



Effectiveness of E-learning Environments in Developing Skills for Designing E-tivities Based on Gamification for Teachers of Technology in Gaza

Eficacia de los entornos de aprendizaje electrónico en el desarrollo de habilidades para el diseño de actividades electrónicas basado en la gamificación para los profesores de tecnología en Gaza

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ABSTRACT

The Corona Global Pandemic created challenges for teachers and students in using E-learning tools in the teaching and learning process. Thus, training teachers to use these tools was extremely crucial. The current study examined the effectiveness of E-learning environments on developing the skills to design E-tivities based on Gamification for Gaza technology teachers. The researchers followed the quasi-experimental approach for two randomly selected experimental groups. The first experimental group was taught via E-learning social environment Edmodo, while the second experimental group was taught via the personal E-learning environment WordPress. Every group consists of 30 teachers teaching Information Technology for secondary students. The group equivalence was adjusted before the experiment in designing E-tivities skills based on gamification. To collect data, the researchers prepared an observation card of the skills for designing E-tivities based on gamification. The observation card dealt with the design tools and their sub-indicators, and it was applied before and after the intervention phase. The results showed that there were no statistically significant differences at the level ($\alpha \leq 0.05$) between the mean of the teachers' scores in the experimental social environment group Edmodo, and the experimental personal learning environment group WordPress in the post-application of the observation card for designing E-tivities skills based on gamification. Additionally, the findings revealed great effectiveness of E-learning social environment Edmodo and the personal E-learning environment WordPress on developing skills for designing E-tivities based on gamification. In light of these results, it is recommended that social and personal E-learning environments should be employed in developing the skills of teachers and improving their experiences. This helps organize and display information in addition to facilitating communication between the components of the educational process and the benefit of using these environments in training teachers under the Global pandemic, Coronavirus, COVID-19.

RESUMEN

Palabras clave

E-learning

Entornos Sociales de Aprendizaje

Entornos Personales de Aprendizaje

Edmodo, WordPress, Gamificación

E-actividades

El modelo de las cinco etapas

La pandemia mundial del Coronavirus formuló desafíos tanto para los profesores como para los estudiantes con respecto al uso de herramientas de aprendizaje electrónico en el marco del proceso de enseñanza y aprendizaje. Así las cosas, la capacitación que los maestros necesitan para utilizar aquellas herramientas era sumamente crucial. En este estudio se examinó la eficacia de los entornos de aprendizaje electrónico en el desarrollo de las aptitudes para diseñar actividades electrónicas basadas en el juego por parte de los profesores de tecnología de Gaza. Los investigadores siguieron un enfoque cuasi experimental para el cual se recurrió a dos grupos experimentales seleccionados al azar. Al primer grupo experimental se le enseñó a través del entorno social

de aprendizaje electrónico Edmodo; al segundo grupo experimental se le enseñó a través del entorno personal de aprendizaje electrónico WordPress. Cada grupo constó de 30 profesores que enseñan Tecnología de la Información en escuelas secundarias. La equivalencia del grupo se ajustó antes del experimento en el diseño de las habilidades de E-actividades basadas en el juego. Para recoger datos, los investigadores prepararon una tarjeta de observación de las habilidades para el diseño de E-actividades basadas en la gamificación. La tarjeta de observación tiene que ver con las herramientas de diseño y sus subindicadores, y se aplicó antes y después de la fase de intervención. Los resultados mostraron que no hubo diferencias estadísticamente significativas a un intervalo de confianza de 95% ($\alpha \leq 0,05$) entre la media de las puntuaciones de los profesores en el grupo experimental de entorno social Edmodo y el grupo experimental de entorno personal de aprendizaje WordPress después de la aplicación de la tarjeta de observación para el diseño de las habilidades de E-actividades basadas en la gamificación. Por otra parte, los hallazgos revelaron una gran efectividad del entorno social de aprendizaje electrónico Edmodo y del entorno personal de aprendizaje electrónico WordPress en el desarrollo de habilidades para el diseño de actividades electrónicas basadas en la gamificación. A la luz de estos resultados, se recomienda el empleo de entornos sociales y personales de aprendizaje electrónico para el desarrollo de las habilidades de los profesores, lo que se verá reflejado en una mejora de sus experiencias. Esto es útil para organizar y mostrar la información, además de facilitar la comunicación entre los componentes del proceso educativo y el beneficio de utilizar estos entornos en la formación de los profesores en el marco de la pandemia mundial.

1. Introduction

In the current Global pandemic, Coronavirus, COVID-19, the high value of technology in the teaching process has been appeared clearly. As the educational process was interrupted in many countries of the world. The ability of the countries to continue education has been affected and was directed to rely on the skills of the teachers in using E-learning instead. UNICEF (2020) has also raised an important question within a proposal to develop a serious re-opening vision after the Global pandemic, Coronavirus, COVID-19 on the availability of high-quality E-learning in those countries that can be used and accessed within the same framework as what the education focuses on. One of the preparation ways to catch-up with the exponential spread of COVID-19 is staff preparation and training. This included arrangements for safeguarding, division of work between departments, mechanisms for teachers to remain in touch collectively for mutual support, and brief simple updates on learning technologies they already familiar with. Many institutions had plans to make greater use of technology in teaching, but the outbreak of COVID-19 meant that changes intended to occur over months or years had to be implemented in a few days (Daniel, 2020). Accordingly, this meant that the education system in times of pandemic has had to be urgently and unexpectedly transformed into a virtual modality (Fardoun et al., 2020). The proposal also focuses on the necessity to implement innovative methods and approaches to support teachers' professional development online, particularly, after the constant discontinuation of the development of these cadres since teachers are challenged to employ E-learning in the next stage of instruction. There is an urgent need to use appropriate E-learning environments that could be employed in the training process. This strengthens the modern approach in adopting such environments in teacher-training programs in the process of developing teachers' skills.

Apparently, the use of E-learning environments of various types and objectives in the process of developing teachers' skills has become a new orientation in teachers' training programs and has provided them with the skills and knowledge in the educational institutions. Consequently, the professional growth of teachers can be achieved, this is by meeting their needs through high-quality, continuous and innovative programs. E-learning has become a solution that enhances the professional growth for educators (Al-Dowayan and Mustafa, 2019:193).

Edmodo is considered the latest social network which creates an environment that stimulates and enhances student-teacher interaction and facilitates learning. Some educators see Edmodo as a new conquest in the field of education that brings advantages and benefits for both teachers and students. Yet, others maintain that it is just a natural development of education technology. Additionally, key components that make Edmodo a preferred environment for teachers and learners in the education process can be summarized as creating generic and sub-classes or groups, controlling learners' accounts, viewing the latest learning activities, providing a field of discussion and communication, a library for uploading files and learning materials, assigning quizzes and E-tivities, and many other features. All these provide full of cooperation and practice in a social frame of interaction (Al-muqran, 2019: 123-124).

Second-generation Web applications, tools, and services also helped to generate personal learning environments that build on the learners' suitable characteristics and learning styles and learn through various learning resources that can be accessed personally, and allow organized learning (Remod, 2017: 14).

