Effects of Interactive Video on Mind Mapping Skills of Common First Year Students' at Umm Al-Qura University

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Summary

This study set off to explore the effect of interactive videos on developing mind mappings skills required for the common first-joint year students at Umm Al-Qura University. Towards this end, the experimental research design of a quasi-experimental of two experimental groups was adopted. The research tools consisted of an achievement test of the cognitive aspects of mind mapping skills and a product evaluation form of mind mapping skills. Results showed statistically significant differences at the significance level (α 0.05) between the mean scores of the two experimental groups who studied the educational video regardless of the type of video in the pre-post cognitive test of the mind mapping skills and the form of product evaluation. Besides, there are statistically significant differences at the significance level (0.05≥α) between the mean scores of the first experimental group who studied the conventional educational video and the mean scores of the second experimental group who studied the interactive educational video. This significant difference was in the posttest of mind mapping skills and in favor of the group who studied the interactive educational video. Nevertheless, there were no statistically significant differences at the significance level (0.05≥α) between the mean scores of the first and second experimental groups in the post-application of the product evaluation form of mind mapping skills. The researcher recommended using the interactive video in teaching courses to common first-year students. It also recommends organizing courses for the faculty members to train them on using interactive videos in their teaching.

Keywords:
Interactive video (IV), mind mapping, Instructional video.

1. Introduction

Interactive video is a type of advanced digital video that facilitates interaction between learners and their learning content. The Educause Association publishes annual reports on the most important technologies that impact the educational process [1]. According to the Horizon report issued in 2020 by this association, this type of interactive technology could make a leapfrogging in teaching and learning processes.

First: Interactive Video (IV)

Definition of Interactive Video (IV)

Despite many definitions of interactive video (IV), the definitions that correspond to the current study have been adopted throughout the present investigation. One of these definitions conceptualizes IV as a non-linear video in which several classic functions can be provided, such as the play, pause, pause, rewind, and forward buttons. It also has more complex functions such as presenting a table of contents, an index that facilitates navigation in the presentation of the video. This type of video is usually rich in hyperlinks which enable access to additional materials such as documents and other audio files, images, etc., via tags or hot spots [2]. Abu [3] defined IV as a "video program that has been divided into small parts that can contain movement, sound and text, and the learner's responses are determined by the computer when the video scenes are sequenced, and as a result, both the form and nature of the show are affected" (p. 168).
Touched on above, interactive video can be defined as a non-linear video. A number of classic and more complex functions can be presented, such as presenting tables, indexes, hyperlinks, quizzes, and others, making the video interactive.

Justifications of Utilizing Interactive Videos (IV)

Numerous educational studies have investigated students' weaknesses in their interaction with educational videos. Add to that the linear nature of the conventional educational video, which makes it a source of little interaction, which may negatively affect both skills related to deep learning, such as thinking and interpretation [2]. Viewing it differently, the lack of interactive elements in educational videos limits their effectiveness, wasting time and effort and increases distraction [4]. There is a need to take advantage of the possibilities offered by interactive video, through which the disadvantages of conventional videos can be avoided .

Characteristics of Interactive Videos (IV)

Interactive video has the same characteristics found in ordinary digital video. In addition, interactive video has more features the ordinary digital videos have. The features are discussed below.

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- **Dynamism**

This feature is the opposite of the stability that characterizes images and static graphics, which is the moving dimension of images. It helps the learner to perceptualize the content to be learned because it is more suitable for human nature [2].

- **Interactivity**

This feature enables the user to interact with the visual presentation by allowing freedom of control and free movement within the clip or comment and share the discussion about what to be learned either with peers, the teacher, or individually [2-5-6].

- **Non-linear design**

Video clips are generally linear clips. This means that they can display clips in one way with one beginning and one end. However, the development and use of technology and the emergence of applications that facilitated the design of videos in a non-linear manner resulted in easy control of the display Videos, and the addition of points or hyperlinks that allow for movement within the videos, have all helped in the emergence of interactive videos that support non-linear patterns when designing [5-7].

- **Personal learning Environments Support**

This can be obtained through the use of interactive videos that allow the learner the freedom to make decisions and feel control within the content to be learned, and this enables learners to self-organize their learning and make the learning process more effective [8-9].

Theories of Interactive Videos (IV)

The use of any technology in education is based on theories that help designers recognize the circumstances surrounding technology use in education. In addition, a reliance on approaches helps to increase the effectiveness of the technology used when employed in classrooms or training rooms. The IV technologies in the educational process are generally based on two theoretical approaches: an epistemological approach that focuses on how learners process information and a sociological approach concerned with the social interaction between the learner and other learning elements [5].

- **Cognitive theory**

Cognitive theory is concerned with the internal processes that occur within the learner's brain and how it can explain this learning by focusing on the processes of reception, processing, memory processes, and information retrieval [10].

Cognitive theories in the interactive video can serve two essential functions: facilitating information processing by displaying it in the form of sequential visual representations and supporting knowledge acquired by non-linear patterns that contribute to the development of thinking [5-8].

In his theory of multimedia learning, [8] pointed out that learning is an active process that occurs within the brain through which the information presented is selected, organized, and stored. However, the human processing capabilities of sequential information are somewhat limited. As a result, multimedia programs must be designed to do not exhaust learners and reduce their cognitive activity.

