

# The impact of using distance synchronous and asynchronous eLearning videos on developing practical skills in the "Scratch" program under the conditions of the COVID-19 pandemic

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**Abstract:** The study aimed to develop the skills of students specializing in "Learning Resources and Educational Technology" at Al-Quds Open University in using the "Scratch" program under the conditions of the COVID-19 pandemic, by developing eLearning videos to teach and learn program skills both synchronously and asynchronously, and then examining their impact on developing their skills. The study adopted both the experimental and descriptive methodology, and the study sample consisted of all students of the specialization who studied the basics of computer and programming, supervised by the researcher, and their number was (100) male and female students, during the academic years between 2019-2021, divided into two groups: the traditional group (who learned through traditional methods in natural conditions before the Corona pandemic), and the experimental group (who learned through employing eLearning videos synchronously and asynchronously under the conditions of the Corona pandemic). The observation card and the opinion poll were used as tools for collecting information. The study results showed that using synchronous and asynchronous eLearning videos helped in developing practical skills in the "Scratch" program for students, in light of the COVID-19 pandemic conditions, to a degree not less than their traditional face-to-face learning before the pandemic. The study also revealed the high positive opinions of the experimental group students regarding the use of eLearning videos, both synchronously and asynchronously, to develop their practical skills in the "Scratch" program, and their high satisfaction in using them for distance learning to face the challenges of the COVID-19 pandemic.

**Keywords:** e-learning, videos, distance learning, synchronous, asynchronous, practical skill, Scratch program, COVID-19 pandemic.

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## I. INTRODUCTION

The university education stage is considered one of the most important stages at the individual and societal levels. Higher education institutions always seek to develop their academic programs, curricula, and teaching methods to achieve their goals and objectives more effectively. If university education requires keeping up with technological innovations and employing technologies in it, and developing modern forms of teaching and learning methods supported by the use of e-learning tools to keep up with modernity, achieve flexibility in the educational process, and support students' learning skills (Saienko and Shevchenko, 2020), then the circumstances that the world has gone through during the coronavirus pandemic and the challenges it has imposed on the educational process have made this requirement an urgent need and not an option to confront those challenges and overcome those circumstances.

A pandemic (COVID-19) caused by the novel coronavirus has swept through countries around the world since the end of 2019 and the beginning of 2020, forcing them to take preventive measures to try to limit the spread of this pandemic. The most important of these measures is the principle of physical distancing between individuals, and these measures have extended to repeated and long-term closures of institutions in various sectors. Various areas of life have been partially or completely paralyzed, including the educational sector. This has forced all educational institutions around the world to shift from traditional face-to-face education, which poses a risk of infection, to online learning, which allows for distance learning while maintaining physical distancing and addressing the problem of interrupted education due to repeated closures of educational institutions.

The emergence and proliferation of e-learning tools have provided opportunities for universities to expand their teaching methodologies and learning environments beyond traditional face-to-face classrooms and to enhance student learning outcomes. The availability of educational resources on the internet makes them accessible to students anytime and from anywhere, achieving the principles of effective distance education.

Modern distance education is a synchronous or asynchronous learning process that allows individuals to learn during the geographic separation between the teacher and the learner or educational institution, using advanced and diverse methods and activities employing e-learning systems. This provides learners with a virtual educational environment that is equivalent to the traditional face-to-face learning environment, despite the geographic distance and long distances between learning and teaching groups.

The eLearning video is considered one of the most important tools for e-learning and has the most impact on the effectiveness of learning, especially in distance learning systems. It meets many of the basic learning needs that cannot be met by traditional learning tools. Many studies have recommended the use of eLearning video clips as a common practice in universities due to their advantages, benefits, and impact on the effectiveness of the learning process, as well as their ability to develop teaching methods as tools and sources for distance learning. These studies include: Al-Shayea (2018), Alajrami (2019), Nugroho and Wilujeng (2019), Harrison (2019), Caldeira et al. (2020), Saienko and Shevchenko (2020), Duong (2020), and Danjou (2020)..

## **II. LITERATURE REVIEW**

Technology tools have developed tremendously and rapidly in recent decades, and their use has spread widely in various aspects of life, including education. Their use in the field of education has been distinguished by their ability to change teaching methods as tools and sources of education and learning (Caldeira et al., 2020).

E-learning is one of the most important technological applications that contribute to the development of teaching and learning methods in educational institutions. Its use in higher education has become a necessary and essential supportive educational approach (Ibn Arabi, 2022). The concept of e-learning refers to the use of modern electronic means in the field of education and learning, notably computers and the Internet with their various services, programs, and applications, to achieve efficiency and effectiveness in the educational and learning process (Sankari, 2022).

E-learning is a method of teaching and learning using modern communication mechanisms such as computers, networks, multimedia, electronic libraries, internet portals, and other technologies of all kinds; to deliver information to the learner in the shortest time, with less effort and greater benefit, and achieve active learning with content, teacher, and peers, whether synchronously (requiring simultaneous presence between the teacher and the learner) or asynchronously (not requiring simultaneous presence between the teacher and the learner), while providing flexibility in learning time, place, and speed that suits the learner's circumstances and abilities (Mashri, 2020).

The tools of e-learning have varied and the methods of employing them in the educational process have diversified. ELearning videos are one of the most prominent and common tools, especially with the spread of mobile devices and the availability of the internet. Harb (2018) defines eLearning videos as digital recordings made through media technology programs on the computer, which allow learners to enjoy watching them as if they were realistic in different time periods.

