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Degree of Teachers' Adaptation to Digital Teacher Skills Considering Sustainable Professional Development

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Abstract: The study aimed to assess the degree of adaptation of teachers to the skills of the digital teacher in the context of sustainable professional development. The researcher adopted Qualitative research methods that were used. The research was carried out with 10 teacher educators from different departments. Pre- and post-interviews were conducted to evaluate the degree of teachers' adaptation to digital teacher skills considering sustainable professional development. A study tool consisting of three open-ended questions was prepared, and its validity and reliability were verified. The study revealed that teachers need to develop digital skills to improve teaching performance. It highlighted the necessity of offering diverse, up-to-date training programs that integrate digitalization into education. Additionally, some teachers showed a low degree of adaptation to digital teaching skills due to a lack of awareness. The findings indicated a need for teachers to enhance their digital skills to improve teaching performance. The study underscored the importance of providing diverse and up-to-date training programs that incorporate digitalization into educational practices. Additionally, it was observed that some teachers exhibited a low degree of adaptation to digital teaching skills due to limited awareness. Based on these findings, the study recommended the implementation of in-service teacher training programs focused on digital applications, as well as the establishment of essential digital and human infrastructure to facilitate greater adaptation to digital teaching skills.

Keywords: coping; digitization; digital skills; sustainable development

1. Introduction

The world is experiencing tremendous technological advances in all industries, including education. The advent of the digital revolution has altered learning settings into dynamic, interactive spaces. As a result, teacher professional development is becoming increasingly important, as educators must be able to manage and generate digital material while using a variety of digital tools and platforms both within and outside the classroom. Teacher professional development programs play an important role in achieving digital transformation in education by providing teachers with the skills and knowledge they need to manage the difficulties of the digital era. Teachers' professional development not only improves their own performance, but it also helps students learn, allowing them to adapt to current developments and the rising use of technology in education.

Numerous studies have stressed the need of professional development in preparing instructors for digital learning. For example, Ayvaz (2018) emphasized the necessity of teacher development for the success of e-learning, whereas Alvermann & Sanders (2019) and Yue (2019) emphasized the need for professional development to enhance teaching effectiveness and equip instructors with 21st-century abilities. According to Copriady (2018), in-service training programs can assist instructors grasp digital skills and improve their interactions with digital environments. Despite the advantages of digital learning, its success is dependent on collaboration among educational institutions, communication firms, and community groups, as highlighted by Zawacki-Richter and Anderson (2019). Furthermore, Dabbagh (2020) pointed out the necessity of preparing teachers to integrate digital technologies effectively, particularly in response to the sudden shifts in modern learning strategies.

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This study aims to assess the level of adaptation of teachers to the skills required of a digital teacher in the context of sustainable professional development. It seeks to identify the challenges teachers face in acquiring these digital skills and to provide recommendations for enhancing teacher training programs to support digital transformation in education.

Objectives of the study: Determine the extent to which instructors have adapted to the skills of the digital teacher considering long-term professional development and investigate the significance of training programs in the development of digital skills among teachers. Determining the level of awareness among parents and the surrounding environment on the teacher's acceptance and adaptability to digital learning and keeping up with the digital era and its requirements.

The study's significance stems from the theoretical component of understanding instructors' levels of adaptability to digital teaching abilities in the context of long-term professional growth. It may assist us in determining instructors' levels of adaptability, acceptance, and usage of digital learning abilities in the educational process. The practical importance lies in identifying the challenges that teachers face when using digital learning, which assists officials and decision-makers in the Ministry of Education in identifying teachers' attitudes toward the use of digital learning in education, allowing them to focus on the positive aspects of these trends while also being aware of and addressing the negative ones.

Study Problem

This study came to investigate the level of adaptation of teachers to the skills of the digital teacher in the light of sustainable professional development and the challenges facing them, and given the importance of digital learning in the educational-learning process, which is evident in increasing the effectiveness of teaching, and that digital learning has become an integral part of the educational-learning process, and in order to continue the educational process, teachers should integrate with digitization and its uses in the educational process in modern and advanced methods, as the matter of switching to digital education is not an optional shift of our own free will, the idea was born in the researcher of the need to reveal the level of integration and adaptation of teachers with digitization in education, and the most important challenges facing them to reduce it, believing that digitization achieves the continuity of the educational process, and in order to enter the world of education in the digital age and face challenges so that the teacher can enter, integrate, create and deal effectively with technological means with the need to change the stereotype of education . Based on the recommendations of some previous studies, such as (Yue, 2019) (Sanders & Alvermann, 2019), Al-Yami (2020), which recommended conducting studies on measuring digital teacher skills and ways to develop them and conducting further studies on verifying the level of adaptation of teachers to sustainable development programs in education.

