The effectiveness of a proposed training program in developing digital learning skills among practical education students at Al-Balqa applied university in Jordan

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Abstract This study aimed to investigate the effectiveness of a proposed training program based on associative communication theory in developing digital learning skills among practical education students at Al-Balqa Applied University in Jordan. It utilized a descriptive and experimental approach with a semiexperimental design on a sample consisting of 100 practical education students at Al-Huson College at Al-Balqa University. They were randomly divided into a control group consisting of 50 students and an experimental group consisting of 50 students. The researchers prepared a proposed training program to develop the digital learning skills of the experimental group, which consisted of 12 training sessions. The digital learning skills test was applied, which consists of 28 questions distributed evenly on four main axes of digital learning, namely, basic skills for digital learning, managing digital learning, using digital learning applications, and applying digital learning in the educational process. The results showed that there were statistically significant differences between the mean scores of the experimental group (18.60) and the control group (10.81) in the post application of the digital learning skills test. The findings were in favor of the experimental group that was trained in the program, which confirms the effectiveness of the training program. Finally, the study recommended the development of training programs to provide practical education students with digital learning skills and to enhance their ability to use and employ modern learning technologies.

Keywords: training program, digital learning skills, communication theory, practical education students, Al-Balqa Applied University

1. Introduction

The current era is characterized by rapid changes in the field of knowledge and information resulting from digital progress in the fields of communication, information, electronic applications, and Internet networks. The era of technology and information and communication technology is where modern terms such as websites, electronic management, e-learning, and virtual laboratories emerged (Carayannis et al 2022; Madden 2015; Park 2021). Today, the world is witnessing rapid technological development and a huge digital shift, which includes all areas of life and significantly deepens the educational field. Globalization and technological advancements are enthralling organizations to advance fresh strategic directions (Fareed et al 2016). As a result, digital technology is used to deliver education, knowledge, and skills in various innovative ways. To keep pace with this development, individuals must be prepared to interact with technology and continue to develop and renew their digital skills. The new economic and living environment is increasingly characterized by flat networks and hierarchies, generating a more digital world (Fülöp et al 2023). The pandemic significantly impacted the digitization and transition to an e-learning type of learning (Fülöp et al 2022).

Digital progress represented in information and communication technology has imposed itself on the educational process and teaching methods. Hence, electronic resources have helped to form positive attitudes among teachers towards the application of digital education in the educational process and interest in using various digital applications in education (Rahimi and Tafazoli 2022; Salem and Sobaih 2022; Sawalmeh and Qataish 2015; Szyszka et al 2022). As a result, the use of digital technology has become significant in the educational process. Due to the availability of digital technologies and Internet and communication networks, many common default concepts have emerged in contemporary education systems, such as the digitalization of education, electronic curricula, virtual laboratories, smart boards, blended education, and remote

learning (Al-Shehri 2021; Blundell et al 2020; Johnson et al 2022; Prestridge et al 2021; Willermark and Gellerstedt 2022; Willermark and Islind 2022).

The possession of digital education skills and applications by teachers, administrators, and supervisors working in educational institutions has become a condition for their professional growth and a prerequisite for practicing the teaching profession or educational leadership in most educational systems in the world (Waylz 2011). Therefore, using digital technologies in the educational process is important, especially since dealing with them is a necessity and an inevitable fact, as many educators see the digitization of education as a solution to many educational challenges related to qualitative and quantitative aspects (García-Morales et al 2021; Hosary 2016; Marghani 2016; Schmidt and Tang 2020).

Therefore, progress in the fields of technical digital communications, information, the spread of digital networks, and the Worldwide Web contributed to the expansion of the use and development of digital multimedia software, simulation software, design of virtual learning platforms, and the creation of educational software in various academic subjects (Al-Shamrani 2018; Alshammari et al 2022; Nasir and Ngah 2022; Williams 2022). Livingstone (2015) affirms that digital education is based on the principle of merging the learning management system (Moodle) and the digital learning environment, as it aims to make learning more effective and develop digital skills among teachers and students. Additionally, Cheng and Wang (2011) add that digital education environments are based on the creation of an imaginary educational environment that simulates reality, allowing for interaction between teachers and students despite the spatial distance between them, which contributes to creating an educational environment that stimulates students to learn.