Literature has addressed the theoretical considerations and previous studies that have highlighted the advantages of eLearning videos and the benefits they bring to the development of the educational process and addressing its problems. Boateng et al. (2016) pointed out that eLearning video clips are widely accepted among students, and it is essential to integrate eLearning videos as an important part of the educational process that works to develop and improve it. Video is considered one of the most diverse and distinctive virtual learning media, as it provides a sensory learning environment that enables learners to deepen their understanding, retain information, and recall it better, thus enhancing their learning outcomes and improving their learning approach.

Harb (2018) mentioned that eLearning video has benefits and advantages in education, and it has a strong impact when used in designing and presenting educational materials. It works on influencing the learner in all cognitive, skillful, and emotional aspects. It is an effective, attractive and influential method that addresses several senses at the same time, treats different learning styles, and is characterized by diversity and ease. It is also a powerful and motivating educational tool for learners, supporting their self-learning, allowing them to control its display in terms of play, pause, fast forward, rewind, and repeat it multiple times, and directing them to the educational content accurately to achieve educational goals effectively."

Harrison (2019) pointed out that the videos made by teachers to achieve specific educational outcomes are a characteristic of the technology-enhanced learning revolution that is sweeping higher education, and an important instructional style of technology-enhanced education development, especially in distance learning programs. The spread of eLearning video usage has been contributed by the decrease in technological requirements and costs, as well as the spread of mobile devices such as smartphones and laptops among students that enable them to access video-based learning easily and flexibly anywhere and anytime.

Hanna (2020) believes that there are many advantages to eLearning videos (video lectures), including: greater student engagement in learning and increased attention, allowing the use of diverse sources of free scientific knowledge, increasing opportunities for understanding, analysis and inference, diversifying learning

and teaching strategies, and thus increasing learning effectiveness, making learning more realistic, providing the opportunity to repeat educational situations and learning materials, which helps students, especially those with lower academic achievement, to improve their performance. Moreover, it overcomes temporal and spatial limitations to make learning continuous anytime and from anywhere.

Caldeira et al. (2020) stated that eLearning videos contribute significantly to clarifying concepts and increasing students' motivation and interest in the subject matter. It also improves their learning and retention of knowledge, supports their self-learning, and makes the learning process more attractive. It provides active learning forms by engaging students in discussions while using video clips. The idea of active learning is the desire to involve students in the learning process so that they are not just passive recipients of knowledge but active and creative participants in their learning. In addition, using video clips in education and learning is a relatively cheap and easy-to-handle tool.

Based on the above, the researcher believes that eLearning videos have many advantages and benefits in the educational process, which are difficult to achieve collectively in other forms and tools of e-learning. The most prominent benefits and advantages can be identified as follows: high-quality educational content if produced within its own standards, high effectiveness in explaining abstract concepts, improvement of academic achievement for students, support for students in self-learning, flexibility in learning in terms of time and place, encouragement of collaborative and active learning, helping to increase students' motivation and stimulate their learning, making the educational and learning process more attractive, low cost, relatively easy to handle and do not require training, meeting a number of basic learning needs that cannot be met by traditional learning tools, Strengthen continuous education and distance learning programs and contribute to their development, and they can easily be broadcast through university platforms or through channels on the YouTube platform, or both.

eLearning videos are also characterized by multiple ways of using them in the educational process and their flexibility in use by teachers and learners. The researcher sees that the mechanism for presenting eLearning videos and using them in education and learning falls into two methods: The first is live presentation, where eLearning videos are presented during live meetings using accompanying technologies such as virtual classroom technology and other technologies, which provides opportunities for dialogue and discussion. The second is on-demand video, where eLearning videos are uploaded to video-sharing platforms on the Internet, allowing learners to access and watch them flexibly at their desired time, place, and frequency to support their self-learning and accommodate individual differences among learners.

To achieve the effective goals of eLearning videos, they must adhere to several criteria. Alfayez and Asiri (2018) highlighted the necessity of adopting standardized criteria in designing and producing eLearning videos. Some eLearning videos published on the Internet in general and YouTube in particular lack the standards that make them successful and effective, reducing the demand for watching them.

A study by Boumoussa and Saadi (2017) showed that a lack of consideration for good design and production standards (technical and pedagogical standards) for eLearning videos led to students' dissatisfaction with those videos and made their attitudes towards them below average. The researchers recommended the need to consider technical standards, especially in terms of image and sound quality, as well as pedagogical standards, especially in terms of the quality and accuracy of educational content, and the use of varied teaching methods and tools that take into account individual differences among learners and cater to their educational preferences.

As short video clips are preferred by viewers for effectively achieving their goals, a study by Meseguer-Martinez et al. (2016) found that users prefer short video clips, as they choose the "like" button more often in short videos than in long ones. Similarly, a study by Harrison (2019) indicated that participants prefer short video clips, while most agreed that the length of eLearning videos should depend on their purpose and objective.

Brame (2016) mentioned that in order to achieve maximum benefit from eLearning video clips, the following should be taken into consideration:

- Make video clips concise and brief about learning objectives.
- Use auditory and visual elements to convey relevant parts of the explanation, and make these elements complementary rather than unnecessary.
- Use signals to highlight important ideas or concepts.
- Use a speaking style and enthusiasm to encourage participation.
- Include video clips in an active learning context using instructional questions, interactive elements, or assignments.

Several previous studies have investigated the effect of using distance learning instructional videos on academic achievement:

A study conducted in Turkey by Kor et al. (2014) showed that visually rich, interactive, and video materials make distance learning courses more enjoyable and increase students' motivation to learn.

Another study by Born et al. (2018) demonstrated the positive impact of using instructional videos in learning tennis skills (forehand and backhand strokes). The study found that 89% of the participants rated their use of instructional videos as highly positive.