Prendes et al. (2017) suggest that the concept of a personal E-learning environment is relatively new in educational research. But it can be distinguished as it is related to several well-known concepts such as learning styles, individual differences, self-organized learning. Žubrinić and Kalpić (2008) confirm that a personal E-learning environment is an environment that helps learners to control and manage their learning. Besides, this is to support those learners to set their personal learning goals to achieve the general learning goals. In the same concern, using tools such as WordPress and Wiki are also considered personal learning environments

used to achieve personal learning that is based on the individual own self-experience. This diversity in E-learning environments has challenged the researchers to choose the best in the training process. In the same context, the current study investigates the effectiveness of the social E-learning environment Edmodo and the personal E-learning environment WordPress, on developing teachers' designing E-tivities skills based on Gamification. Salmon (2013) defined E-tivities as "frameworks for enabling active and participative online learning by individuals and groups" p.5. Several studies such as (Slèvin, 2006; Pettenati and Cigognini, 2009; Wright, 2014) have agreed that the key to active online learning is Salmon's definition of E-tivities. These activities were considered as an important resource that allows teachers who teach students in a variety of electronic environments to design meaningful activities. In the same concern, Salmon developed a Five-Stage Model that creates a general framework for designing E-tivities, intending to guide teachers toward more collaborative and cooperative activities with E-learning tools and environments, develop critical thinking, metacognitive thinking, and focuses on creative skills, such as discovery and innovation, and practice (Ruzmetova, 2018: 283).

Gamification is one of the modern concepts that can be applied in designing E-tivities. Benhadj et al. (2019) assure that using gamification in instruction is necessary and unavoidable and teachers should be encouraged to use it as it makes a significant difference in students' learning. This concept refers to the application of game-design elements and game principles in non-game contexts. Deterding et al. (2011) define gamification as game-based mechanics, aesthetics, and game thinking to engage individuals, motivate them, enhance their learning and problem solving (Kapp, 2012). This can change behaviors in non-game situations in an educational context (Robson et al., 2015). Gamification is based on a range of concepts such as motivation and encouragement, effectiveness, and immediate feedback (Ibn al-Hadlaq, 2019: 315).

Many applications such as Kahoot offer some gamification mechanisms. Kahoot is a platform that contains electronic tests based on gamification mechanisms. It makes learning more enjoyable, interactive, and competitive since it provides many elements of gamification mechanisms such as the timer, visualization symbol, and leaderboard (Kaur and Naderajan, 2019: 5). Pilař et al. (2020), Hernández-Ramos and Belmonte (2020) and Benhadj et al. (2019) assure that from students' point of view, using Kahoot and Classdojo in teaching have a positive effect, and these applications are practical and fun that encourage and motivate learners to learn. To make E-tivities design skills based on gamification, the researchers employed some of the gamification application such as Kahoot, Classdojo, and Socrative and the five stages of Salomon's model in a complementary way with the tools for designing E-tivities, as these activities can only be designed by the teacher with a set of tools and applications available online.

The researchers note that there is a variety of tools used in designing E-tivities, and some studies designed their tools according to their perception of E-tivities such as Adams (2019) and El-Tabakh and Ismail (2019). On the other hand, some studies employed the tools offered by learning management systems such as Moodle, Blackboard as the Pineda Hoyos and Tamayo Cano (2016), Juhani (2018) in the design of E-tivities, Dempsey et al. (2018) used a blog for designing E-tivities. Similarly, some studies used the tools of gamification such as Kahoot or Classdojo (Baydas and Cicek, 2019; Hernández-Ramos and Belmonte, 2020; Benhadj et al., 2019).

Due to the diversity of these tools, the researchers faced a real challenge in choosing the right tools to design E-tivities, which give teachers great flexibility in designing their electronic activities. Thus, in this study, the right tools have been chosen by a group of experts including the researchers who have classified them into six domains as follows: Video platforms, educational blogs, learning management system, graphic design editors, mind mapping, cloud computing applications, and gamification applications.

To conclude, it can be said that developing the skills of technology teachers in designing activities based on gamification become a vital requirement, especially in the Global Pandemic Coronavirus COVID-19 (García-Peñalvo and Corell, 2020). This provides those teachers with many tools that facilitate their design and motivate their students to learn. In addition, this could help in training the teachers to use social and personal E-learning environments.

To achieve this, the researchers used a quasi-experimental design with two experimental groups, the first experimental group used the social E-learning environment Edmodo and the second one used the personal E-learning environment WordPress. This procedure aimed to develop teachers' skills in designing E-tivities based on gamification. The quasi-experimental design which is used in this study included a pre-application and post-application of observation card of designing E-tivities skills based on gamification on both experimental groups to reach the final results of this study.

1.1. Objectives of the study

The study aims to identify the effectiveness of both the social E-learning environment Edmodo and the personal E-learning environment WordPress in developing the skills of technology teachers in designing activities based

on gamification. This can be done through using 12 various technological tools and applications, distributed in 6 domains: Video platforms, educational blogs, learning management system, graphic design editors, mind mapping, cloud computing applications, and gamification applications, the variety of tools is intended to provide the teacher with a variety of designs to suit their lesson goals and students' needs in light of the Salamon's model of online active learning.

1.2. Study problem

During Global Pandemic Coronaviruses COVID-19, the Palestinian Ministry of Education faced real challenges to continue training teachers. Therefore, it was a necessity that they should find suitable alternatives to make their training applicable. In this pandemic, teachers were unable to contact their students, and did not have the tools and skills to design E-tivities to help them develop their teaching skills and facilitate students' motivation to learn during this emergency. This weakness illustrates more clearly the strategic plan for education 2017-2022, which considered that there is a lack of professional competencies for teachers in the field of employing technology to design E-tivities and educational materials. There are approximately 80% of technology periods that do not employ supportive E-tivities. In this context, the ministry of education adopted the development of teachers' professional competencies in technology in general (Ministry of Education and Higher Education, 2017).

The researchers found a real exciting problem and need to develop teachers' skills in employing E-learning, and the use of their tools in designing E-tivities. Also, several studies have confirmed that there is an urgent need to become a twenty-first-century teacher. A teacher who possesses knowledge, skills, and competences in the use of technology and the design of E-tivities that align E-learning environments, and active online learning such as Tican and Deniz (2019), Al-shimmery (2019), Al-Dosari (2018), Ruzmetova (2018), and Al-kandry (2013). It was recommended in many conferences, such as a most recent conference: the Digital Education Conference which was held at Cairo University in 2018, entitled: (Digital Education in the Arab World - Challenges of the Present and Future Visions). The Arab Educational, Scientific and Literature Foundation, which stressed the need to develop teachers' skills in preparing electronic content, E-tivities, and digital applications. This is related to the educational controls and conditions to ensure quality of education. Similarly, there was the Second International Learning and Education Conference in the Digital World/Smart Learning, held in 2017 at the National University of Najah, Palestine. It emphasized the need to adopt modern teaching strategies and develop teachers' skills in building and designing their own teaching materials, their E-tivities, and spreading the smart learning culture among learners.