The development of technology is influential in increasing the educational process system and raising the efficiency of those in charge of it. Striving towards designing technical training programs that satisfy needs and increase motivation might help in raising outstanding and creative students (Al-Shehri 2021; Willermark and Gellerstedt 2022). Thus, a teacher's digital professional development is a purposeful and intended process driven by the teacher's motives and directions. It confirms a teacher's responsibility in his or her professional growth and role in developing the educational process. In line with the requirements of knowledge and digital society, the need to continuously develop training for teachers is considered significant (Sem'an 2018). Copriady (2018) confirmed that training for teachers helped them form positive attitudes, master purposeful teaching, and acquire collaborative and technical skills. Accordingly, Bates and Watson (2014) stressed the importance of digital training for teachers, which is based on the precise identification of knowledge and skills to achieve a set of goals and advantages. Specifically, digital training develops educational experiences, updates teacher information, and increases the ability to use digital technology (Al-Odhayani 2020). Figure 1 shows the three aspects of digital training benefits for teachers.
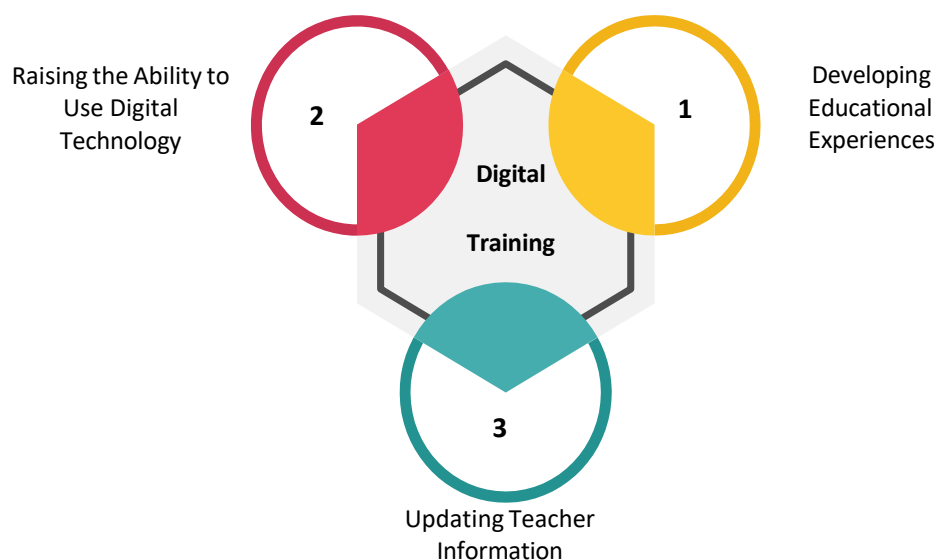

Raising the Ability to Use Digital Technology

2

Digital

Training

Developing Educational Experiences

1

3

Updating Teacher Information

Figure 1 The Importance and Benefits of Digital Training.

Training practical education students to use digital learning skills through targeted training programs is one of the strategies that provides an opportunity for students to learn the training subject and deal with their abilities and speed of learning. In this sense, digital training provides content, educational experiences, various activities, and alternatives from which a trainee chooses what suits him or her based on circumstances and capabilities (Al-Yami 2020; Brown et al 2022; Greenhow et al 2022; Redmond et al 2018). Hence, the current study aims to identify the need to reveal the effectiveness of a proposed training program for developing digital learning skills among students of practical education at Al-Balqa Applied University.

1.1. Research problem and questions

The sense of problem of the current study stemmed from the following two points:

1. Al-Balqa Applied University aims to provide practical education teachers with digital learning skills, in line with the vision of Jordanian universities to introduce digital technology into the educational process and to enhance students with advanced digital learning skills to improve the educational process. However, the researchers noticed, through their work at Al-Balqa Applied University, the presence of training programs that deal with training students of practical education on digital learning skills, in addition to the request of this category to provide training programs on digital learning skills, due to their great impact on the development of the educational learning process.

2. Exploratory study: Based on personal observation, the researchers conducted an exploratory study aimed at identifying the extent to which practicum students are familiar with digital learning skills and applied it to a random sample of (20) students. The students confirmed that they have deficiencies in the concepts and skills of digital learning. This is due to the lack of training workshops on digital learning skills needed for them.

From the foregoing, the problem of the current study can be identified in the need to reveal the effectiveness of a proposed training program for developing digital learning skills among students of practical education at Al-Balqa Applied University. The problem of the study was identified by the following question: What is the effectiveness of a proposed training program according to communication theory to develop digital learning skills among practical education students at Al-Balqa Applied University?