The results of the study conducted by Chen et al. (2016) at Central University in Florida (United States) revealed a high impact of eLearning videos on student achievement. The study compared the test results of a class that utilized video clips in student learning with the results of a previous class (without video intervention). Statistical improvement was found, attributed to the benefits of learning from video clips. The study also showed student opinions, with students finding the video clips very helpful in understanding the educational content of the subject. The videos aided them in completing tasks and required activities. The students rated all aspects of their video experience very highly. The results also indicated that students perceive videos as complementary to face-to-face lectures and helpful in understanding course content.

The results of a study conducted by Al-Shayea (2018) confirmed the effectiveness of using interactive video clips through YouTube in developing students' skills in producing eLearning video clips to a very high degree.

Another study conducted by Shadli et al. (2018) revealed the effectiveness of eLearning videos in learning the gradual process of making a basic pattern for a child's skirt using the composite model approach and to a high degree of mastery.

The results of Harrison's study (2019) revealed the students' satisfaction with the use of eLearning videos in their learning. They perceive that it has a positive impact on their learning, and the majority of participants (76.7%) felt that the quality of video production made a difference in their learning. The videos also helped bridge the gap in distance learning outcomes, as one student stated, "The videos made me feel like I was in face-to-face learning on campus," and another student mentioned, "eLearning videos made learning real and reduced the isolation that may occur in distance learning".

The study by Alajrami (2019) revealed the effectiveness of eLearning video clips through YouTube in developing digital storytelling skills among female students at the Faculty of Education at Al-Aqsa University and their attitudes towards using YouTube. The results of the study showed statistically significant differences between the control and experimental groups in the post-test achievement and the evaluation card in favor of the experimental group. There were also statistically significant differences between the mean scores of the experimental group in the pre-test and post-test of the attitude scale in favor of the post-test. The results also indicated a significant impact of eLearning video clips through YouTube on the development of the cognitive, performance, and emotional aspects.

A study by Saienko and Shevchenko (2020) has shown that regularly incorporating instructional video segments in English language teaching helps improve listening and speaking skills among technical students by approximately twice the rate. The students in the study sample mentioned that instructional video segments significantly enhanced their proficiency in the English language and improved their understanding of the subjects taught. They also expressed their desire to continue benefiting from instructional video segments at home, emphasizing the indispensability of these instructional videos in lifelong continuous learning and education.

The results of a study conducted by Duong (2020) showed that the attitudes of English language major students towards utilizing video clips in the Business Communications course in a Vietnamese university were very high.

A study by Danjou (2020) emphasized the role of synchronous and asynchronous e-learning in facing the challenges of closures imposed by the circumstances of the coronavirus pandemic for remote organic chemistry education. The asynchronous part of the teaching was achieved through the researcher's preparation of video clips broadcasted on the social network Facebook to allow each student to learn independently according to their own time, place, abilities, and needs. While the synchronous part of the teaching was executed thanks to the Discord platform to provide direct discussions with the students, in addition to achieving social communication with them. The results showed that 95% of the students believe that using video clips is better and more suitable for practical explanation than direct explanation, and that video clips allow students to progress at their own pace, with the ability to watch the video clips several times at any time according to their abilities and needs.

### **III. PROBLEM STATEMENT&METHODOLOGY**

#### **3.1. Problem Statement**

Al-Quds Open University adopts a blended learning system in its educational policy, which combines traditional face-to-face learning with various forms of e-learning. However, the closure period that educational institutions faced during the COVID-19 pandemic made the university, like other Palestinian and global universities, rely solely on distance e-learning to achieve The principle of physical distancing and continue the educational process at the same time. However, some of the university course materials have specific

characteristics, such as their level of difficulty and inclusion of practical application aspects, which require the development of strategies for distance e-learning that are suitable for them and achieve their goals effectively. One of these courses is "Computer Basics and Programming".

Since the researcher is the instructor of the course, he has developed a set of eLearning videos for the course topics, utilizing them synchronously and asynchronously, in an effort to effectively achieve the course objectives. This has identified the main research question: *What is the impact of using distance synchronous and asynchronous eLearning videos on developing practical skills in the Scratch program for students specializing in "Learning Resources and Educational Technology" at Al-Quds Open University under the conditions of the COVID-19 pandemic.* And from this research question, the following sub-questions arise:

*Question 1:* Are there statistically significant differences ( $\alpha \leq 0.05$ ) in the means of process skills levels in the Scratch program between the control group (which learned by traditional methods before the COVID-19 pandemic) and the experimental group (which learned using distance synchronous and asynchronous eLearning videos during the COVID-19 pandemic)?

*Question 2:* Are there statistically significant differences ( $\alpha \leq 0.05$ ) in the means of process skills levels in the Scratch program among students in the experimental group (which learned using distance synchronous and asynchronous eLearning videos during the COVID-19 pandemic) in different geographic regions of the university branches?

*Question 3:* What is the viewpoint of the students in the experimental group regarding their benefit from the eLearning videos that were used synchronously and asynchronously to develop their practical skills in the Scratch program under the the COVID-19 pandemic?

### **3.2. Methodology**

The study adopted the experimental and descriptive approaches to suit the nature of the study. The experimental approach was used to compare the results of the control group (which learned by traditional methods before the COVID-19 pandemic) and the experimental group (which learned using distance synchronous and asynchronous eLearning videos during the COVID-19 pandemic). The descriptive approach is used to gather information about the viewpoint of the students in the experimental group regarding their benefit from the eLearning videos that were used synchronously and asynchronously to develop their practical skills in the Scratch program under the COVID-19 pandemic, and then describe it as it is in reality.