2. Objective of the Study and Its Questions:

The current study aimed to identify the adaptation of teachers to the skills of the digital teacher in the light of sustainable professional development by answering the following questions:

Question 1: How do teachers adapt the skills of a digital teacher considering sustainable professional development?

Question 2: What is the relationship between the teacher's specialization from his point of view and the degree of interaction with digitization in education and its acceptance and adaptation?

Question 3: How does the degree of awareness of parents and the surrounding environment reflect on the teacher's acceptance and adaptation to digital learning and keeping pace with the digital age and its requirements?

3. Literature Review

Sustainable development is an essential axis in building the public policies of countries, and sustainability is a developmental pattern characterized by rationality and rationality, and thus contributes to the teacher a vital role in the educational process, as they are the cornerstone of its

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success, and therefore educational institutions should work to update teacher training and qualification programs, to enable them to exercise multiple roles and not only (Nasr, 2008)

Digital education improves the quality of education through digital technologies and overcoming many of the disadvantages and problems of traditional learning, and contributes to raising the capacity of absorption because virtual education does not need a specific place and makes the student not bound to a specific schedule, as modern technology has provided ways to communicate without the need to be present in a specific place and time (National Education Policy Center, 2019))

Ghanaim (2020) has identified resources that must be provided in order to support and sustain education during the inability to attend the educational institution, such as websites and printed educational packages, the use of an existing online distance learning platform or resources, and the development of new online platforms (virtual classes), in order to overcome the challenges faced by teachers while training them in digital learning.

Volman (2018) verifies that the influence of digital technology on education is reflected in the problems associated with integrating digital tools into educational contexts. It demonstrates that students' participation in digital technology can be increased during the educational-learning process, and that technical challenges can be overcome by creating effective, user-friendly, and accessible digital educational resources for all learners, regardless of background or ability. He also highlighted educational policymakers and certification programs to leverage the benefits of digital technology in education while avoiding its possible drawbacks.

Many of the studies stressed the need for the teacher to develop a modern digital professional development before service, and one of these studies is the study of Adipat (2021), the results of which showed the effectiveness of the teacher training program based on (TPACK), as confirmed by the study of (Dervan, P. A., & Gormley, 2019), that improving teachers' performance in digital learning and developing their skills reflects positively on students and increases their This is congruent with the European Training Foundation's recent assessment on teacher continuous professional development, which found that digital teacher skills are one of the most commonly used professional development activities. Brolpito, (2018)

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There are a variety of difficulties that inhibit the attainment of digital learning goals, some of which are attributable to its novelty, including the study. According to Lukasz (2021), one of the barriers to incorporating digital education tools and technology into the educational process is the digital divide between members of society, particularly in developing and third-world countries, where digital learning is a means to an end rather than a specific goal. Educational institutions in these nations strive to attain them, thus work must be done to bridge the digital divide. He also emphasized the importance of simplifying the complicated link between digitization and education, to improve the degree of acceptance by teachers and their adaptation to digital technology in general.

The study Zecheria,al et al. (2020) confirms the challenges of accessing digital tools, resources and competencies that teachers faced during the integration of digitization in education. This study aimed to examine how teachers understood the challenges that arose when using digital tools and resources in the educational process and responded to them. The study also showed great challenges in accessing digitization in education, and challenges in their level of competencies, and that they need to develop them.

Teachers contribute a vital role in the educational process, as they represent the stone and the cornerstone of its success, and therefore they must always renew their knowledge, especially as we

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enter a new millennium, in which the roles of the teacher have changed, and it is not limited to indoctrination, memorization and memorization, but it has become a pivotal key role in the search for knowledge, its acquisition and transfer (Nasr, 2008).

Digital learning makes the role of the instructor more crucial. A creative, highly trained individual with skills that aid in design and programming is required of the instructor who will instruct pupils electronically. Digital teachers have crucial responsibilities in e-learning, according to F. B. Ahmad et al. (2023). He is an inquisitive educator. One of the most crucial roles of a teacher is to do research on the teacher's design for educational experiences as well as to find anything fresh and relevant to the subjects that are taught to the pupils. To accommodate students' interests, he must create dynamic online learning environments, by working to enhance the digital learning environment to support the independence of learners and emphasize the method of self-education.