The researchers found a great challenge to decide the best E-learning environments due to their huge diversity. They decided to compare the social E-learning environment Edmodo with the personal E-learning environment WordPress to find the best environment to rely on in the future training and courses in the Ministry of Higher Education. The researchers prepared an open questionnaire consisting of 8 questions that need to express an opinion about E-tivities and their importance, and teachers need for them and responded to this questionnaire which shows this resolution.

The respondents were 33, distributed as follows: 20 Technology Instructor, 6 Academics and Specialists, 4 Technologists, and 3 Technological Supervisors. The results of this questionnaire concluded the following:

- 70% indicated that the skills of technology teachers are weak in designing E-tivities, and that 76% believe that technology teachers do not design E-tivities based on the right pedagogical foundations.
- 48.5% believe that technology teachers use E-tivities in teaching and motivate students to a small degree, while 51.5% believe that there is a medium to the large use of E-tivities in teaching and motivate students towards learning.
- 80% believe that E-tivities increase students' motivation towards learning, and 95% support the development of E-tivities in light of the principles, elements, and tools of gamification, to motivate students, increasing challenge, cooperation, and competitiveness between them.
- All the teachers responding to this questionnaire agreed on the necessity of the need for teachers of technology to develop their skills in designing E-tivities, especially E-tivities based on gamification.

In light of all of the above, the researchers were able to verify the presence of a real problem related to the necessity of developing the skills of technology teachers in designing E-tivities based on gamification.

1.3. Importance of the study

The importance of this study is because:

1. This study compares the effectiveness of two E-learning environments, the social E-learning environment Edmodo, and the personal E-learning environment WordPress, to find the best method to train teachers on designing skills of e-tivity based on gamification.
2. This study is considered a practical application for the first distance training course in the Ministry of Education and Higher Education for teachers in the light of the Global Pandemic Coronavirus COVID-19.
3. It highlights the latest E-learning practices by integrating the principles, elements, and tools of gamification into E-tivities and various applications; to stimulate the learning process.
4. It provides a list of skills for using tools for designing E-tivities based on gamification, which is considered as one of the teacher's skills in the twenty-first century.

2. Literature Review

2.1. E-learning Environments

First of all, E-learning describes learning which is delivered fully online whereas technology mediates the learning process. Teaching is entirely delivered via Internet, and students and instructors are not required to be available at the same time and place (Gros and García-Peñalvo, 2016). Several studies in educational literature dealt with the concept of e-learning environments. For example, Ibrahim et al (2015) define the e-learning environment as: "A range of social networking services such as micro-blogging, video and images sharing, work together to create an educational environment that allows the learner to learn in a self-appropriate manner for their characteristics" the researchers define it as The electronic environment that includes tools and technology for transmitting information from devices and networks, and is equipped with all facilities and usability standards that allow educational and learning practices, socially and personally, interactively between the student, teacher, and content; in light of a specific educational design; contributes to the achievement of the required educational goals. Many studies dealt with the social learning environment Edmodo like Altunkaya and Ayrancı (2020), which aimed to identifying the effects of academic writing instruction using Edmodo environment on students' achievement. The researchers measured students' achievement by using an achievement test and investigated the students' opinions about the E-learning environment. The sample consists of 108 students divided into two groups the control group, and the experimental group. The study results indicate that the experimental group achievement in academic writing is higher than the control group achievement. Tamrin and Basri (2020) also aimed to understand students' perceptions about the use of the Edmodo environment in English language instruction and used the descriptive qualitative approach. The researchers used a questionnaire and an interview to know the role of this environment in explaining the students learning style and improving their performance. The study concluded that students prefer to learn online using this environment. Sugito et al. (2019) measured the impact of the Edmodo environment on the students' science achievement and their attitudes. The researchers used the quasi-experimental method for experimental and control groups The sample consisted of 124 students. They used a questionnaire to measure students' attitudes toward Edmodo, and a test to measure students' achievement. These results indicate the effect of Edmodo on increasing student attitudes and achievement toward science.

Žubrinić and Kalpić (2008) considered CMS Content Management Systems such as WordPress and Wiki editors as personal E-learning environments that customize educational content to suit the trainee needs and to achieve his personal learning goals and gaining experience.

The researchers benefited from these studies in defining the features of the Edmodo social E-learning environment, and determining the advantages of this environment in the training process, as well as for the personal E-learning environment WordPress, which provides tools that allow the trainees to build their own learning content, and presented a flexible environment allows them to learn freely, discover Knowledge, and develop their personal skills.

2.2. E-tivities & Gamification

The concept of electronic activities is related to the nature of the expected tasks, and from the researchers' point of view this concept is defined by Palma and Piteira (2008) as "Activities carried out in an E-learning

environment such as: Engaging in dialog with teachers, as simultaneous activities, participating in discussion forums, e-testing, uploading files for later reading", Al-Dosari (2018) defined it as: "A set of activities teachers design using technology-innovations applications: The Internet, e-mail, chat rooms, and social media based on the principle of complementarity, sequencing, and logical sequencing in giving students cumulative experience", Salmon (2013) defines E-tivities as "frameworks for enabling active and participative online learning by individuals and groups".

Dempsey et al. (2018) study provided a perception of the structure of E-tivities by using the blog. To implement E-tivities, the researchers relied on a TPACK framework that used blog technology to provide an opportunity for students to gather research articles, and comment on other students' blogs. The study concluded that 69% of the students believed that blogs were rich in content, and 82% of the research activity discussions were mission-oriented, 73% emphasized that their friends' blogs were inspiring for them, about 76% indicated that the blog activity was appropriate, and enhance their reading ability and comment, almost 76% confirmed that the blog facilitated knowledge transferring to them, and 62% expressed their satisfaction with E-tivities.

Pineda Hoyos and Tamayo Cano (2016) used Moodle's E-tivities and electronic forums, questionnaires, chat rooms, and appointments, to train teachers on electronic supervision concepts and E-tivities. The researchers made a case study for 20 teachers with no prior experience in designing E-tivities or in electronic supervising concepts. They were assigned to a number of tasks, the most important one is describing strategies and activities that can be integrated into the Salmon model. The results showed that teachers embodied many of the characteristics suggested by Salmon's model of E-tivities.

Gamification is a design process where elements or mechanics in gaming are added to a non-game application or system (Shane et al., 2020). Cordero-Brito and Mena (2020) and Rojas-López et al. (2019) depended on gamification components which were points, badges, avatars, and a leaderboard. They revealed how gamification over time gained importance. The main conclusion of these studies indicated that gamification improved engagement with the students to succeed in solving the challenges successfully and it increased motivation. While Baydas and Cicek (2019) used Kahoot as a gamification application to measure the factors that may affect the process of designing gamification in university education. Their study concluded that using cooperative and gamification mechanisms in the learning environment increased students' participation. In addition, Adams (2019) proposed a framework for gamification educational design principles to facilitate student participation in E-learning environments. This study concluded the effectiveness of integrating reward and well-designed feedback as one of the gamification elements and integrating it with learning activities. On the other hand, Juhani (2018) employed the gamification tools provided by the Blackboard system to develop mathematical problem-solving skills for gifted female students in the first year of secondary school. The study recommended benefiting from learning gamification in the educational field and to improve teachers learning gamification 'skills, and encouraging teachers to make learning methods more exciting.