### **3.3. Study Variables**

*Independent Variable:* Employing distance synchronous and asynchronous eLearning videos.

*Dependent Variable:* Developing practical skills of students in the Scratch program.

### **3.4. Participants**

The study sample included all students specializing in "Learning Resources and Educational Technology" who studied "Computer Basics and Programming" Course, taught by the researcher, who were (100) male and female students distributed among four sections. The first section included (20) male and female students who studied the course in the second semester of the academic year 2018-2019. The second section included (19) male and female students who studied the course in the first semester of the academic year 2019-2020. The researcher considered these two sections as a control group who had learned by traditional methods before the COVID-19 pandemic. Therefore, the number of the control group is (39) male and female students, all of whom are from one branch, which is the Nablus branch in Palestine.

The third and fourth sections have studied their course in the first semester of the academic year 2020-2021, and their number was (67) students. Six of them were absent from the practical exam for personal reasons, making the approved number of students (61). The researcher adopted these last two sections as an experimental group who had learned using distance synchronous and asynchronous eLearning videos during the COVID-19 pandemic. It should be noted that the students of the experimental group are distributed in nine branches (Five regions) spread across different provinces in the West Bank and Gaza Strip in Palestine, out of a total of eighteen branches.

Table1. shows the distribution of the study sample according to the two control and experimental groups. Table2. shows the distribution of the study sample according to the branches of the university (Five regions) affiliated with it in Palestine. Figure1. shows a map of the distribution of the study sample according to the branches of the affiliated university in Palestine.

**Table1. Distribution of the study sample according to the control and experimental Groups**

Groups	Learning period	Teaching and learning method	Number
Control Group	Before the COVID-19 Pandemic	Traditional Method	39
Experimental Group	During the COVID-19 Pandemic	Using Synchronous and Asynchronous eLearning Videos	61
Total			100

**Table2. Distribution of the study sample according to geographical regions for the university branches.**

Groups	Number of study sample by geographical regions for the university branches						Number
	Branches	Nablus					
Control Group	Number	39					39
Experimental Group	branches	Nablus	Tulkarm & Qalqilya	Ramallah & Jericho	Bethlehem	Gaza, North Gaza & Alwusta	61
	Number	9	17	13	9	13	
Total							100

**Figure1. Distribution Map of the Experimental Group according to university branches Affiliated in Palestine.**



### 3.5. Study Tools and Procedures

The study tools were divided into two types: experimental tools and measurement tools. The experimental tools were represented by eLearning videos prepared by the researcher for distance synchronous and asynchronous use to develop students' skills in using the "Scratch" program. Meanwhile, the measurement tools included two note cards: one for measuring students' skills in using the "Scratch" program, and the other for evaluating students' project of an educational game using the "Scratch" program.

#### 3.5.1. ELearning videos and their distance use synchronously and asynchronously

The following is a clarification of the eLearning videos and their distance synchronous and asynchronous use, based on the curriculum book for programming with "Scratch" Program at Al-Quds Open University, which the researcher followed:

1. The researcher analyzed the educational material related to programming with "Scratch" program, and derived the skills that need to be developed by students, which amounted to (137) sub-skills.
2. The researcher divided the educational material into six mini-units, each consisting of a teaching lecture. Then, each mini-unit was divided into several sections, and each section was further divided into a number of educational sessions totaling (37) educational sessions distributed among those sections and organized according to their psychological and logical sequence.

3. The researcher wrote the educational scenario for each educational session, and then developed it into eLearning videos using (Camtasia Studio 8) program for producing and editing desktop videos. Then, those videos were edited, formatted, refined, and produced in (MP4) format, and named according to the unit number and section to which they belong, with their specific title, and their sequential number. The number of those eLearning videos reached 37 videos (one eLearning video for each educational session), and the duration of those videos generally ranged between five and fifteen minutes.
4. The researcher reviewed each eLearning video and verified its validity and accuracy of information.
5. The researcher uploaded eLearning videos on his own channel on the video-sharing platform "Youtube" as well as on the video-sharing platform of Al-Quds Open University "Qtube". He uploaded videos of every educational lecture (a mini-unit) at the beginning of each week, and for six weeks, so that students could learn from them at any time and from anywhere they want, asynchronously.
6. The researcher also used these eLearning videos during the weekly distance meetings with the students through virtual classroom technology, presenting and discussing them during and after the presentation to use them synchronously in teaching the students.

### **3.5.2. observation Cards**

A practical exam has been prepared that accounts for (50%) of the total practical grade. Students were also asked to product a project using the "Scratch" program, which is a design for an educational game that accounts for (50%) of the total practical grade. In order to evaluate the results of the practical exam and the educational game project, the researcher built an observation card for the practical exam, and another observation card (product evaluation card) for the practical project, through the following procedures:

- 1- Goal setting: The aim of the observation card was to evaluate the results of the practical exam for the "Scratch" program, while the aim of the product evaluation card was to evaluate the practical project produced by the student using the "Scratch" program, which is represented by the design of an educational game. This is for the purpose of measuring the degree of practical skills in the "Scratch" program that the students gained through the use of synchronous and asynchronous eLearning videos.
- 2- Paragraph formulation of the observation card: The observation card for the practical exam included (20) phrases, each measuring a specific skill. The product evaluation card included (25) indicators distributed across five main criteria.
- 3- The quantitative assessment of student performance: The researcher used the five-level quantitative assessment to evaluate the student's performance in each skill of the observation card related to the practical exam. The researcher relied on five levels to assess the performance grades, which are (1,2,3,4,5). Where level (1) indicates the skill is very poor, level (2) indicates the skill is poor, level (3) indicates the skill is medium, level (4) indicates the skill is high, and level (5) indicates the skill is mastery. Thus, the overall grade for assessing the skills performance is (100).