This is what Al-Shamrani. (2019) study confirms, which recommended the need to promote the establishment of electronic groups for dialogue and discussions between learners via e-mail or the Internet to develop their teamwork skills. The study of Grand-Clement, et al (2017) also confirms that the requirements for the development of digital skills for the teacher are represented in technical readiness, which is represented in the cost of using the international information network and the availability of computers and software. Human readiness is represented in the high cultural and educational level of teachers, learners, and parents.

The teacher has a role as a provider of digital content, and this is one of the most important skills of the twenty-first century, as the study of Al-Yami (2020) pointed to the need to employ e-training in teacher qualification programs, especially on the production and management of digital content, and through the expansion of the scope of training provided to teachers, in light of the new changes in the field of digital teaching and training programs. The results of the study Zaragoza, at el, (2019) showed the extent to which today's schools need teachers with new competencies, who are able to respond to digitization and interact with it by integrating it into the educational process, in addition to the psychological readiness and awareness of teachers to deal with new data and methods. and adapt them to the requirements of learning and accepting digital skills.

Bdiwi, Runz, Faiz & Cherif, (2019) confirms that digital learning makes the learner effective in the educational process, so that he is entrusted with multiple and varied tasks. This requires a competent teacher who can be a designer of educational content using multimedia and superior multimedia, which are supportive and supportive of him in the educational process, and the correct use of digital learning provides an opportunity for continuous learning and lifelong learning, and this is confirmed by Swaidan (2020). The educational process can be facilitated for learners, and by several means of ease of availability, which enhances them, activates their motivation, and provides them with immediate feedback.

This is in line with the study of Gambo & Muhammad, (2022) that the use of digital education increases the quality of the educational process because it provides a more appropriate environment for learners of different mental levels, age, and stages of learning.

The adaptive learning style, which is the foundation of the current study, is defined by the capacity of both the teacher and the student to quickly adjust to various educational environments and contribute to the dynamic and interactive nature of scientific content. To meet the needs of all students, the study makes use of all available media. Because they will be able to recognize the patterns and styles of learners, it makes e-learning environments more intelligent. Smart adaptive learning environments can change themselves and their shape according to what the learner provides them with data and what they deduce from previous knowledge about the learner and the way they learn, which makes them able to achieve the best results

The debate here can be focused on the outcome of digital learning. While Bdiwi, Runz, Faiz & Cherif, (2019) and Swaidan, (2020) agree on the potential for digital learning to foster active participation and continuous learning, (Gambo & Muhammad, 2022) argue that digital education enhances the quality by making it adaptable to various learner levels. The conversation here is about the primary benefit of digital education—is it the active involvement of learners and lifelong learning

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as suggest (Bdiwi et al.2019) or the overall quality and customization of the learning environment. as (Gambo & Muhammad argue,2022)

And he affirms Zeitoun (2007) The most significant theory that informs adaptive learning is Theory Structuration Adaptive Theory. This idea highlights that by offering media that inspire and motivate students to replicate the information they are exposed to and attain new knowledge products, a variety of educational technology applications can accomplish a few organizational modifications inside the adaptive learning environment. This is due to the fact that adaptively presented instructional media cater to the needs of learners based on their distinct learning styles, explaining why learners progress more toward more dynamic cognitive production processes and related learning materials the more adaptive the media are.

According to Al-Shamrani's (2019) study, which emphasized the significance of establishing electronic groups to improve collaboration among students, prior research has focused on important aspects of digital learning and the role of teachers in delivering relevant digital educational content. By doing this, it highlights how technology may help students engage with one another and build their group's abilities. However, as noted in the Al-Shamrani (2019) study, the Grand-Clement et al. (2017) study emphasized the need for teachers to be both technically and humanly prepared to enter the world of digital learning. This study did not specifically focus on student interaction, instead focusing on enhancing teachers' technical competence. Al-Yami's (2020) study on digital content and ongoing teacher preparation came to the conclusion that it is critical to prepare teachers to create and oversee digital material, which calls for more training in digital skills. While the study by Zaragoza et al. (2019) emphasized the necessity for teachers to have new competencies to interact with digital transformation, such as psychological readiness and the ability to deal with new teaching methods and environments, this also affirms the significance of the role that teachers play as providers of digital content. When discussing ongoing education and productive communication, Bdiwi, Runz, Faiz & Cherif (2019) and Swaidan (2020) agreed that digital learning promotes active learner engagement and contributes to lifelong learning. This highlights the importance of active interaction between learners and educational content.

On the other hand, Gambo & Muhammad (2022) stressed that digital education improves the quality of the educational process by adapting it to the different levels and abilities of learners , which indicates the importance of customizing education to suit the needs of each student.