By reviewing the educational literature represented in the previous studies, which dealt with E-tivities in the learning process. The researchers recognized a wide variation in the nature of E-tivities, but all of them agreed that E-tivities are online activities carried out by students. Given the diversity and differences in the researchers' illustrations of the E-tivity nature. The researchers decided that the Salmon Model for active learning via the Internet in determining the nature of E-tivities was clearly, maintaining that many studies follow it in preparing E-tivities in different E-learning environments, for example, Pineda Hoyos and Tamayo Cano study (2016).

3. The study Questions

The main study question is:

What is the effectiveness of E-learning environments in developing skills of designing E-tivities based on gamification for teachers of technology in Gaza?

This main question is divided into the following sub-questions:

1. What are the two suggested E-learning (social/personal) environments for developing the skills of technology teachers in designing E-tivities based on gamification?
2. What are the skills of designing E-tivities based on the gamification needed to be developed for technology teachers?
3. Are there statistically significant differences at the level of ($\alpha \leq 0.05$) between the mean scores of the teacher in the experimental social environment group Edmodo, and the experimental personal environment group WordPress in the post-application of observation design skills card of designing E-tivities skills based on gamification?

4. Are there statistically significant differences at the level of ($\alpha \leq 0.05$) in the mean scores of the teachers in the experimental social environment group Edmodo, between the pre-application and the post-application of observation design skills card of designing E-tivities skills based on gamification?
5. Are there statistically significant differences at the level of ($\alpha \leq 0.05$) in the mean scores of the teachers in the experimental personal environment group WordPress, between the pre-application and the post-application of observation design skills card of designing E-tivities skills based on gamification?

3.1. Study hypotheses

1. There are no statistically significant differences at the level of ($\alpha \leq 0.05$) between the mean scores of the teacher in the experimental social environment group Edmodo, and the experimental personal environment group WordPress in the post-application of observation design skills card of designing E-tivities skills based on gamification.
2. There are no statistically significant differences at the level of ($\alpha \leq 0.05$) in the mean scores of the teachers in the experimental social environment group Edmodo, between the pre-application and the post-application of observation design skills card of designing E-tivities skills based on gamification.
3. There are no statistically significant differences at the level of ($\alpha \leq 0.05$) in the mean scores of the teachers in the experimental personal environment group WordPress, between the pre-application and the post-application of observation design skills card of designing E-tivities skills based on gamification.

4. Methodology

The current study followed the qualitative and the quantitative method to collect data to describe and analyze the scores of the two study groups in designing e- tivities skills based on gamification.

4.1. Study Design

The current study compared the effectiveness of the social E-learning environment Edmodo and the personal E-learning environment WordPress on developing technology teachers' skills in designing E-tivities based on gamification. A semi-experimental design is used, and the sample of the study is divided into two experimental groups:

1. Experimental Group 1: This group used the social E-learning environment Edmodo to practice designing E-tivities skills based on gamification, and the researchers used characteristics and tools that this environment provides to achieve the best possible social communication among the trainee, such as the forums for dialog and discussion, exchanging of ideas, and comments in the electronic environment.
2. Experimental Group 2: This group used the personal E-learning environment WordPress to practice designing E-tivities skills based on gamification, the trainees are asked to create their own personal blog, organize the skills they mastered in articles on the blog, and build their own training content. They have received some guidance from the researchers on designing E-tivities skills based on gamification.

The semi-experimental design used in this study included a pre-application and post-application of observation card of designing E-tivities skills based on gamification on both experimental groups. after they passed the experimental process and training them on those skills as shown in Figure 1.



4.2. Study subjects

4.2.1. The study community

All the technology teachers in the governmental schools in Gaza strip, from all the directorates of education, were 269 male and female teachers.

4.2.2. The study sample

The researchers used a pilot sample of 30 teachers different from the original sample of the study. To adjust the study tool, and verify its validity and reliability, then the researchers selected the current quasi-experimental study sample consisting of 60 technology teachers to work in secondary schools, then they divided the sample divided randomly into two experimental groups, the first experimental group consisted of 30 teachers used the social E-learning environment Edmodo, and the second experimental group consisted of 30 teachers and used the personal E-learning environment WordPress.

4.3. Study Variables

The study contains the following variables:

1. Independent variable E-learning Environment in two stages:
 - Social E-learning environment Edmodo.
 - Personal E-learning environment WordPress.
2. Dependent variable:
 - Designing E-tivities skills based on gamification skills.

4.4. Procedures and steps for carrying out the study

Researchers used an open questionnaire to define the research problem and its dimensions. The questionnaire was introduced to experts and teachers, to review the problems of designing E-tivities in general and using in the process of teaching and E-learning; to determine the problem. In light of its results, the researchers concluded that there was a real problem that was required to conduct this study. So, they have a clear vision to put the study questions and hypotheses. They found that the qualitative method is suitable to describe the quantitative data that is collected from the study tool, and they identified the study community 269 technology teachers in government schools, researchers applied the semi-experimental design to two experimental groups. The study sample consists of 60 teachers divided randomly into two groups, 30 teachers in the first experimental group used the Edmodo social E-learning environment, and 30 teachers in the second experimental group used the personal E-learning environment WordPress to know the effectiveness of both environments on developing the design skills of e-activities based on gamification. Researchers held a workshop with 7 experts in the field of educational technology and e-learning on Tuesday, 21/01/2020 to identify tools and applications that will be used in designing E-tivities based on gamification. They identify 12 tools and applications to use for training teachers to develop their skills in designing E-tivities based on gamification. In this workshop, they identify 6 main domains, tools classified as it is shown in Table 1.

After the previous expert workshop, the researchers built an observation design skills card for designing E-tivities based on gamification, included evaluation indicators for each item, to ensure the reliability of this tool for the evaluation process. They applied it to a pilot study of 30 teachers different from the main study sample to verify the validity and reliability of the tool. The training included 6 training axes that included several training topics as shown in Table 2.

The Edmodo social e-learning environment and the personal e-learning environment WordPress were prepared and each group was trained to use their e-environment. Before the beginning of the experiment, researchers applied an observation design skills card of E-tivities based on gamification to the two study groups, to control groups equivalence, in two sessions for each trainee in the two groups, the evaluation process divided into two parts the trainer and his assistant, using the Teamviewer program. The trainer contacted directly with

Table 1. The main domains, tools and applications used for designing E-tivities skills based on gamification.