The researcher used the five-level quantitative assessment to evaluate the student's performance in each indicator of the evaluation criteria of the assessment card for the product of the practical project (the educational game). The researcher adopted four levels to estimate the performance grades, which are (1, 2, 3, 4). The estimation (1) referred to a low degree for the performance indicator, while the estimation (2) referred to an acceptable degree for the performance indicator, the estimation (3) referred to a high degree for the performance indicator, and the estimation (4) referred to an excellent degree for the performance indicator. Thus, the total grade for evaluating the performance in the practical project product is (100).

4- The validation the observation card and the product evaluation card: The researcher presented the initial image of the observation card and the product evaluation card to academic arbitrators who specialize in teaching the "Scratch" program to arbitrate them, to confirm the clarity of their paragraphs and their suitability for achieving their purpose. The arbitrators indicated the validity of both tools in achieving their goals.

5- The reliability of the observation card and the evaluation card: To ensure the reliability degree of the observation card and the product evaluation card, the researcher calculated the Cornbach's Alpha coefficient for both tools after applying them to the sample. The reliability coefficient of the observation card related to the practical exam was (0.84), while the reliability coefficient of the product evaluation card related to the practical project was (0.78). These values indicate good reliability and validity of the two cards for use.

### **3.5.3. Student Opinion survey**

The researcher prepared an electronic survey using Google Forms, aiming to ask the study sample students in the experimental group about the degree to which they benefited from using distance eLearning videos, synchronously and asynchronously, in developing their practical skills in the Scratch program, with specifying response grades (excellent, very good, good, weak, very weak) and assigning weights to them (5, 4, 3, 2, 1), in addition to an open paragraph in which the student expresses their opinion about the eLearning

videos that were used in the course, in light of their use and experience. They were asked to respond anonymously to ensure the objectivity of their responses and the freedom of their expression of their opinions.

### **3.6. Study Procedures**

After the researcher prepared the eLearning videos for teaching programming in the "Scratch" program (experimental tool), which reached a total of (37) eLearning videos distributed in six mini-units (educational lectures), the researcher applied the research experiment for six weeks as follows:

1- The researcher uploaded the videos of each mini-unit (educational lecture) at the beginning of each week of the research experiment on a dedicated channel on the video-sharing platform "YouTube", and informed the students to watch and learn the skills on their own, and to train on them at any time and from anywhere, at the appropriate speed and repetition.

2- In every week of the research experiment and at a specific time, the researcher held a virtual meeting through the Virtual Class technology for two hours. The purpose of the meeting was to present the dedicated videos for the conducted lecture, which were uploaded on the "YouTube" platform during that week. The videos were paused at certain intervals to discuss and enrich the students' understanding of the skills included in them. Feedback was also obtained from the students. At the end of the meeting, a general discussion was opened regarding the skills clarified in the instructional videos. This way, the instructional videos were synchronized with the students, and recordings of these virtual meetings were recorded and made available to the students on the university platform for online courses. The students can refer to and watch them at any time and from any place asynchronously.

3- The researcher clarified the requirements for the students in the practical project (designing the educational game) and its technical and educational standards, the deadline for submission, and the mechanism of submission (via email). Additionally, they explained the requirements of the practical exam, its schedule, and location.

4- The researcher built measurement tools represented by the observation card for evaluating students' skills through their performance in the practical test, and the evaluation card for evaluating the practical project, then ensuring the validity of both tools.

5- After the completion of the six virtual meetings, and covering the educational material through explanation, discussion, and clarification, the practical exam was held. The administration of the Nablus branch (to which the researcher and students academically belong) coordinated with the administrations of other branches to hold the practical exam for each student in their branch. After the completion of the practical exam, each branch sent electronically the answer file of the affiliated students to the administration of the Nablus branch, and then it was delivered to the researcher to evaluate the students' performance using the observation card prepared for this purpose. After that, the researcher calculated the student's grade in the practical aspect by calculating the total of their marks in the practical exam and the practical project and dividing it by 2, so that the total grade for the practical aspect becomes 100.

6- The students submitted their practical projects to the researcher through electronic correspondence, who in turn evaluated them using a product evaluation card prepared for this purpose.

7- The researcher contacted the students to survey their utilization of distance synchronous and asynchronous eLearning videos in developing their practical skills in the "Scratch" program, and to gather their opinions freely regarding their usage and experience, as well as any recommendations for improvement and development.

8- The researcher ensured the reliability of the observation card and the product evaluation card by calculating the Cronbach's Alpha coefficient for each after their application.

9- The students' opinions regarding their use of synchronous and asynchronous eLearning videos for developing their skills in the "Scratch" program were collected. The collected data from observation cards and evaluation cards were encoded, entered into the computer, and analyzed using the statistical package for the social sciences (SPSS) to obtain the results. These results were then discussed, and recommendations related to them were written.

## **IV. RESULTS AND DISCUSSIONS**

**4.1. The results related to the first question, which states:** "Are there statistically significant differences at the significance level ( $p \leq 0.05$ ) in the average practical skills level in the 'Scratch' program between the control group (which learned through traditional methods before the COVID-19 pandemic) and the experimental group (which learned through synchronous and asynchronous e-learning videos during the COVID-19 pandemic)?"