The current study differs from previous studies in its objective, as it seeks to reveal the degree of adaptation of teachers to the skills of the digital teacher in the light of sustainable professional development and relied on the descriptive survey approach.

4. Methodology

Based on the nature of the study and the information required to answer its questions and achieve its objectives, the researcher used the qualitative approach to suit the subject of the current study and its objectives, by collecting information and data on the level of teachers' adaptation to the skills of the digital teacher, considering sustainable professional development by conducting interviews and asking open-ended questions. The data collected is not in the form of numbers but comes from interviews, field notes, personal documents, memo notes, and other documents. This study uses a descriptive method to compare actual data with the applicable theory.

Data Collection:

The most important phase of a study is gathering data. Both primary and secondary sources were employed in data collecting for this study. In addition, the researcher's research methodology is qualitative, and the data was gathered via social media, direct communication, and email to reach as many people as possible in a variety of geographic locations, allowing access to all educational environments. Additionally, because the community is large, the sample consists of more than 300 male and female teachers, and individual interviews were conducted via social media and the Zoom platform, which included the study questions as attached to the questionnaire. Setting the time for the interview was within the time that suits the target group, so it was very effective, and the

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researcher felt comfortable for the teacher during the interview and answered the questions with confidence and proficiency.

The researcher employs a semi-structured interviewing style in which the researcher conducts interviews using a pre-prepared set of questions that may be expanded upon during the interview. Conversations having a clear goal are called interviews. Two people participated in the conversation: the interviewer, who asked the questions, and the interviewee, who was the one who answered them. Direct face-to-face interaction between the information provider and the information seeker is the primary characteristic of the interview. A variety of prepared questions were asked throughout the interview. It is through these interviews that the researcher collects data, information and descriptions of the research subjects. The interview technique in this study was aimed at exploring teachers' Degree of teachers' adaptation to digital teacher skills considering sustainable professional development.

Population:

The study population consisted of all teachers of the basic education stage in public schools in the capital Amman /Wadi Al-Seer Brigade for the academic year (2023/2024), which numbered (1371) male and female teachers, distributed between (41) female schools and (19) male schools According to the latest statistics available at the Directorate of Education for Wadi Al-Sir Brigade, These participants were chosen based on the findings of a field analysis conducted by researchers to assess the teacher's ability to use technology and Table 1 shows this:

Table 1. Distribution of members of the study community in Wadi Al-Seer Brigade in the capital Amman.

Sex	Males	Females	Total
	504	867	1371
Schools	19	41	60

* (Source: Authors).

Table (3-1) shows that the number of female teachers is higher than the number of male teachers, and in terms of schools, female schools were also higher than male schools.

Participants

The study sample consisted of (310) male and female teachers , selected by the simple random method. The study sample members were also distributed according to the variables (gender, teaching experience) as shown in Table 2.

Table 2. Distribution of the study sample according to its variables.

Variable	Category	Frequency	percentage
Sex	Males	107	34.4%
	Females	203	65.5%
	Total	310	100%
Teaching Experience	Less than 5 years	65	21.5%
	5 - 10 years	79	25.5%
	10 years and more	166	53.5

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	Total	310	100%
Total		310	100%

* (Source: Authors).

Table 2 shows that (34.4%) of the study sample is male, while the percentage of females was (65.5%), and in terms of teaching experience, the highest percentage of teachers I served was (10) years and more and reached (53.5%), and secondly came the teachers I served (5 years – less than 10 years) and by (25.5%), and finally the teachers I served (5 years and less) and by (21.0%).

Interviews

The interviews were used to gather information and data in order to complement the data collected by the interviewers, and the information was collected in a direct way from its source. The open interviews were conducted with (100) male and female teachers from the study sample, who expressed their desire to do so, as the data were recorded to benefit from them in interpreting the results. The interviews were conducted directly and during the researcher's visit to schools.

5. The Findings of the Research

Analysis of study data: Personal characteristics of the study sample: Table 3 shows the distribution of the study sample according to their personal characteristics.

Table 3. Demographic characteristics of the study sample.

	groups	Frequency	Percentage
Gender	Male	107	34.5
	Female	203	65.5
Teaching Experience	Less than 5 years	65	21.0
	5 - 10 years	79	25.5
	10 years and more	166	53.5
*(Source: Authors)	Total	310	100.0

Gender:

The percentage of males was (34.5%), and the percentage of females was (65.5%). It is noteworthy that the percentage of females is the largest. The researcher explains the increase in the percentage of females due to the increase in the total number of female teachers, which is (867) female teachers compared to the number of male teachers, which is (504) male teachers, in addition to the increase in the number of female schools and mixed schools in Wadi Al-Sir district in the capital Amman, and therefore this led to an increase in the percentage of females , as shown in the following Table 4.