No.	Domains	Tools & Applications
1	Video Platforms	1. Youtube
		2. Edpuzzle
		3. Zoom
2	Education Blogs	4. Edublogs
3	Education management systems	5. Canvas
4	Graphic design editors, mind mapping, and conceptual maps	6. Spark
		7. Coggle
5	Cloud computing applications	8. Google Drive
		9. Google classroom
6	Gamification tools and applications	10. Kahoot
		11. Classdojo
		12. Socrative

Table 2. Domains and Training Topics

No.	Training Domains	Training Topics
1	Important concepts	- o Important e-learning concepts - o Salmon online active learning model: - o Important E-tivities concepts based on gamification skills.
2	E-tivities design	- o Planning for designing E-tivities based on gamification - o Designing E-tivities based on gamification tools - o Educational standards of designing E-tivities based on gamification - o Content E-tivities based on gamification
3	Video platform tools	- o using Youtube in designing E-tivities - o Create a class with Edpuzzle video platform. - o Zoom application and use in e-tivity .
4	Educational blogs and learning management system	- o Create and manage educational Edublog - o Learning Management System Canvas in designing E-tivities.
5	Graphic design editors, mind mapping, and Cloud computing	- o Designing images and stickers with the Spark Graphic Design Editor. - o Drawing conceptual and mind mapping with Coggle: - o Create and share Educational files with Google Drive Cloud computing. - o Administration Virtual Classes "Google classroom".
6	Gamification tools and applications.	- o Create interactive tests using Kahoot. - o Reinforcement with Classdojo classes. - o Designing online competitive competitions with Socrative.

each trainee and noticed his/her performance by sharing his/her desktop using the program, the evaluation process took about a week to evaluate all skills of the two study groups. Then the researchers carried out the study remotely on April 2020 and the experiment carried out by training the first experimental group using the social E-learning environment Edmodo and communicating with the trainees socially using that environment and in the other side the second experimental group trained to use the personal E-learning environment WordPress, where each trainee built his/her personal blog and organized in an appropriate ways to acquire designing E-tivities skills based on gamification. The post-application followed the same procedures of the pre-application, the trainer implements the observation design skills card for designing E-tivities skills based on gamification on the two study groups, to compare the effectiveness of the social E-learning environment Edmodo and the personal E-learning environment WordPress. The post-application takes place after the completion of training on designing E-tivities skills based on gamification in three sessions for each trainee in the two groups, and the evaluation process was carried out by the trainer and his assistant, by using Teamviewer. They contacted directly with each trainee and observed his/her performance by sharing his/her desktop using that program. The evaluation process took about two weeks to evaluate all skills for the two study groups. Researchers used appropriate statistical treatments SPSS to analyze the data, the researchers used several statistical methods

such as Alpha Cronbach Coefficient, Pearson Correlation Coefficient, t-test for two dependent samples, and two independent samples, after verifying the validity and the reliability of these tests. Then they deduce the results and elicit the interpretation and discussion. Finally, they write recommendations and suggestions.

4.5. The Instruments

The researchers designed an observation design skills card to measure teachers' skills in designing E-tivities based on gamification. This has been done after examining the educational literature that dealt with different tools and skills for designing these activities, such as Dempsey et al. (2018) that indicated the educational blog in designing E-tivities. Pineda Hoyos and Tamayo Cano (2016) focused on E-tivities and active learning via the Internet, as well as the study of El-Tabakh and Ismail (2019), and the study of Adams (2019), Baydas and Cicek (2019) which dealt with gamification design and use skills, The researchers aimed to use this card to:

- Define the designing E-tivities skills based on gamification to be developed by technology teachers in Gaza.
- Measuring teachers' designing E-tivities skills based on gamification.
- Comparing the differences between the mean scores of the two groups of studies in those skills after using two different E-learning environments in order to identify the effectiveness of those environments in acquiring designing E-tivities skills based on gamification.

4.5.1. Validity and Reliability of the Instrument

The researchers held a workshop to identify tools and applications that will be used in designing of E-tivities based on gamification. and extracting the main domains of these tools, then the researchers prepared a list of sub-skills for these tools and revised them to present them to another group of arbitrators, to verify their apparent sincerity in terms of clarity of the formulation of items, their suitability for measurement, and their adequacy to cover each field.

The observation design skills card, defining the indicators for measuring each skill accurately, and to become ready to be applied to a pilot study consisting of 30 teachers, who joined similar courses before, and used different tools in designing electronic activities, to come out with its final draft consisting of 96 skills, distributed in six domains, and ranging at five-point Likert scale, this tool becomes, ready to be applied to a pilot study. The researchers benefited from the previous pilot study by calculating the following:

- The agreement of the observers and the reliability of the degrees between them.
- Reliability of tools using the Alpha Cronbach coefficient.
- Validate the internal and structural consistency of the study tools.

4.5.1.1. The agreement of the observers and the reliability of the estimates between them

To verify the observers' agreement, the researchers used the Cooper formula, which showed a stability rate of 93.3% in the observation card, a high agreement ratio that makes the researchers reassured about the reliability of their tool in measuring what they were prepared for. The Table 3 shows the observers' agreement and the reliability of the estimates between them:

4.5.1.2. Reliability of tools using the Alpha Cronbach coefficient

The researchers verified the reliability of the tools using the Cronbachs' Alpha coefficient, where they found that the value of the reliability factor in the skills' observation card ranged between (0.998 - 0.977) and that the total reliability factor of the card is equal to (0.994), and this indicates that the study instrument has a high degree of reliability and that when applied to the same sample in the same conditions will give almost the same results, and this makes the researchers comfortable to apply it to the study sample. The Table 4 shows the reliability of the observation design skills card using the Alpha Cronbachs' coefficient for each item with its domain:

Table 3. Observers' agreement and the reliability percentage of the observation design skills card for designing E-tivities skills based on gamification

Domains	No. Items	Agreement Points	Differences Points	Reliability Percentage
Using video platforms	20	536	64	89.3%
Using the blog Edublogs	12	348	12	96.7%
Using the Learning Management System Canvas	12	326	33	%90.8
Using the Graphic Design Editor Spark and mind mapping Coggle	12	336	24	%93.3
Using cloud computing applications Google Drive	20	570	30	%95
Gamification	20	568	32	%94.4
Total	96	165	195	%93.3

Table 4. Observation card reliability designing E-tivities based on gamification Using the Alpha Cronbach coefficient.

Domain	The number of paragraphs	Alpha Cronbach coefficient
Using video platforms	20	0.977
Using Edublogs	12	0.982
Using the Learning Management System Canvas	12	0.997
Using the Graphic Design Editor Spark and mind mapping Coggle	12	0.997
Using cloud computing applications Google Drive	20	0.987
Gamification	20	0.998
Total	96	0.994

4.5.1.3. The Validity of the internal consistency of the observation design skills card designing E-tivities skills based on gamification

The researchers calculated the validity of the internal consistency of the observation designing skills card which consists of 96 items, by using Pearson's correlation between the item and its scope, in the first domain: Skills of using video platforms in designing E-tivities, the correlation coefficients between the items, and this scope ranged between (0.943 - 0.596), and the coefficients of paragraphs correlation ranged with the second domain: Edublogs 'skills in designing E-tivities are between (0.967 - 0.865). Items' coefficients for the third domain: Skills of using the Learning Management System Canvas in designing E-tivities ranged between (0.999 - 0.956), and the fourth domain: Skills of using the graphic design editor Spark and mind mapping Coggle in designing E-tivities, the correlation coefficients between the items and this scope ranged between (0.995-0.931), and the coefficients of items correlation ranged with the fifth domain: Skills of using cloud computing applications Google Drive in designing E-tivities ranged between (0.945 - 0.854), and finally the sixth domain: Gamification tools and applications used in the design of E-tivities, correlation coefficients between the item and this scope ranged between (0.990 - 0.947), and all correlation coefficients between the item and its scope were significant at the level of (0.01), which are appropriate correlation coefficients indicating the high validity of internal consistency.