For the purpose of answering this question, the researcher referred to the practical aspects of the course "Computer Fundamentals and Programming" for students specializing in "Learning Resources and Educational Technology". This was done by reviewing the official grades records of both the control and experimental groups, as well as Tables3. and Tables4. which illustrate:



**Table3. Practical skills grades in the "Scratch" program for the control group (maximum grade: 100).**

#	Grade	#	Grade	#	Grade	#	Grade	#	Grade
1	87	9	92	17	78	25	55	33	81
2	85	10	86	18	93	26	95	34	84
3	92	11	35	19	91	27	94	35	88
4	88	12	63	20	88	28	72	36	71
5	86	13	90	21	74	29	84	37	30
6	75	14	82	22	80	30	82	38	80
7	80	15	85	23	46	31	77	39	82
8	35	16	95	24	74	32	64		
Average of grades (Post-test) for the control group							77.4		

**Table4. Practical skills grades in the "Scratch" program for the experimental group (maximum grade: 100)**

#	Grade	#	Grade	#	Grade	#	Grade	#	Grade
1	85	14	91	27	75	40	80	53	87
2	76	15	77	28	74	41	82	54	66
3	97	16	92	29	73	42	78	55	70
4	81	17	82	30	73	43	81	56	87
5	68	18	67	31	63	44	78	57	80
6	71	19	80	32	85	45	88	58	90
7	92	20	83	33	75	46	68	59	81
8	83	21	72	34	72	47	86	60	78
9	77	22	77	35	80	48	76	61	84
10	78	23	77	36	70	49	80		
11	85	24	74	37	70	50	83		
12	77	25	75	38	86	51	70		
13	98	26	77	39	66	52	50		
Average of grades (Post-test) for the experimental group							78.4		

Referring to the previous Tables3.AndTables4., there appears to be a similarity between the mean scores of practical skills in the "Scratch" program for the experimental group (78.3) and the control group (77.4), with noticeable differences for the experimental group.

It is also evident that the number of students who did not achieve a passing grade in practical skills in the "Scratch" program for the control group is four students, indicating a failure rate of (10%), while there is no student in the experimental group who scored less than (50) in practical skills in the "Scratch" program, indicating a failure rate of (0%). The researcher attributes this result to the availability of eLearning videos for learning the "Scratch" program for the students in the experimental group, allowing them to study at any time, from anywhere, at their own pace, and repeat viewing as needed, which was not available for the students in the control group.

For the examination, if there were statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the means of practical skills in the "Scratch" program between the control group and the experimental group, t-test for independent samples was used, and the results are shown in the following Tables5.

**Table5. Results of the independent samples t-test for the significance of differences in the level of practical skills in the "Scratch" program between the control group and the experimental group.**

Degree of practical skills in the "Scratch" program	Groups	n.	Mean	St. Dv.	(t) Value	Sig.
	Control	39	77.41	16.70		
experimental	61	78.31	08.47	- 0.356	0.722	

\* Statistically significant at the level of significance ( $\alpha \leq 0.05$ )

It becomes clear from the results of the previous Table5. that despite the apparent differences in favor of the experimental group, the calculated significance level (0.722) is higher than the assumed significance level (0.05). This means that there are no statistically significant differences at a significance level of ( $\alpha \leq 0.05$ ) in the averages of practical skills proficiency in the "Scratch" program between the control group (which learned through traditional methods before the COVID-19 pandemic) and the experimental group (which learned through synchronous and asynchronous eLearning videos during the COVID-19 pandemic).

The researcher believes that this result indicates that the use of synchronous and asynchronous eLearning videos has contributed to the development of practical skills in the "Scratch" program for students specializing in "Learning Resources and Educational Technology" at Al-Quds Open University, under the circumstances of the Corona pandemic, to a degree not less than the development of their practical skills under traditional face-to-face learning conditions before the Corona pandemic. In other words, the use of synchronous and asynchronous eLearning videos replaced traditional face-to-face learning in order to develop practical skills in the "Scratch" program for students specializing in "Learning Resources and Educational Technology" under the circumstances of the Corona pandemic.

The researcher attributes this result to the following factors:

- The high quality of eLearning videos, both technically in terms of precision and clarity, and educationally in terms of goal clarity and inclusiveness of the educational material, as well as dividing the educational material into specific sections and parts with defined goals and skills, and the sequential and logical progression of the learning material, making it clear, easy to learn, understand, and apply.
- The use of synchronous eLearning videos through virtual classrooms has made the learning environment as close as possible to the traditional face-to-face learning environment, enabling students to have direct (synchronous) communication with the instructor (researcher), facilitating discussions, asking questions, and providing immediate feedback.
- The use of asynchronous eLearning videos has supported self-learning for students and achieved learning flexibility, as each student was able to learn at any desired time, from any location, at their own pace, and repeat the videos according to their needs. This has contributed to considering the individual differences among students and taking into account their personal circumstances.

**4.2. The results related to the second question, which states:** "Are there statistically significant differences at the significance level ( $\alpha = 0.05$ ) in the average practical skills proficiency level in the 'Scratch' program between students in the experimental group (who learned through synchronous and asynchronous online instructional videos during the COVID-19 pandemic) across different geographic regions of the affiliated university branches?"