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Table 4. Distribution of members of the study community in Wadi Al-Sir Brigade in the capital Amman by gender and schools.

Sex	Males	Females	Total
	504	867	1371
Schools	19	41	60

* (Source: Authors).

Teaching Experience:

The highest percentage of teachers I served was (10) years and more and reached (53.5%), and secondly came the teachers I served (5 years – less than 10 years) and by (25.5%), and finally the teachers I served (5 years and less) and by (21.0%).

Data Analysis:

Data analysis in research is essentially a process of processing data that has been obtained in the field so that it becomes information. The result of the study besides depending on the data obtained in the field will also depend on how the data are analyzed. The data analysis technique used is descriptive analysis technique through qualitative research using data and information obtained directly from informants and then analyzed using a theoretical basis and described systematically based on the facts from the field. This data analysis is closely related to the research design and problem formulation that have been determined before. It can be stated that data analysis techniques can only be used after research points have been met, for example by collecting the appropriate data that is adapted to the problems in specific research.

Thus, the purpose of the data analysis is to determine or get the overall conclusion that comes from the research data that has been collected by the researcher. In addition, data analysis techniques aim to describe and explain the research data, so that it can be understood. The researcher used the description and analysis of data on what is available in the target group environment to conduct data analysis and draw conclusions.

There is three main focus of discussion from the data obtained from this research, namely (a) How do teachers adapt the skills of a digital teacher considering sustainable professional development,(b)What is the relationship between the teacher's specialization from your point of view and the degree of interaction with digitization in education and its acceptance and adaptation, & (c) How does the degree of awareness of parents and the surrounding environment reflect on the teacher's acceptance and adaptation to digital learning and keeping pace with the times and its requirements.

Interview Results:

As for the analysis of the results of the interviews in the current study, data were collected from teachers through interviewing them personally in their workplaces, and through social media in particular, and to reveal the degree of adaptation and adaptation of teachers to integrate digitization into the educational process, which has become an important modern requirement, and this is why the data is classified by answering the questions of the study as follows.

Question 1: How do teachers adapt the skills of a digital teacher considering sustainable professional development?

Training programs to develop digital competencies for teachers:

Every willing teacher who is interested in using digital learning tools like the Internet and other super media in the classroom will receive training digitally, according to the teacher development philosophy. The study examined the degree of teachers' adaptation and interaction with these programs, including their use of online programs and platforms for educational purposes, by

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conducting interviews with them and classifying the data. This was done in order to achieve the fourth Sustainable Development Goal, which is to update teacher training programs to develop digital competencies for teachers. We'll talk about other ways to help instructors increase their digital proficiency.

60% of the teachers in the research sample who participated in interviews stated that there is a high level of teacher-to-digitalization adaptation in the classroom. According to the study, it is critical and essential to monitor improvements and stay up to date with advancements in other nations (Alsalti et al., 2024).

The Ministry is working with interest to develop the teacher digitally, and although there are training courses continuously for teachers, as a number of them reported, the benefit of these programs is not in the required form, and the reason is that teachers are not available to join these courses and that they were held during school hours, and the difficulty of transportation and mobility led to a reduction in participation despite the fact that they expressed their desire to do so, because the activation of digital learning tools has benefits for educational work and for learners.

40% of teachers needed their circumstances to enroll in training courses that enable them to possess digital learning skills online, and they were following the courses using digital platforms such as Zoom and Microsoft Teams, but they benefited little because of the difficulty of direct application, and they also reported that the evaluation was self-assessed. Taking advantage of the training process in all its aspects without moving to the training place and without the presence of the trainer and trainees in the same space does not achieve the important and important interaction in the training, which is a three-dimensional interaction (digital training content, the trainer, and the trainees) and managing the training process as soon and less expensive.

Through the interviews, it was also discovered that the training programs offered by the government do not include the abilities required to be a digital teacher. The low efficacy and quality of these initiatives are among the deficiencies. According to the interviews, 90% of the teachers agreed that the lack of training program viability—which prevents teachers from presenting the curriculum in ways that grab students' attention, creating assessments and using the tools to provide instant feedback, and creating all design-related activities—is what led to the low activation of digital learning in the educational process, not a lack of motivation for training. Of education. They also stressed that this places a great responsibility on the teacher to be aware of everything new in the field of educational technologies.