1.2. Objectives of the Study

2. Determining a list of digital learning skills that must be acquired by practical education students at Al-Balqa Applied University.
3. Building a proposed training program to develop digital learning skills.

Examining the effectiveness of the proposed training program in developing digital learning skills among general education students.

1.3. Procedural definitions

The proposed training program: The researchers define it procedurally as an asynchronous technical digital training environment that includes a set of digital learning skills provided to the trainee with interactive digital activities to develop the digital learning skills specified in the program.

Digital learning skills: The researchers define them procedurally as some of the digital learning skills required for practicum students, which were identified in the program, namely, mastering the basic skills of digital learning, managing digital learning processes, using digital learning media, and employing digital learning.

2. Literature review

2.1. Learning Skills and Digital Training

Education in the era of digital knowledge requires reformulating digital skills needed for teachers in light of digital technology. In line with that, Reisoğlu (2022) stressed the importance of professional development for teachers and its role in meeting the needs of students and developing their digital skills. Since the educational process is an essential element in bringing about this development, preparing the teacher who can keep pace with these transformations and changes and benefit from them requires a reconsideration of the digital development of the teacher in terms of concept, content, and style. Moreover, it is also affected by modern trends and the availability of technical means and communications (Basilotta-Gómez-Pablos et al 2022).

Accordingly, training student teachers in digital education in the digital era is important (Basilotta-Gómez-Pablos et al 2022; Fernández-Batanero et al 2020; Zhao et al 2021). Bahjat and Abdel Moneim (2018) pointed out that training student teachers on digital education is a process in which digital expertise and skills are acquired more recently and that process relies on benefiting from web-based systems and content management systems. Additionally, Muharram (2019) believes that the concept of digital training is an interactive process during which training knowledge and skills are transferred and managed remotely between trainers and trainees through various and appropriate digital means of communication to provide trainees with those skills and knowledge where they are. Moreover, Shabanat (2021) stresses the importance of including digital learning skills in digital programs and learning content and the need to use them in the educational process, as it has become an educational necessity for both teachers and students.

Digital training can be defined as using computer technology, networks, and multimedia-based digital applications, in which trainees can accomplish the training process of set objectives in the shortest amount of time and with the least amount of effort (Al-Juhani 2021; Shurygin et al 2022). It can also be defined as the process of communication between both trainers and trainees so that each of them is spatially or temporally far from the other while strengthening communication

with digital technology to develop the educational process and the highest levels of quality without being restricted by the limits of time and place (Hejazy 2017; Cattaneo et al 2022; Korte 2022). Digital training is a digital learning and training environment based on the use of modern digital technologies, such as computers and the Internet, aimed at building specific content and delivering it to trainees through various and varied media, such as videos, graphics, images, texts and other technical media.

From the foregoing, the use of digital training programs for teachers leads to a shift in the educational situation from imitation and stagnation to effectiveness and dynamism. The senses of the trainee have a positive role in the achievement and the trend towards training materials, especially the digital technology programs necessary for teachers in schools. In line with that, Al-Balqa Applied University has set within its plans and programs to provide students with practical education with the skills of digital learning and the search for knowledge. However, the digital age, as studied by Adzaai (2019) and Badir (2019), showed that digital training programs do not achieve their goals and do not bring about an appropriate change in education patterns, so they are accustomed.

Based on the vital role of students of practical education in implementing and succeeding in the educational process and improving learning outcomes, it has become necessary for teachers to maintain a level characterized by innovation in digital learning skills, which are considered among the most prominent skills of the twenty-first century. Therefore, the issue of teacher preparation and professional development occupied a space. It is of wide interest to those concerned in the educational field, so we find that it is one of the important and vital issues whose importance stems from the role of the teacher and the need to provide all the necessary capabilities for his preparation and qualification (Al-Yami 2020; Greenhow et al 2022).