For the purpose of answering this question, a one-way analysis of variance test was used, and the following Tables6. and tables7. show the results:

**Table6. Frequencies, means and standard deviations for the level of practical skills in the "Scratch" program among students in the experimental group, according to the geographical regions of the university branches.**

Geographical regions of the affiliated university branches	n.	Mean	St. Div.
Nablus	9	75.78	3.42
Tulkarm & Qalqilya	17	78.41	6.66
Ramallah & Jericho	13	75.54	7.56
Bethlehem	9	77.11	7.91
Gaza, Northern Gaza, and Central Gaza	13	83.54	12.21
<b>Total</b>	<b>61</b>	<b>78.31</b>	<b>8.47</b>

From the results in Table6. in the previous, it is clear that the median of the computational skills in the "Scratch" program among the students of the experimental group according to the geographical regions variable for the branches of the university to which the students belong is similar to a large extent, and Table7. shows whether these differences have statistical significance.

**Table7. Results of the analysis of the univariate variation for the significance of the differences in the degree of practical skills in the "Scratch" program among the students of the experimental group according to the geographical regions variable for the branches of the university to which the students belong.**

Source of variation	Sum of squares	Deg. of free.	Mean of squares	F value	Sig. level
Between groups	526.058	4	131.515	1.949	0.115
Within groups	3779.024	56	67.483		
Total	4305.082	60			

\* Statistically significant at the level of significance ( $\alpha \leq 0.05$ )

It is clear from the results of the previous Table7. that there are no statistically significant differences at the significance level ( $\alpha \leq 0.05$ ) in the averages of the practical skills in the "Scratch" program in the experimental group (which learned using synchronous and asynchronous electronic distance instructional videos in the circumstances of the Corona pandemic) attributed to the variable of the geographical areas of the university branches to which the students are affiliated, as the calculated significance level value (0.115) is greater than the assumed significance level (0.05).

The researcher believes that this result confirms the impact of employing synchronous and asynchronous electronic distance instructional videos on the development of practical skills in the "Scratch" program remotely, regardless of the distance and location in different university branches in Palestine.

**4.3. The results related to the third question, which states:** "What are the estimates of specialized students' use of learning resources and educational technology at Al-Quds Open University in utilizing synchronous and asynchronous eLearning videos for the development of their practical skills in the Scratch program under the circumstances of the Corona pandemic?"

The researcher reviewed the students' responses in the experimental sample regarding their electronic voting on their degree of benefit from the use of synchronous and asynchronous eLearning videos in developing their practical skills in the Scratch program. Their responses are as shown in Table8. below:

**Table8. Estimates of the experimental sample students' benefit from the synchronous and asynchronous eLearning videos employed remotely to develop their practical skills in the "Scratch" program under the circumstances of the Corona pandemic.**

Response Degree	Excellent 5	Very good 4	Good 3	Weak 2	Non-existent 1	Total
Repetitions	54	7	0	0	0	61
Percentage	88.5%	11.5%	0%	0%	0%	100%
Mean of the total response degree				4.89		
Percentage of the total response degree				97.7%		

From the results in Table8. above, it is evident that the vast majority of students in the experimental group (88.5% of the sample) rated their benefit from the synchronous and asynchronous implementation of eLearning videos in developing their practical skills in the "Scratch" program during the circumstances of the COVID-19 pandemic as excellent. As for the remaining participants (11.5% of the sample), their ratings for their benefit were very good, with no lower estimations. Additionally, the results showed that the average score for the overall responses of the experimental group students reached 4.89, with a percentage of 97.7%, which is a very high rate that indicates a substantial conviction among the experimental group students regarding the importance of eLearning videos and their benefit in synchronous and asynchronous distance learning, as well as their impact on developing their practical skills in the "Scratch" program.

As the researcher reviewed the responses of the experimental group students regarding the open paragraph that carried their opinions about the use of distance synchronous and asynchronous eLearning videos to develop their practical skills in the "Scratch" program, their opinions expressed gratitude, appreciation, and great satisfaction. The most frequently repeated words in describing their opinions were: fantastic, excellent, outstanding, creative, comprehensive, sufficient, proficient, enjoyable, simplified, easy to learn, motivating, I benefited greatly from them, a suitable alternative to face-to-face meetings, better than face-to-face explanations, the best courses I have studied, made distance learning wonderful, considering the student's circumstances and meeting their needs, a fantastic and excellent method of teaching and learning to face the challenges of the Corona pandemic.

As for the most repeated responses, their meaning was as follows:

- The eLearning videos are wonderful, enjoyable, simplified, and understandable. I benefited from them excellently.
- This course is the most comprehensive course I felt that e-learning was employed in it with all the possibilities and facilitations that we need in an integrated, proficient, detailed, enjoyable, lively manner, and without any boredom.
- It was a unique and suitable experience for the educational material, and the explanation of the eLearning videos and discussing them during virtual meetings was very useful. It did not differ from face-to-face explanation. In my opinion, it was better than face-to-face attendance, as understanding and focus were excellent in it.
- It was a wonderful experience and I benefited a lot. I was curious to follow the tutorial videos one by one, so I waited for the day they were uploaded on YouTube to watch and apply their skills and send my work and practice to the doctor to give me his opinion. This motivated me to take the initiative and learn more about the educational material, follow it, and practice its skills.
- The tutorial videos were comprehensive and detailed, and the way they were utilized was creative. I believe that if we trained more, we would achieve a higher level of proficiency in software skills.
- It was one of the best courses I studied at university. The tutorial videos that were employed were sufficient and comprehensive, and the explanation was more than wonderful and very understandable.
- The eLearning videos that were provided to us were excellent and served the purpose of understanding and comprehending the material in a simple and uncomplicated manner. They made distance learning wonderful, taking into consideration the student's circumstances and meeting their needs.
- The eLearning videos were excellent, and their utilization gave the material its due explanation and even enhanced it to the point where we understood the distance learning material as if it were face-to-face.
- The eLearning videos and their utilization in the course were more than excellent and no less important than face-to-face meetings. They replaced them wonderfully in the face of the coronavirus pandemic, giving the student the freedom to learn using their suitable time and according to their own abilities. They also added interaction and communication between students and the professor.
- The use of eLearning videos made learning a fun experience and helped me understand the subject easily and quickly.
- The experience with Al-Quds Open University is beautiful, excellent, and always at the forefront of e-learning.
- It was a wonderful, useful, and distinctive experience.