Some teachers considered that adapting and adapting to digital and online teaching and learning is one of the most important skills that a digital teacher should master in the 21st century. They considered the need to acquire new digital competencies as part of the process of adapting to the digital age. One teacher said, "I think anything can be learned if the teacher is provided with the appropriate opportunity to participate and learn to integrate digitalization with education. Then it can be easier to adapt and accept digitization than if we can't use it. "

" I have been an Arabic teacher for 15 years. We have not participated in the training courses required for the digital teacher. However, I am embarrassed in front of the students if they ask me to activate the websites or provide them with something through the websites for digital content." Do you find learning computer skills and digitization any difficulty? " The teacher replied, “I think he needs to know the minimum to be able to use the computer and I don't think using it is very complicated. Anyone and any teacher can learn if they want to. I consider that communication competencies in the online environment are particularly necessary [nowadays]. One teacher linked the challenges of developing the digital competencies needed for online teaching to the lack of skills in other areas, for example, English language skills It is a necessity to provide an opportunity to develop digital competencies, as evidenced by this quote from another teacher interview in which he says.

“I think [core digital competencies are essential to be able to teach online]. You can see how easy it is to talk now [in an online environment]. But if you had asked me three months ago or more, I wouldn't have known which button to press. Instead of turning the camera on, I would turn it off, and so on. Because I don't know English, I needed to pick up words like Get going! Anyone can

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"play", "access", "share" [originally English word], maybe there are competencies that I have not discovered, but they are enough for me.

Question 2: What is the relationship between the teacher's specialization from your point of view and the degree of interaction with digitization in education and its acceptance and adaptation?

According to the results of the interview, 30% of teachers have no trouble adjusting to digital learning and its resources, such as the Google educational app, creating instructional and interactive videos, and, from a technical standpoint, communicating with and engaging students in digital learning. The nature of their computing and scientific fields is the cause. Some teachers, however, stated that even though they readily adjust and actively engage with digital learning resources, there are challenges in putting them into practice because there aren't enough suitable environments, particularly in remote areas where some schools still lack computer labs and the Internet is unavailable for various geographical reasons.

While some of the teachers confirmed by 50% who work in schools where there is infrastructure to a certain extent and to a medium degree, which allowed them to communicate through websites and activate digital platforms, and take electronic tests, and the communication was good, fast, interactive and positive from the students, as they indicated that the students felt independent in expression, providing suggestions and answers as well as participating in the discussion.

Question 3: How does the degree of awareness of parents and the surrounding environment reflect on the teacher's acceptance and adaptation to digital learning and keeping pace with the times and its requirements?

Some teachers reported that the degree of their compatibility and harmony with the integration of digitization in education is to the degree of awareness of some parents, as 70% of parents are supportive and supportive of interaction between students and communicating with them on an ongoing basis, which increases the degree of students' interest and makes it easier for parents to follow up their children and monitor their academic achievement, especially since many parents have jobs and return home late.

A group of teachers stated that we could not adapt, adapt and interact with students in the educational process through digital learning tools, especially if there are some classes that are given remotely to strengthen students, but among 70% of teachers, we cannot judge that the student is with us during the lesson, especially since the student locks the camera, and more than once I ask students to turn off the sound next to him.

The lack of updating teachers' communication programs was an important reason for describing the technical problems that are occurring that hinder the progress of the class, including what was mentioned by a young teacher (twenty-five years old) as follows:

"I have a phone to work from, but the camera is not very good. Since I'm working from my phone, I can't see them all at once. I only work on my phone; I don't work from my laptop.

Another teacher spoke about digital pedagogy as a difficult field to understand, and complained about the differences between face-to-face and digital communication:

Teachers have become concerned about whether parents and students can master the digital resources needed for the educational process and the competence these resources require: "It was a challenge to learn how to work online at the beginning of my educational career, to learn many things on [online educational] platforms," says one teacher.

How is communication achieved between your teacher and parents and students, and by what means? "It was difficult to communicate with parents," says one teacher. I was afraid at first that they wouldn't understand a lot of things: WhatsApp group and getting all the kids phone numbers I didn't have, Google Classroom platform, setting up all the accounts, then working on Zoom and so on. Way... beyond that. I was surprised at how fast and resilient the parents were."

Communities that invest in digital infrastructure (like high-speed internet, devices, etc.) make it easier for teachers to implement digital learning strategies.

Lack of Resources: In less aware communities with limited resources, teachers might struggle to adopt digital tools due to lack of access and support, hindering their ability to keep up with modern

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educational requirements. In essence, a well-informed and supportive environment fosters a teacher's confidence in adopting digital learning, while a lack of awareness or resistance from parents and the community can slow down this transition.