The methods of using digital technology and its technologies in the educational process vary from one teacher to another, as their use depends on the availability of digital educational programs and the skill of the teacher in using them. Teachers' technological competencies are reflected in the knowledge, skills, attitudes, and values that they should gain and master in the fields of educational technology, especially in designing, producing, and evaluating educational materials, as well as in the field of operating educational devices in their various forms (Al-Sharidah 2022). Among the most prominent of these innovations that teachers can use in education are Skype, Viber, Facebook, WhatsApp, Twitter, Kal Board, etc. Through these media, teachers can create groups of students for discussion. Additionally, students can send individual and group messages to communicate with their teachers at anytime and anywhere (Al-Odhayani 2020). Given the importance of using digital learning skills in the educational process, most advanced educational systems have tended to establish an educational system based on the use of digital technologies in education, so many countries have worked to introduce technology, educational techniques, and communication into their educational systems to improve the educational process. Among these countries is Jordan, whose educational institutions have worked on training many leadership, educational and administrative cadres on the use of digital technologies, which focused on providing teachers with digital learning skills necessary for teachers and students (Akram and Hussain 2018).

While many previous studies have emphasized the importance of preparing preservice teachers to use technology in their teaching, few have focused on how to effectively promote their knowledge and use of it (Baran et al 2017 cited in Hsu and Lin 2020). Researchers asserted the necessity of developing college students' competencies in digital literacy, computer use, and multimedia and computer-based learning, which includes blended learning classes, distance learning, cloud technologies, and virtual and augmented reality tools (Al-Sharidah 2022). Therefore, this study aims to explore the effectiveness of a training program based on digital learning skills among students of practical education at Al-Balqa Applied University.

2.2. Communication Theory

The educational field is dominated by many strategies and theories concerned with renewal and development in the field of developing digital learning skills for student teachers. The most prominent of these strategies is communication theory, which seeks to clarify and achieve learning in light of the large flow of information in line with the needs and requirements of the twenty-first century (Bates and Watson 2014). Therefore, communication theory is considered one of the theories associated with contemporary technological development, especially the significant development in information and communication technology (ICT). At the same time, communication theory takes advantage of three traditional educational theories, behavioral, cognitive, and constructivist, by assembling salient elements from three aspects, educational, social, and technological, to put learning through electronic environments and networks in an effective social framework that allows learners to communicate and interact with each other while learning (Al-Mulhim 2021).

Generally, communication theory can be defined as "A theory that discusses education as a network of personal knowledge that is created to involve individuals in the educational process" (Al-Shahrani 2020). In this sense, it can be said that it is a theory that seeks to explain how learning takes place in electronic environments, including modern means of communication, and how they are affected by social changes. Communication theory focuses on digital learning through networks and on the use of information and communication technology tools in education. It also views learning as actionable knowledge that the individual obtains through social media, databases, educational institutions, and other

sources. These sources can be represented with a network of nodes in which each node represents a source of knowledge (Muharram 2019). This theory believes that the acquisition of knowledge (the occurrence of learning) takes place only by building new knowledge for the individual and not by simply acquiring it, in the sense that the individual who is able to learn is the one who has the ability to see the connections between the different sources of knowledge (contracts), which enables him to understand the world and act creatively (Al-Odhayani 2020).

According to communication theory, the main elements of education design are addressed in different ways. With regard to educational goals, the focus is not on specific behavioral goals, as is the case in traditional education. It also develops students' ability to distinguish between important and unimportant information. For educational content, content analysis is not considered a central part of the content design process, as is the case in traditional education. Among the most prominent of these activities is continuous participation in the development of Wiki content for academic courses, sharing articles, preparing and publishing some educational materials, carrying out blogging activities through Twitter, and participating in various media such as audio, pictures, videos, and likes. For evaluation, it is not just a mastery of the content of education as is the case in traditional education, but it goes beyond it to mastering the skills of access to knowledge and the ability to form social communication and deal with information and others.

Numerous studies have been conducted at the local and global levels, which are concerned with researching digital learning and ways to develop it from different angles. The study by Al-Shehri (2021) aimed the level of digital learning skills and attitudes towards using them in teaching mathematics among students at the College of Education at King Khalid University. Additionally, the study of Al-Shibl (2021) attempted to identify the reality of digital learning to enhance twenty-first century skills from the point of view of mathematics teachers and supervisors at the secondary level in the Kingdom of Saudi Arabia. The findings showed that the degree of practicing digital learning skills to enhance twenty-first century skills is a medium from the female teachers' point of view. Meanwhile, the study by Al-Awn (2021) attempted to indicate the degree of Islamic education teachers' possession in Jordan of digital learning skills necessary for distance education. The results showed that the degree of Islamic education teachers' possession of these skills is medium. In a similar vein, Nedime (2020) identified the readiness of schools for digital education and the attitudes of teachers towards the use of digital learning. Al-Taj and Wafaa (2020) tried to identify the reality of digital learning among faculty members at Amman Arab University. The results showed that the level of digital learning at Amman Arab University was average.