- I relied entirely on eLearning videos, and the explanations in them were more than wonderful, clear, easy, and accurate.
- ELearning videos have great benefit, mastery, excellence, and great efforts.
- The eLearning videos are very excellent, they helped us learn in a fantastic and excellent way despite the COVID-19 pandemic.
- The eLearning videos were excellent and easy to understand and apply, and their use in virtual meetings was fantastic and very clear.
- I benefitted a lot from the eLearning videos and the explanations in them were extremely excellent and useful, similar to face-to-face explanations and even more, and the explanation was clear and progressive from easy to difficult.

## **V. CONCLUSION& RECOMMENDATIONS**

The concept of e-learning refers to the use of modern electronic means in the field of education, including computers, mobile devices, and the internet with its diverse services, programs, and applications, aiming to achieve efficiency and effectiveness in the educational process. If distance e-learning used to be a difficult and worrying issue for many educational institutions in the past, it has become a challenge, a pressing need, and a reality imposed during the COVID-19 pandemic. The circumstances imposed by the pandemic, including the repeated closures of various community institutions, including educational institutions, have led to an urgent, rapid, from traditional face-to-face education to distance e-learning to ensure the continuity of the educational process and prevent its interruption.

Therefore, post-COVID e-learning will not be the same as before it; if countries and their educational institutions seek to employ e-learning through equipping the appropriate infrastructure, preparing electronic programs, systems, tools, and applications, and developing their curricula electronically, in order to benefit from the advantages and benefits that e-learning achieves under natural circumstances, then the emergency conditions that may sweep a country, or the world and its educational institutions (as witnessed by the world during the COVID-19 pandemic), necessitate that they be more prepared to implement successful and effective e-learning, capable of addressing the problems arising from any emergency circumstances, and facing their challenges.

eLearning video is considered one of the most prominent tools of synchronous and asynchronous e-learning; as it greatly contributes to clarifying concepts and increasing students' motivation and interest in the subject of study, improving their learning and retention of knowledge, supporting their self-learning, making the educational and learning process more attractive, and providing active forms of learning by engaging students and discussing with them while using video clips. In addition, the use of video clips in teaching and learning is a cheap and easy-to-use tool, especially with the spread of mobile devices among students.

The results of this study have shown that the use of synchronous and asynchronous eLearning videos has worked to develop practical skills in the "Scratch" program for students under the circumstances of the COVID-19 pandemic to a degree not less than developing their practical skills in traditional face-to-face learning in normal circumstances before the COVID-19 pandemic. In other words, the use of synchronous and asynchronous eLearning videos has replaced traditional face-to-face learning in order to develop practical skills in the "Scratch" program for students under the circumstances of the COVID-19 pandemic.

As the study results showed, the vast majority of the experimental group students (88.5% of the sample) had estimations for their benefit from the remote synchronous and asynchronous electronic instructional videos employed to develop their practical skills in the "Scratch" program under the circumstances of the COVID-19 pandemic (excellent), while the remaining (11.5% of the sample) had estimations for their benefit (very good). While there were no lower estimates among the students, the results showed that the average score of the total responses for the students in the experimental sample was (4.89) with a percentage of (97.7%), which is a very high percentage approaching complete agreement for the students in the experimental group on the importance of electronic educational videos, and their synchronous and asynchronous use at a distance, and their impact on the development of their practical skills in the "Scratch" program.

Based on the findings of this study, the researcher recommends the following:

- To adopt the eLearning videos that have been produced and utilized synchronously and asynchronously for teaching the "Scratch" program remotely, in light of the Corona pandemic, for students specializing in "Learning Resources and Educational Technology" at Al-Quds Open University. These videos should also be used in any emergency circumstances that hinder traditional face-to-face learning and require distance learning. They should also be adopted for teaching and learning the "Scratch" program under normal conditions after the end of the Corona pandemic as supportive tools alongside traditional face-to-face education. It is worth noting that the videos are uploaded on the university's video-sharing channel (qtube.qou.edu).
- To adopt the eLearning videos that have been produced and utilized synchronously and asynchronously remotely for teaching students in other universities who require the practical aspect of the 'Scratch' program

during the COVID-19 pandemic, as well as adopting them as supportive tools alongside traditional face-to-face education under normal circumstances after the end of the COVID-19 pandemic, knowing that the videos are uploaded on the video sharing channel 'YouTube' ([www.youtube.com](http://www.youtube.com)).

- To adopt the eLearning videos that have been produced to assist technology teachers in schools and their students in teaching and learning the 'Scratch' program during and after the COVID-19 pandemic, as the program is taught in the upper primary stage, knowing that the videos are uploaded on the video sharing channel 'YouTube' ([www.youtube.com](http://www.youtube.com)).

- To develop eLearning videos for practical courses in the specialization of "Learning Resources and Educational Technology" and employ them synchronously and asynchronously remotely in light of the circumstances of the COVID-19 pandemic. Also, to conduct research and studies on their impact on student learning and skills development, student attitudes towards them, and their role in facing the circumstances of the COVID-19 pandemic or other emergency situations that may hinder or halt the educational process.

### **Conflict of interest**

There is no conflict to disclose.

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