Digital Infrastructure:

Although it is important to provide a strong digital infrastructure for education, to achieve efficiency and continuity in education, some schools suffer from a severe lack of technological infrastructure, as well as a lack of human infrastructure.

"How do you find the strength of the Internet network in the school and the residential area in general?

During an interview with some teachers, 70% of them reported that the broadband infrastructure is completely centralized, as they showed through their experience in education, and through their direct communication among them that schools in the governorates, villages, camps and valleys suffer the most from the provision of the Internet, and the unequal opportunities between the governorates and the few high-speed Internet subscribers. This was an obstacle in the adaptation of teachers to integrate technology into education, as well as reflected on students, as the great weakness generates boredom and monotony among students in following up their learning, which drives them to leave the websites of the proposed educational materials, as well as reduces the speed of their interaction in submitting assignments. 60% of teachers confirmed that the technological infrastructure was of below average quality, and the question was asked "What technological tools are available in the school?" 40% of teachers confirmed that the touch devices we rely on are our personal devices, and they are not available in school such as (phones, laptops) and the question was " Is it possible to connect to the Internet through them?" 50% of teachers said that the telecommunications infrastructure has poor access to the Internet, electricity, etc. We have difficulties in ensuring that all students (can) attend appropriate classes and solving assignments due to problems with technological infrastructure. This was understood to be happening because the students' families did not have the means to provide them with access to technology during the day (while working).

Teachers who were teaching students with access to a laptop and the Internet considered themselves lucky, pointing to the fact that they considered this to be the exception rather than the rule. In some cases, how do you find the follow-up mechanism for students, which is characterized by difficulty, there is enjoyment of distance learning, and while following assignments?

One teacher reported that even half of the class some students were not able to follow online learning activities on a regular basis. Another of the interviewees stated that the difficulty of adapting and accepting digital learning, as well as I was unable to follow the performance of my students through the platforms due to the low quality of the Internet, the high cost of subscription to this service, that I have a phone that does not support the Internet service. One says having a mobile device is twice the income they earned. However, they felt that the lack of participation was linked to situations of poverty.

Another teacher mentioned a lack of intrinsic motivation, also noting that a lack of commitment to attending online classes may have an impact on some students' willingness to attend. This applies to some of the teachers interviewed. And that there was communication only through the WhatsApp group.

How is communication through the platforms through your interaction with students, and how does this reflect on the communication between students and teachers?

Other teachers even mentioned that communication and follow-up through educational platforms require less technological infrastructure as a strategy to reach a larger number of students, as this teacher, who works in a rural area, mentioned during the focus group:

'Yes, there are some [students] we couldn't contact via Zoom, but we did it via messenger, we keep messages, sometimes we work on Zoom and messenger, we work from the laptop but also from the phone, and that's how we tried to reach as many students as possible.'

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Moreover, even when online communication between students and teachers is possible, technological infrastructure has negatively affected the communication process, affecting how well the teacher understands what is going on, on the other side of the students' screens. Communication through educational platforms plays a crucial role in shaping the interaction between students and teachers. Platforms such as learning management systems (LMS), video conferencing tools, and collaborative software have transformed the way education is delivered and how communication takes place. Here's how this dynamic works and how it reflects the communication between students and teachers:

Communication through educational platforms plays a crucial role in shaping the interaction between students and teachers. Platforms such as learning management systems (LMS), video conferencing tools, and collaborative software have transformed the way education is delivered and how communication takes place. Here's how this dynamic works and how it reflects communication between students and teachers, Enhanced Accessibility and Flexibility.

Communication through platforms makes education more accessible. Teachers can provide resources, lectures, assignments, and feedback from anywhere, allowing students to learn at their own pace. Real-Time and Asynchronous Communication Teacher-Student Interaction: Platforms enable both real-time communication (e.g., live classes, chat features) and asynchronous communication (e.g., discussion boards, recorded lectures). This balance allows for immediate feedback and ongoing dialogue.

Collaborative platforms, such as Google Classroom, Microsoft Teams, or Moodle, allow for group work, peer reviews, and shared resources. Teachers can assign collaborative tasks, which encourage students to work together. This collaborative approach helps build a stronger sense of community, even in remote or hybrid learning environments, enhancing both teacher-student and student-student relationships.

Teachers can provide continuous feedback on assignments and participation, and students can communicate their difficulties or ask questions directly on the platform. Platforms can lower the psychological barriers that might exist in traditional classrooms, such as shyness or fear of speaking out. Students may feel more comfortable asking questions through chat or discussion boards than in person.