Additionally, Al-Odhayani (2020) conducted a study aimed at revealing the effectiveness of a proposed training program for developing digital classroom skills among faculty members at Shaqra University. The results showed the effectiveness of a proposed training program for developing digital classroom skills among faculty members at the university. Almost similarly, the study of Al-Zaboon (2019) aimed to identify the degree of availability of the requirements of digital learning skills in teaching Islamic education from the point of view of a sample of teachers of Islamic education in the governorates of Jerash and Ajloun in Jordan. The results showed that the degree of availability of the requirements for applying digital learning is medium. A study conducted by Duggan and Al-Jabr (2018) aimed to reveal the effectiveness of digital learning in developing scientific, cognitive, and meta-cognitive thinking skills among secondary school students in Al-Ahsa Governorate schools in the Kingdom of Saudi Arabia. This finding indicated the effectiveness of using digital learning in developing some scientific thinking and thinking skills, such as cognitive and metacognitive skills, among female students. Moreover, the study by Al-Hamidi (2017) attempted to identify the degree of Arabic language teachers' possession of digital learning skills in Kuwait. The results showed that the degree of teachers' possession of digital learning skills was medium. Meanwhile, a study conducted by Al-Mahamadi (2016) aimed to identify the degree of mastery of Arabic language teachers at the secondary level of the skills necessary to use electronic digital learning and prepare electronic courses. The results showed that the degree of mastery of Arabic language teachers of the skills necessary to use electronic digital learning and prepare electronic courses came at the level of weak and at all skills.

From the previous presentation, the current study is in line with some research that focused on researching the development of digital learning skills and their application in the educational process (Al-Shehri 2021; Al-Odhayani 2020; Greenhow et al 2022; Duggan and Al-Jabr 2018; Al-Mahamadi 2016). However, it differs from those studies that were concerned with revealing the reality of employing digital learning in the educational process (Al-Awn 2021; Al-Taj and Wafaa 2020; Al-Zaboon 2019). It also agrees with the studies that employed training programs using the semiexperimental approach to develop digital learning skills among teachers, students, or faculty members. Nevertheless, it can be distinguished from other studies in its attempt to verify the effectiveness of a proposed training program according to the associative communication theory for developing digital learning skills among practical education students at Al-Balqa Applied University, which justifies the importance of conducting this study.

3. Methodology

In light of the objective of this study, the researchers followed the analytical descriptive approach to identify the digital learning skills needed for practical education students and the experimental approach with a semiexperimental design to reveal the effectiveness of a proposed training programme for developing digital learning skills of the experimental group.

3.1. Semi-Experimental Design

The study used the experimental design and control groups with pre- and post-measurement and the appropriate statistical test, the T test for two independent samples. Table 1 shows the following:

Table 1 The quasi-experimental design of the research.

Group	Measuring Tools - Before	Teaching method	Measurement Tools - After
Experimental	Digital Learning Skills Test - Pre	Proposed training programme	Digital learning skills test
Control	Digital Learning Skills Test - Pre	-	Digital learning skills test

3.2. Sample

The sample of the study consisted of all practical education students at Al-Balqa Applied University - Al-Husn University College, consisting of 100 male and female students. They were randomly distributed to a control group consisting of 50 male and female students and an experimental group consisting of 50 male and female students.

3.3. Study Tools

To achieve the objectives of the current study, the researchers prepared the following tools:

List of some digital learning skills

A list of digital learning skills was prepared and used in formulating the vocabulary of the digital learning skills test to measure the digital learning skills of the two study groups, the use of digital learning applications, and the application of digital learning in the educational process, and under each skill, it has 8 digital subskills. To ensure its validity, it was presented to a group of arbitrators in the field of educational technologies, and the required modifications were made in light of their appropriate scientific suggestions. The list in its final form consisted of 28 subskills distributed equally over the four main digital skills (Table 2).

Digital learning skills test

This test aims to measure the digital learning skills of practical education students at Al-Balqa Applied University. In light of this goal, the researchers built the test by reviewing the literature and previous studies in the field of using digital technology in education and surveying the opinions of a sample of educational specialists through interviews. Based on the list of digital learning skills, the researchers prepared a test that measures the digital learning skills to be measured among the study individuals. The identified four main digital learning skills and 28 subskills of digital learning are as follows:

The first skill: The basic skills of digital learning, measured by 7 questions.

