like this. There are also students who do not perceive themselves to be fully capable to identify and manage the PMH presentations. In this context, we can say that the findings of the study agree with the findings of similar studies conducted in the world.

Furthermore, it was found that the students need further training to improve their skills to assess and care for women with mental health problems. They need also more practice in assessing and managing mental health problems of both during pregnancy and after birth women, more lecture time on mental health problems of both during pregnancy and after birth women, more knowledge in the treatment techniques and more practice in managing these problems. Such suggestions and needs have also been shown by nurses in different countries of the world, with the aim of providing the most quality care and service to expectant mothers.

### **Conclusions and Suggestions**

Based on various studies, it is now accepted that perinatal mental health problems nowadays exist. Their management constitutes a challenge for health professionals, both in terms of early identification and in terms of their proper treatment. In this context, nurses also have an important role.

Nursing students have high levels of awareness related to perinatal mental health issues.

The perception of Nursing students related to their knowledge about perinatal mental health issues is good. In general, they are knowledgeable about Stress, Anxiety and Depression, about Learning Disabilities, and about Medical, obstetric conditions.

The perception of Nursing students related to their confidence in identifying perinatal mental health problems is positive. Most of the students think that they are confident in identifying Stress, Anxiety and Depression, Learning Disabilities, Medical, obstetric conditions.

The perception of Nursing students regarding their confidence in the management of more common PMH presentations is good. Most of them think that

are confident in managing Stress, Anxiety and Depression, Learning Disabilities, Medical, obstetric conditions.

The students who live in the city have a higher awareness of perinatal mental health issues compared to those living in the village. Additionally, they have a more positive perception regarding their level of knowledge, regarding their confidence in identification and regarding their confidence in management, but these relationships are not statistically significant.

Midwifery students have a higher awareness related to perinatal mental health issues compared to the others. They have also a more positive perception regarding their level of knowledge, and regarding their confidence in management of perinatal mental health problems. Regarding their Confidence in identification of perinatal mental health problems, the students that have completed the General Nursing Bachelor study program have a more positive perception, compared to other students. However, these relationships are not statistically significant.

There is a negative correlation between the age of the students participating in the study and their perception of perinatal mental health issues, between their age and their perception about their level of knowledge regarding these issues, and between their age and their perception about their confidence in identification of perinatal mental health issues. There is a positive correlation between the age of the students participating in the study and their perception about their confidence in management of perinatal mental health issues.

Students' opinion is that their nursing education programs prepares them in the adequate manner for the assessment and management of perinatal mental health issues and that adequate emphasis was placed on the assessment and management of them.

Students think that they have the appropriate skills to assess and care for women with mental health problems, both during pregnancy and after, but, also, they need further training to improve their skills.

Students' opinions about the amelioration of nursing education program in order to better prepare them for their role in the screening and management of women with mental health problems, both during pregnancy and after, are different. Mainly, they think that are needed more practice in assessing mental health problems, more practice in managing these problems, more lecture time on mental health problems, more knowledge in the treatment techniques.

In general, the findings of the study are similar to the findings of studies of this nature in other countries. It is necessary to carry out more extensive studies on this topic in our country to shed light on the Albanian reality. Also, it is necessary to revise the curricula, especially in general nursing education program, as well as carry out training for nurses related to the problems of perinatal mental health issues.

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