Feedback on Interview Answers (Discussion)

In light of the presentation and interpretation of the results, the researcher found that in-service teacher training programs should be more modern and developed, and in line with the requirements of the digital age and to meet the needs of digital transformation in the educational process This is what he confirmed (Zeitoun,2007), especially that learners have the ability to seek, analyze and research more than previous generations, and we must not remain the same approach and usual educational policies. Adaptation and adaptation to digital and online education and learning have become one of the most important skills that a digital teacher should master in the 21st century.

This requires gaining modern skills that have been addressed by the sustainable development of education, as well as working to provide the appropriate educational environment and enrich the infrastructure with modern digital technologies and working to conclude agreements and partnerships with local and international community institutions to support the educational field with the necessary digital technologies and technology, and to provide human resources that have the ability to qualify the current teacher digitally (F. B. & etl., 2023). He lacks the necessary skills in digitization, and he did not receive his learning during the university stage that he studied in the past. As stated by everyone (Ahmad, 2023) & (Volman, 2018), digital communication between all elements of the educational process and the local community must be achieved to ensure the success of the educational process and to be a safe environment. (Ghanim, 2020).

Building teachers' digital abilities is essential to promoting sustainable professional development since it helps them stay up to date with the quick changes in technology and contemporary teaching techniques. Building teachers' digital abilities is essential to promoting sustainable professional development since it helps them stay up to date with the quick changes in technology and contemporary teaching techniques. In line with the study's recommendations,

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teachers must also be knowledgeable about the latest developments in educational robots and technology since the future of education hinges on developing tools that are easy to use and suitable for accelerating the learning process for students (Al-Nawasah et al., 2024).

The value of enhancing teachers' digital abilities is clear when it comes to raising educational standards and utilizing technology to assist educators in creating engaging and creative learning environments that better serve students' varied needs. Digital skills may boost productivity and efficiency and pave the way for instructors to take advantage of e-learning resources like online training classes, which allow them to keep improving their abilities without depending on more conventional training options.

Enhancing interaction with students because technology provides new ways to interact with students, such as virtual classrooms and e-learning platforms, and enables them to keep pace with technological development through the ability to employ modern tools and technologies in education, which enhances their efficiency and makes them able to deal with future challenges.

6. Considering Sustainable Professional Development:

Digital skills are an essential part of sustainable professional development, as they ensure the teacher's continuous development and the ability to provide modern and effective education. Sustainable development requires the ability to adapt to changes and lifelong learning, which technology contributes directly to.

7. Recommendation and Contribution

The current findings of the study allow outlining several recommendations that are likely to improve the adaptation of the teachers' digital teaching skills. First, it is recommended that educational institutions come up with strategic plans and programs that utilize the positive attitude of the teachers towards digital learning so that the focus on improvement is never-ending. Moreover, it becomes necessary to deliver additional training programs to enhance teacher effectiveness and ease their adjustment to the digital learning environments. Besides, initiatives aimed at the introduction of e-culture could increase students' interests so that they are prepared for active involvement in online learning. In addition, there should be an incorporation of the digital learning courses in the teacher preparation programs in the universities, which will help to broaden the skills of the prospective teachers and thus ensure that the new teachers possess the relevant skills as soon as they graduate.

Also, this study adds to the existing body of knowledge by emphasizing the need for the sustainable professional development of teachers to attain progressive levels of digital skills enhancement in teaching. The study makes clear the gaps in teachers' digitalization at their level and therefore calls for the provision of systems that harmonize the delivery of resources to be both digital and human to enhance the practice. This study adds to the general knowledge of the last few decades, which were focused on how any country can effectively advance its digitalization in the education sector through informing policies and structures of teacher education programs. The work is a contribution to the advancement of knowledge in the areas of sustainable professional development in relation to strategic areas and shows a direction in which education stakeholders can adopt to enhance digital competencies among teaching faculties.

8. Conclusion:

Conducting such a study on a different sample of public-school teachers and comparing the results of this study with the results of those studies to obtain a clearer picture of the degree to which teachers possess digital learning skills. Work seriously by the Ministry of Education to activate the live broadcast feature between the teacher and the student through the educational platform in public schools. We present the proposed vision for developing professional development programs for teachers considering the requirements of the Fourth Industrial Revolution, including its starting

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points, components, stages and mechanisms for its implementation, obstacles to its implementation, how to overcome them, and indicators of its success.

In conclusion, it can be said that if the proposed vision can be implemented, it will contribute significantly to enriching the educational process, increasing its effectiveness, and keeping pace with the Fourth Industrial Revolution by raising the cognitive and skill levels of an important element of the educational process inputs, namely the teacher.

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