The second skill is digital learning management, measured by 7 questions.

The third skill: Using digital learning applications, measured by 7 questions.

The fourth skill, applying digital learning to improve learning processes, was measured by 7 questions.

Table 2 Specifications of the Digital Learning Skills Test.

Skills	Remembering 7%	Understanding 11%	Implementation 35%	Analysis %-	Composition 7%	Evaluation 40%	Total 100%
Basic skills for digital learning	2	2	2	-	-	1	7
Digital Learning Management	-	1	3	-	2	1	7
Use of digital learning applications	-	-	2	-	-	5	7
Application of digital learning in the educational process	-	-	3	-	-	4	7
Total	2	2	10	-	2	11	28

3.4. Validation of the Test

After the test was prepared in its initial form, it was presented to a group of faculty members at Al-Balqa Applied University, consisting of 8 arbitrators, to express their opinions and observations about the validity of the test. The arbitrators expressed their opinions about the validity of the test and its suitability for the application while making some observations. In light of these observations, the test was amended, and it consists of 28 questions in its final form.

3.5. Test Stability

To verify the stability of the test, the researchers found the stability coefficient for the test questions using the test-retest method, where the test was applied to a similar survey sample and then reapplied again with a two-week interval

between the first and second application. The results showed that the coefficient of stability of the test ranged between 0.80-0.84, and the coefficient of total stability of the test was 0.83, which indicates that the test has a coefficient of stability suitable for the application

3.6. Equivalence of the Two Groups

The students' scores were monitored in the pretest before the start of the experimental study, and the scores were extracted to adjust the achievement variable in the test. The t test was used to identify the differences between the scores of the students in the control and experimental groups. The results showed that there were no statistically significant differences at the significance level of 0.05 in the scores of students in the two groups (experimental and control) in the pretest, as the calculated t value for digital learning skills was 0.198, which is a non-statistically significant value. This indicates the equality of the two groups (experimental and control) in the pretest.

3.7. Test Correction

The value of students' grades on the test is determined from 0 degrees as a minimum to 28 degrees as a maximum for achievement so that the test taker gets one point if he answers the question correctly.

3.8. The proposed training program

Since the current study aims to measure the effect of a proposed training program to develop digital learning skills for practical education students, the methodological procedures for building the program proceeded as follows:

First, determining the needs of practicum students to be trained in some digital learning skills and to determine the needs of the study individuals in terms of digital learning skills, previous research, studies, and educational and technical literature that dealt with digital learning skills was reviewed, and then access to a set of main skills, which included 28 subskills.

Second: Designing the proposed program for developing digital learning skills. To construct the proposed training program, the researchers looked at a number of educational design models that dealt with how to design and build training programs that are based on the theory of associative communication, including models (Al-Odhayani 2020; Duggan and Al-Jabr 2018; Sem'an 2018). The researchers relied on choosing the general model (ADDIE) to design the proposed program, as the general model of educational design is the basis from which all educational design models emerged with some modifications that suit the nature of the current study (Figure 2). The proposed model consists of the following stages (Al-Mulhim 2021):

Figure 2 The General Model of Education Design.

3.8.1. First: The study and analysis phase

It included the following steps:
Determining the characteristics of the target group: Practical education students at Al-Balqa University, consisting of 100 male and female students.

Identification of training needs: The training needs were represented in the existence of a need for practical education students to acquire digital learning skills, and the training needs were reached through previous studies and research related to digital learning skills (Willermark and Gellerstedt 2022; Al-Odhayani 2020; Duggan and Al-Jabr 2018). Accordingly, a number of general objectives were identified to help students achieve the required training outcomes, which can be presented as follows:

As shown in Table 3, the researchers suggested dividing the content of the program into parts to be presented in 3 training weeks, with 4 training sessions each week.

Table 3 Specifications of the Digital Learning Skills Test.

Training days	Training Content
1st week (4 days)	First session: Introducing the training program.
	The second session: premeasurement of digital learning skills.
	Third session: (basic concepts in digital learning).
	Fourth session: Using office applications in writing educational texts in digital learning.
Second week (4 days)	The first session: managing digital learning systems.
	The second session: the skill of accessing digital content in digital libraries.
	Third session: Using digital learning applications and media and digital browsers (Google).
	Fourth session: the skill of employing digital educational programs.
Third week (4 days)	Session 1: Presentation of some digital educational videos and presentations.
	Session Two: Employing digital learning to improve digital learning processes.
	Third session: Designing digital presentations for a specific educational topic.
	Fourth session: telemetry.