4.5.1.4. Validity of the structural consistency of the observation card of designing E-tivities based on gamification skills

To calculate the constructive validity that is concerned with the goals of the observation design skills card seek to achieve, the researchers measured the association of each domain of the observation designing skills card with the total score of the items, which appears as in the table 5.

Through the previous table, it is clear that correlation coefficients are high, ranging between (0.964 - 0.681), and this gives the researchers an indication of the structural validity of this tool and its applicability to the study sample.

Table 5. Correlation coefficient between each domain in the observation designing skills card with the total score of the items

Domain	Correlation coefficient
Skills of using video platforms in designing E-tivities	0.964**
Skills of using blog platforms Edublogs in designing E- tivities	0.681**
Using the Learning Management System Canvas skills in designing E-tivities.	0.881**
Using the Graphic Design Editor Spark and mind mapping Coggle skills in designing E-tivities	0.930**
Skills of using Google Drive applications in designing E- tivities	0.752**
Tools and applications of gamification were used to design E- tivities	0.941**

(*) (R) table value at the degree of freedom (29) at the significance level (0.05) = 0.355

(**) (R) table value at the degree of freedom (29) at the significance level (0.01) = 0.455

4.6. Control of study variables

To verify the equivalence of the groups and control the study variables, an observation design skills card measures the skills of E-tivities based on gamification pre-applied on the two study groups. The two study groups checked for equivalence using a T-test for independent sample, to compare mean scores of the first experimental group Edmodo and mean scores for the second experimental group WordPress, in an observation card of the skills of designing E-tivities based on gamification, the results were as in the Table 6.

Table 6. Results of the T-test for two independent samples to calculate the differences between the mean scores for the experimental group Edmodo and the mean scores for the experimental group WordPress in the pre-implementation of the observation card of the skills of designing E-tivities based on gamification

Domain	Group	Number	Mean	stander deviation	T calculated value	Sig. value	Statistical significance
Using video platforms	Edmodo	30	51.6	10.98	0.137	0.891	not significant
	WordPress	30	52	11.58			
Using Edublogs	Edmodo	30	30	10.46	0.853	0.397	not significant
	WordPress	30	32.3	10.43			
Using the Learning Management System Canvas	Edmodo	30	21	7.60	0.275	0.784	not significant
	WordPress	30	21.5	7.39			
Using the Graphic Design Editor Spark and mind mapping Coggle	Edmodo	30	22.1	8.22	0.471	0.639	not significant
	WordPress	30	23.1	7.65			
Using cloud computing applications Google Drive	Edmodo	30	75.7	17.04	0.306	0.760	not significant
	WordPress	30	74.4	15.78			
Gamification	Edmodo	30	36	13.55	0.946	0.348	not significant
	WordPress	30	39.4	14.28			
The Total Mark for Observation Card	Edmodo	30	236.5	46.82	0.599	0.578	not significant
	WordPress	30	242.8	40.235			

(*) t- table value at 58 df. at (0.05) sig. level equal to 2.021

(**) t- table value at 58 df. at (0.01) sig. level equal to 2.704

The Table 6 shows that it is clear that there are no statistically significant differences between the means of the two experimental groups in the observation card of the design of E-tivities based on gamification, which means that these skills are equivalent in the pre-application of this card.

5. Results

The study aimed to examine the effectiveness of E-learning environments on developing designing E-tivities skills based on gamification for technology teachers in Gaza, After statistical treatment. The researchers interpreted and explained the results in the light of previous studies, then developed recommendations and concluding proposals.

5.1. Study Questions' answers

Here is an analysis of the research findings of the questions and hypotheses:

5.1.1. First question's answer

The first question introduced as follows: "What are the proposed E-learning (social/personal) environments to develop the skills of technology teachers in designing E-tivities based on gamification?"

To answer this question, the researchers reviewed the literature on E-learning environments and found that there are different types of those environments can be used to develop skills, and those environments are an electronic community that includes tools and technology to transfer information from devices and networks, and equipped with all facilities and portability standards, permits educational use and learning practices interactively between the trainer, the trainee, and the content. It contributes to achieving the required educational goals, and from those environments. The researchers chose the social e-learning environment Edmodo because it contains many tools that the researchers think are appropriate for the process of training teachers socially, and they also chose the personal E-learning environment WordPress, which is a personal blog contains many tools which help the trainees to organize their own learning, and here the illustration of the most important characteristics of these two environments:

- Personal E-learning environment Edmodo:

The researchers used the social E-learning environment Edmodo due to its many features, options, and characteristics that the researchers employed with the study group that used this environment in the training process, as follows:

- A public forum for discussing educational ideas and topics.
- Meaningful communication between the trainer and the trainees using private messages.
- Sharing training resources and materials with the trainees.

- Personal E-learning environment WordPress:

The researchers also used the personal E-learning environment WordPress that relies on creating a personal blog and appropriately organizing its contents suits his /her perspective about training skills. The blog provides many options that allow the personalization of the trainees' pages and articles. WordPress features summarization as a personal E-learning environment as following:

- Creating introductory profiles about his training designing skills.
- Writing and publishing articles in the blog about the skills of designing E-tivities based on gamification, and sharing with the trainer.
- Collecting appropriate learning resources related to designing E-tivities based on gamification, and organizing in his/her blog.

5.1.2. Second question's answer

The second question introduced as follows: "What are the skills of designing E-tivities based on gamification needed to improve among technology teachers?"

The researchers relied on the Salmon concept of e-activity in the current study, as it defines a clear and specific philosophy in building e-activity regardless of the nature of the tools used. Thus, it has a comprehensive concept that describes the nature of active learning via the Internet, the definition of E-tivities adopted in this study is: "frameworks for enabling active and participative online learning by individuals and groups" (Salmon, 2013: 5)

To answer this question, the researchers studied the theoretical literature to search for tools to design E-tivities, and prepare a list of skills, then tools were identified, and presented in a session of experts to come up with a list of tools and applications that they recommend to train teachers to develop their designing E-tivities skills based on gamification, the committee classified tools in 6 main domains. Then, the researchers prepared the observation design skill card after identifying sub-skills from these tools and presented them to another group of arbitrators to be initially ready for applying on the pilot study to verify its reliability and validity. After the application of the procedures, the observation design skills card for designing E-tivities skills based on gamification is ready for use in the study, and it consisted of 6 main areas under which 96 indicators or skills fall, and these skills can be summarized as follows:

- The first domain: Using video platforms skills: This domain is concerned with developing the skills of teachers to use video platforms, which are Youtube, Edpuzzle, and Zoom.
- The second domain: Using Edublogs: This domain concerned with developing the skills of creating an educational blog for the teacher, through which he/she can write articles, publish information and share with his students, as it is a basic skill in organizing the educational content shared with students in the form of electronic links, containing the educational content to be transferred to the student in the form of texts, multimedia or hyperlinks.
- The third domain: Using the Learning Management System Canvas: This domain focused on developing the skill of using E-learning systems in designing E-tivities based on gamification, in this study, the researchers used the Learning Management System Canvas to provide many options and features that facilitate the presentation of educational content to students and manage their learning during the design of the E-tivities.
- The fourth domain: Using the Graphic Design Editor Spark and mind mapping Coggle: This part clarifies the skills of using graphic design editors and drawings that depend on the relationships between elements, such as the Graphic Design Editor Spark and the conceptual and mind mapping tool Coggle, which the teacher can use in the practice of E-tivities that rely on graphics and charts.
- The fifth domain: Using cloud computing applications Google Drive: This domain contributes to developing the skill of using cloud computing applications Google Drive, and its distinguished tools to design E-tivities such as participatory documents that used in cooperative activities, in addition to e-tests provided with a Google Form, in addition to the virtual classes Google Classroom and its role in designing integrated e-tivity.
- The sixth domain: Gamification tools and applications used to design E-tivities: These tools are complementary tools to the overmentioned E-tivities design tools, and they are mainly used to benefit from gamification mechanisms to support E-tivities. The researchers relied on three applications for gamification, Kahoot, Classdojo, and Socrative.