3.8.2. Second: The design phase

It includes the following steps:

Determine the training outcomes: The proposed program aims to develop digital learning skills among practical education students at Al-Balqa University.

Determine the program elements: The proposed program elements were identified in light of the digital learning skills that represent the training needs. The researchers organized the content of the program into 4 main digital learning skills and 28 digital learning subskills.

The proposed strategies in the program: Application strategies varied between self-learning, theoretical meetings, panel discussions, training workshops, practical application, and the use of digital activities carried out through brainstorming, dialogue, discussion, and collaborative activities that take place during work in small groups and participatory activities by designing implementing digital educational presentations and some video and audio files that contribute to the experimental group's acquisition of digital learning skills.

3.8.3. Third: The production stage

The materials of the proposed program, such as printed materials and electronic blogs, were designed, produced and published. Other ready-made materials were also selected, and some modifications were made to suit the program's intended outputs, such as audio and video files.

3.8.4. Fourth: The evaluation stage

The training program was presented to a group of arbitrators specialized in the field of educational technologies to express their opinions and suggestions on the skills and tools of the training program, the appropriateness of its contents, the time allotted for implementing the program, and to suggest any other observations they deemed appropriate. The arbitrators' notes were considered and implemented on the program before its final application.

3.8.5. Fifth: Use phase

The researchers coordinated with the sample of the study to implement the program. The program was applied according to the following steps:
1.   Preapplication of the study tools: a questionnaire on digital learning skills in the two study groups before the actual application of the program.
2.   Application of the program.

Post application of the study tools: After completing the application of the training program and carrying out all the activities, the post application of the study tools was applied to the two study groups.

3.9. Statistical methods

The study relied on the statistical package for social sciences (SPSS) software in conducting the statistical analyses that were used in this study, represented in the arithmetic averages of the performance of the two study groups on the vocabulary of digital learning skills included, and the t-test to compare the average scores of the experimental and control groups in the post application of digital learning skills.

4. Results of the study

Results of the study question: What is the effectiveness of a proposed training program according to the associative communication theory to develop digital learning skills among practical education students at Al-Balqa Applied University? To answer this question, a T test was applied to compare the mean scores of the experimental and control groups in the post application of digital learning skills. Table 4 shows the results:

Table 4 Results of the t test to compare the mean scores of the experimental and control groups in the post application.

Digital learning skills	Group	n	Average	Standard Deviation	T value	Significance Level	Effect Size
Basic skills for digital learning	control	50	10.90	1.65	3.60	0.000 Statistically significant	0.228
	Experimental	50	17.87	2.00			
Digital Learning Management	control	50	10.45	1.94	3.33	0.000 Statistically significant	0.202
	Experimental	50	18.20	1.61			
Use of digital learning applications	control	50	17.95	2.38	2.88	0.000 Statistically significant	0.159
	Experimental	50	19.83	2.03			
Digital learning applications to improve learning processes	control	50	12.95	1.64	3.01	0.000 Statistically significant	0.171
	Experimental	50	18.50	1.81			
The total score for the test	control	50	10.81	5.72	5.86	0.000 Statistically significant	0.438
	Experimental	50	18.6	5.84			

It is clear from Table 4 that there is a statistically significant difference between the mean scores of the experimental and control study groups in the practical performance of digital learning skills with a large effect size, as the level of statistical significance of the value of the T test reached (0.000) for the total score of the test and its constituent subdimensions. It is a smaller value than the level of significance (0.01), which indicates that there is a statistically significant difference at the level of significance ($\alpha \leq 0.01$) between the mean scores of the experimental group and the control group in the post application of the digital learning skills test in favor of the scores of the experimental group.

This result is due to several factors, the most important of which are as follows:

1. The training environment for the skills of the proposed program, through which digital learning skills were presented in an organized and interesting manner to the trainees, as that technical environment included many media elements such as texts and educational video clips accompanied by audio, which displays the digital skill performance model so that it is presented to the trainee How to perform this performance, and digital video clips were adopted as a model for the performance of the digital skill, which led to an increase in the trainee's attention to the digital model presented to him, and thus the rate of retrieval of this information increased in subsequent training situations.

2. Designing digital educational presentations in a way that enabled the members of the experimental group to build meaningful technical digital links between words and pictures, and they learned through texts and pictures more effectively than through learning through pictures alone, as well as providing digital content in an organized and easy manner, allowed them to navigate between them when their desire, rather than showing them continuously automatically, is also to divide educational digital content into small units and lessons.

Organizing the skills of the proposed training program gradually helped students to recognize the extent of their progress in acquiring digital skills and thus increased their confirmation of correct performances and stopped the wrong performance, which caused a change towards increasing their skill proficiency rate. This is consistent with the results of the study (Willermark and Gellerstedt 2022; Al-Odhayani 2020; Greenhow et al 2022; Duggan and Al-Jabr 2018), all of which confirmed the effectiveness of a proposed training program in developing the digital learning skills of the experimental

group.

To determine the value of the difference in the mean scores of the two groups (control and experimental) on the post-test digital learning skills, the modified arithmetic averages resulting from isolating the effect of the performance of the members of the two groups in the pretest of digital learning skills on their performance in the post-test were extracted. The results are presented in Table 5.

Table 5 Adjusted arithmetic means of the scores of the experimental and control groups on the post-test of digital learning skills after isolating the effect of the pretest.

Digital Learning Skills	Group	n	Average	Standard Error
Basic skills for digital learning	Control	50	10.92	0.290
	Experimental	50	17.90	
Digital Learning Management	Control	50	10.47	0.313
	Experimental	50	18.18	
Use of digital learning applications	Control	50	11.95	0.287
	Experimental	50	19.85	
Digital learning applications to improve learning processes	Control	50	12.90	0.278
	Experimental	50	18.47	
overall Score	Control	50	11.32	
	Experimental	50	18.57	

Table 5 shows the adjusted arithmetic averages of the scores of the experimental and control groups on digital learning skills after isolating the effect of the pretest on the control group who were trained in the usual way.

5. Conclusions

This study investigated the effectiveness of a proposed training program based on associative communication theory in developing digital learning skills among practical education students at Al-Balqa Applied University in Jordan. It utilized a descriptive and experimental approach with a semiexperimental design. The results showed that there were statistically significant differences between the mean scores of the experimental group and the control group in the post application of the digital learning skills test. The findings were in favor of the experimental group that was trained in the program, which confirms the effectiveness of the training program. The aim of the study was to identify the need to reveal the effectiveness of a proposed training program for developing digital learning skills among students of practical education at Al-Balqa Applied University.

6. Recommendations

Considering the study results, the researchers recommend the following:

1. Developing training programs to provide practical education students with digital learning skills and to enhance their ability to use and employ modern learning technologies.
2. Motivating practical education students at Al-Balqa University towards employing digital technology in the educational process.
3. Employing modern technologies in training practical education students at Al-Balqa Applied University to keep pace with technological development.
4. Initiate Al-Balqa Applied University to provide a digital training environment and digital academic content supported by modern digital technologies and media.
5. Conducting a study examining the effectiveness of a training program using digital standards in designing digital educational content in certain subjects to develop the digital professional performance of student teachers.

Conducting an evaluation study of the difficulties that hinder the use and employment of digital learning at Al-Balqa Applied University.

7. Implications of study

7.1. Theoretical Implications

The importance of this study developed from the fact that it intended to provide practical education students with digital skills that can be employed in the educational process, and it also drew the attention of teachers of practical education students at Al-Balqa University towards the importance of providing students with these skills. It also enhanced the attitudes of students and teachers towards employing digital technology in the process. It is hoped that the results of this study will open the way for researchers to conduct other studies dealing with digital learning skills and processes from different angles.

7.2. Practical Implications

Having sound digital literacy skills and having the confidence to grow them is becoming an essential professional skill for all graduates. This research is a pioneering investigation for university experts and decision makers to realize the importance of developing digital learning skills for university graduates in Jordanian universities. However, this study is expected to enable Jordanian universities to improve and develop outcomes of the educational process mainly by adopting new teaching strategies that improve students' writing skills.

8. Limitations and future research directions of the study

First, this study was limited in terms of the objectives of the study, i.e., the effectiveness of a proposed training program to develop digital learning skills among practical education students. Second, the limitations of the study are also in light of the population and sample, which consist of 100 students in practical education majoring in vocational education only from single university settings (Al-Balqa Applied University - Al-Husn University College). Last, these students were only from the first semester of the academic year 2022/2023. Future researchers can add to the findings of the current study by indulging other private and public sector universities in Jordan.

Ethical considerations

Not applicable.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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