5.1.2.1. Salmon online active learning model

The researchers relied on the teacher training to design E-tivities skills based on gamification in an organized way using the Salmon Model for Active Learning via the internet, which consists of five stages. (Salmon, 2020), as presented in her book, considered "E-moderating as the key to teaching and learning online" in its third edition, as shown in the Figure 2 (Salmon, 2013).

Salmon (2002) illustrates these stages as follows:

1. Access & Motivation stage: At this stage, the student's access to the E-tivities, and at this stage, the student is welcomed, encouraged, and motivated, by setting a welcome screen, and instructions for how to implement the activity via the Internet. The teacher also supports the student by facilitating his entry to the platform or the E-learning environment or the electronic activity tool used such as: (Blogs/social networks/forums. Etc.).
2. Online Socialization stage: At this stage, the focus is on creating a special online community for all students participating in online learning, where they are eager to share and exchange their ideas and cooperate.

Figure 2. Salmon online active learning model



3. Information Exchange stage: At this stage, during the design of E-tivities, the teacher takes into consideration the collaborative manner to achieve tasks, by allowing students to exchange information and the necessary information is explored according to the students' ability while respecting the different points of views.
4. Knowledge Construction stage: This stage includes an element of discussion to develop the cognitive knowledge, and the teacher considers that students build their knowledge using new methods that depend on building groups for learning via the Internet, assigning them to more complex activities and contributions, and transforming students to knowledge production and building, not just consumption, and this is through cooperation and teamwork that is essential at this stage.
5. Development stage: The teacher focuses on designing e-tivity on critical thinking skills and metacognition skills and seeks to transform students into independent learners, the activities in this stage deals with evaluation and reflections, experiences, and evaluation of learning experiences.

5.1.3. The third question's answer

The third question is introduced as follows: "Are there statistically significant differences at ($\alpha \leq 0.05$) between mean scores of the teacher in the social experimental group Edmodo and the personal experimental group WordPress in the post-application of the observation design skills card of the designing skills of E-tivities based on gamification?"

To answer this question, the researchers tested the following null hypotheses:

There are no statistically significant differences at ($\alpha \leq 0.05$) between mean scores of the teacher in the social experimental group Edmodo and the personal experimental group WordPress in the post-application of the observation design skills card of designing E-tivities skills based on gamification.

T-test for two independent samples is used to answer this question, to find the significant differences between mean scores of the two study groups in the post-application of the observation design skills card of designing E-tivities skills based on gamification, which is shown in Table 7.

The Table 7 shows that there are no statistically significant differences between the two experimental groups in the post-application of the observation design skills card of the designing E-tivities skills based on gamification in both different learning environments, the sig value ranged from (0.465) to (0.970) in the areas of skills of designing E-tivities based on the gamification of the observation card, and the sig value of the total skills reached (0.768), and all of these values are not statistically significant, which made the researchers accept the null hypothesis, with no statistically significant differences at the level of ($\alpha \leq 0.05$) between the mean scores of the teachers in the social experimental Edmodo group, and the personal experimental WordPress group in the post-application of the observation card due to the different E-learning environment.

5.1.4. Fourth question's answer

The fourth question is introduced as follows: "Are there statistically significant differences at ($\alpha \leq 0.05$) level between mean scores of the teachers in the social experimental group Edmodo in the pre/ post-application of the observation design skills card of the designing E-tivities skills based on gamification?"

Table 7. T-test for two independent samples to compare the differences between the mean scores of the two groups of studies in the pos-application of the observation card for designing E-tivities skills based on gamification

Domain	Group	N	Mean	STD Deviation	T	sig value	Statistical significance
Using video platforms	Edmodo	30	87.63	8.720	0.245	0.807	not significant
	WordPress	30	88.17	8.103			
Using Edublogs	Edmodo	30	52.67	5.241	0.736	0.465	not significant
	WordPress	30	53.60	4.561			
Using the Learning Management System Canvas	Edmodo	30	53.20	5.209	0.054	0.957	not significant
	WordPress	30	53.13	4.329			
Using the Graphic Design Editor Spark and mind mapping Coggle	Edmodo	30	55.53	3.540	0.038	0.970	not significant
	WordPress	30	55.50	3.267			
Using cloud computing applications Google Drive	Edmodo	30	93.17	6.571	0.403	0.689	not significant
	WordPress	30	93.77	4.840			
Gamification	Edmodo	30	89.63	7.271	0.271	0.787	not significant
	WordPress	30	90.13	7.021			
Total	Edmodo	30	431.83	34.120	0.296	0.768	not significant
	WordPress	30	434.30	30.287			

* t- table value at 58 df. at (0.05) sig. level equal to 2.021

* t- table value at 58 df. at (0.01) sig. level equal to 2.704

To answer this question, the researchers tested the following null- hypotheses:

There are no statistically significant differences at ($\alpha \leq 0.05$) level between mean scores of the teachers in the social experimental group Edmodo in the pre/ post-application of the observation design skills card of the designing E-tivities skills based on gamification.

The researchers used T-test for two dependent samples to answer this question to infer the significance of the differences between mean scores of the social E-learning environment group Edmodo in the pre and post-application of observation card of designing E-tivities skills based on gamification and the Table 8 shows that.

It is clear from the previous table that there are statistically significant differences at the level of (0.01) between mean scores of the teachers in the E-learning social group Edmodo, in the pre and post-application of the observation design skills card, in favor of the post-application in each skill separately, and in the general total score.

The researchers have calculated the effect size of the E-learning environment on developing the design skills of E-tivities skills based on gamification in the observation design skills card, Etta square (η^2) is used to compare the pre and post results of the observation design skills card. It is clear from the previous table that there is a significant impact of E-learning social environment Edmodo on developing designing E-tivities skills based on gamification in the observation design skills card, for the following domains: Video Platform, Edublogs, Learning Management System Canvas, Spark Graphic Design Editor and Coggle, and Gamification Skills, where the value of the Etta square (η^2) ranges between (0.829) to (0.964) in those domains, and it is noticeable that the effect size is medium in the domain of Google Drive cloud computing applications where it reached (0.595), and the researchers explain that the study sample is a teachers of technology and they have previous experience about some of the skills that used in this study, but in total, the effect size in all of these domains reached (0.964) and this indicates that there is a significant effect of the social E-learning environment Edmodo on developing the skills of designing E-tivities skills based on gamification.

5.1.5. Fifth question answer

The fifth question introduced as following: "Are there statistically significant differences at ($\alpha \leq 0.05$) level between mean scores of the teachers in the personal experimental group WordPress in the pre/ post-application of the observation design skills card of the designing E-tivities skills based on gamification?"

Table 8. T-test for two independent samples to compare the differences between the mean scores of Edmodo group in the pre/post-application of the observation design skills card for designing E-tivities based on gamification.

Domain	Application type:	N	Mean	STD Deviation	T	Level of significance (Sig)	square Etta (η^2)	Effect size
Using video platforms	Pre	30	51.60	10.988	18.327	0.01	0.920	large
	Post	30	87.63	8.720				
Using Edublogs	Pre	30	30.03	10.460	11.885	0.01	0.829	large
	Post	30	52.67	5.241				
Using the Learning Management System Canvas	Pre	30	21.00	7.602	27.454	0.01	0.962	large
	Post	30	53.20	5.209				
Using the Graphic Design Editor Spark and mind mapping Coggle	Pre	30	22.17	8.221	25.120	0.01	0.956	large
	Post	30	55.53	3.540				
Using cloud computing applications Google Drive	Pre	30	75.73	17.045	6.536	0.01	0.595	Intermediate-Term
	Post	30	93.17	6.571				
Gamification	Pre	30	36.03	13.551	28.244	0.01	0.964	large
	Post	30	89.63	7.271				
Total	Pre	30	236.57	46.824	27.976	0.01	0.964	large
	Post	30	431.83	34.120				

(*) T-table value at 29 df. at (0.05) sig. level equal to 2.021

(**) T-table value at 29 df. at (0.01) sig. level equal to 2.045

To answer this question, the researchers tested the following null- hypotheses:

There are no statistically significant differences at ($\alpha \leq 0.05$) level between mean scores of the teachers in the personal experimental group WordPress in the pre/ post-application of the observation design skills card of the designing skills of E-tivities based on gamification.

The researchers used T-test for two independent samples to compare the differences between the mean scores of personal E-learning environment group WordPress in the pre/post-application of the observation design skills card for designing E-tivities skills based on gamification (see Table 9).

It is clear from the Table 9 that there are statistically significant differences at ($\alpha \leq 0.01$) level between mean scores of the teachers in the personal experimental group WordPress in the pre / post-application of the observation card, In the favor of post-application for each skill and the total scores of skills.

The researchers calculated the effect size of the E-learning environment on developing the designing E-tivities skills based on gamification in the observation design skills card, they used Etta square to compare the pre and post results of the observation design skills card. It was clear from the previous table that there is a significant impact of personal E-learning environment WordPress on developing designing E-tivities skills based on gamification in the observation design skills card, for the following domains: Video Platforms, Edublogs, Learning Management System Canvas, Spark Graphic Design Editor and Coggle, and Gamification Skills, Etta square (η^2) value ranges between (0.812) to (0.960) in those domains, and it is noticeable that the effect size is medium in the domain of Google Drive cloud computing applications where it reached (0.625) as is the case in the group of social learning environment Edmodo, the researchers explain that the study sample are technology teachers and have previous experience about some of the skills that used in this study, but in total, the effect size in all of these domains reached (0.971) and this indicates that there is a significant effect of the personal E-learning environment WordPress on developing the skills of designing E-tivities based on gamification.

To answer this question: "What is the effectiveness of E-learning environments on developing designing E-tivities skills based on gamification for technology teachers in Gaza?"

The researchers calculated the Black modified gain ratio, the following table shows the adjusted Black ratio gain for the post-application of observation design skills card compared to the pre-application of observation design skills card for each group as follows:

From the Table 10, it is clear that there is effective for both social E-learning environments Edmodo and the personal E-learning environment WordPress on developing designing E-tivities skills based on gamification,

Table 9. T-test for two independent samples to compare the differences between the mean scores of WordPress group in the pre/post-application of the observation card for designing E-tivities based on gamification.

Domain	Application type:	N	Mean	STD Deviation	T	Level of significance	square Etta (η^2)	Effect size
Using video platforms	pre	30	52.00	11.588	16.185	0.01	0.900	large
	post	30	88.17	8.103				
Using Edublogs	pre	30	32.33	10.433	11.198	0.01	0.812	large
	post	30	53.60	4.561				
Using the Learning Management System Canvas	pre	30	21.53	7.399	26.245	0.01	0.959	large
	post	30	53.13	4.329				
Using the Graphic Design Editor Spark and mind mapping Coggle	pre	30	23.13	7.651	26.509	0.01	.960	large
	post	30	55.50	3.267				
Using cloud computing applications Google Drive	pre	30	47.43	15.784	6.954	0.01	0.625	Intermediate Term
	post	30	93.77	4.840				
Gamification	pre	30	39.43	14.289	25.653	0.01	0.957	large
	post	30	90.13	7.021				
Total	pre	30	242.87	40.235	31.337	0.01	0.971	large
	post	30	434.30	30.287				

(*) t-table value at 29 df. at (0.05) sig. level equal to 2.045

(**) t-table value at 29 df. at (0.01) sig. level equal to 2.759

Table 10. Black's modified gain ratio

Tool	Edmodo	WordPress
Observation card for designing of E-tivities skills based on gamification	1.208	1.206

Black modified gain ratio reached the value (1.2), Black considers this result as the borderline of effectiveness in the using the program.

6. Recommendations

In light of global pandemic coronavirus COVID-19, teachers' skills in using e-learning tools for instruction are challenging. The distance learning became a vital requirement in the current situation, because of the big variety of options in E-learning environments available via the Internet, the current study aimed to know the effectiveness of E-learning environments on Designing E-tivities skills based on gamification on technology teachers in Gaza, and develop teachers' skills in designing E-tivities based on active learning via the Internet, to stimulate students learning and become more e-learners.

In the same concern, it is clear that there is great effectiveness of both educational environments used in this study. They are social E-learning environment Edmodo, and personal E-learning environment WordPress on the development designing E-tivities skills based on gamification on the study sample, Both environments have contributed very closely to developing the teachers' skills compared to their skills prior to the experiment. The results showed that there are no statistically significant differences between the mean scores of the teachers between the two experimental groups. The researchers clarify that this is due to the importance of these two learning environments and that they focus on different aspects of the learners, and neither of them replaces the other, and this is supported by the results of several studies that dealt with the feasibility and usefulness of social e-learning environments as the study of (Altunkaya and Ayrancı, 2020), and (Tamrin and Basri, 2020) study on developing cognitive and performance skills, as well as what was indicated by the study of (El-feky, 2019) which emphasized the role of the personal learning environment on developing those skills. With this result, this study highlights the appropriate use of social and personal E-learning environments in the training

and learning processes, the teachers' designing E-tivities skills based on gamification can be improved by using these learning environments. Thus, the researchers recommend that the great feasibility and usefulness of these environments are necessary for organizing and displaying information and facilitating communication and interaction among both parties of the educational process.

7. References

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