Having said that, many principles are defined for designing multimedia programs and applications appropriate to the way information is processed within the human mind. An example of this is a principle indicating that learning is done well when the lesson is organized logically well" to reduce the cognitive load that results from external processing. Another principle states that "the advantage of learning through words and pictures together over learning through words only" enhances generative processing [8-11].

- **Cognitive Social Theory**

Social cognitive theory indicated that learning occurs when an individual interacts with social contexts, experiences, and external media to which he is exposed [10]. Interactive video is also an education and collaboration tool that helps learners think collectively and spread and share knowledge inside and outside the school [5].

For this reason, it is assumed that when designing the interactive video, knowledge of the principles of educational theories from all directions should be taken into account to design and produce interactive videos that correspond to what the theories refer to, which positively affects the quality of educational products and thus raises the level of educational outputs.

Effectiveness of interactive digital video in learning

It goes without saying that digital video, which is widely used in the educational process, is one of the most commonly used teaching aids in educational environments and the most preferred by teachers and learners [5]. On the other hand, many studies have shown that it is difficult to prove the superiority of educational video over other educational methods. The effectiveness attributed to educational video in the educational process may be characterized by a kind of exaggeration [12]. However, with the tremendous developments in technologies and their use and the emergence of interactive video, which is designed to overcome the defects found in ordinary digital video, many studies have also emerged confirming the presence of many contributions of interactive video in improving the educational process [5].

Hence, the effectiveness of interactive video in the educational process gives a positive view of the use of interactive video inside and outside the classroom and contributes to encouraging teachers and learners to take

advantage of this type of educational video to achieve the maximum educational benefit.

Interactivity in Digital Educational Video

Interactive video (IV) is distinguished from ordinary digital video by many points that add interaction tools to educational content in digital videos. In this regard, many educational studies indicated some of the interaction tools used within the interactive video, and their levels vary from simple to more complex and advanced types [2-5-7-13-14]. The interactive tools that can be added to digital videos are the following:

- **Control**

This feature refers to the possibilities of moving to specific and programmed places commensurate with the desired goals of displaying the video. The learner can benefit from the control features of pausing playback, restarting again, or going back. This may help in facing the difficulties that may stand in front of the learner and cause an increase in his/her cognitive load.

- **Hyperlinks**

The tags or hyperlinks indicate a position inside or outside the video and may link to additional material such as text, images, videos, or web pages. These links within an IV are called Hot Spots [2-7]. Interactive video with links inside their structure is called homogeneous hyper videos, while the interactive video that links outside their structure is called hybrid videos [15]. The hot spots inside the IV may be of a spatial or temporal dimension; the use of the spatial dimension results in a representation of the position within the video structure, which leads to branching and going to the planned face, as for the temporal dimension, it is through the appearance of the link for a specific period of time during the presentation of the video to help on attracting the learner's attention to the existence of the possibility of branching [2].

When used in educational videos, hyperlinks or so-called hot spots can be used to add directions that help enrich the content for the learners, increase their knowledge, and expand their understanding and awareness of the placement of the video.

- **Communication**

Among the advantages of interactivity are the features of individual and group annotations within the video in a collaborative environment and electronic testing, as well as taking notes during the presentation of the video and linking the notes with the learning content electronically [2-7-16-17]. Among the previous features, the electronic tests feature, one of the most common features, is an electronic test integrated with the interactive video application, which helps obtain an instant or delayed evaluation. It can also provide direct feedback on the extent to which the learner has benefited from the footage he watches [18].

- **Searching index**

This feature of searching is the video contents allows searching for parts within the content of the video automatically. It is also possible to search within the text file of the dialogues and comments of the video [7].

The abovementioned interactive features in digital video signify the importance of these features and the support they add to the educational process and better knowledge of the extent to which the learners understand the content presented to them and the increase in interaction between the learners and the content. This would raise the importance of interactive features or features in digital videos.

Second: Mind Maps

Mind maps are strategies that can be used to help learners organize knowledge within their minds by using visual images and symbols in displaying educational content [19]. A mind map is a strategy used to express ideas through diagrams, pictures, drawings, text, and colors rather than using words only. It relies on visual memory in an illustration that is easy to review and remember with easy rules and instructions.

Significance of Mind Mapping

Several studies have proven that the human brain can absorb about 36000 images per minute and that between 80-90 percent of the information received by the human mind comes through sight [20]. Mind maps are appropriate means that can better exploit the human mind's capabilities in understanding. Such a mapping strategy depends on mental activities and skills that help learners obtain, interpret, perceive, and preserve information, and then express information visually through visual representation. The use of mind maps occurs when vision, imagination and drawing are involved in active interaction.

Main components of mind maps

Mental maps consist of several essential parts in their construction [20]:

1. The mind map's central theme or main idea is placed in the middle of the page.
2. Keywords, and their role is to link ideas.
3. The main branches, which help identify the main ideas related to the main topic, and the secondary branches are subdivided from them according to the ideas and their nature
4. colors and images, which help to link concepts and install ideas.

Theories of Educational Mind Mapping

Mind maps are based on many teaching and learning theories, including the following:

- **Paivio's Dual Coding Theory**

This theory assumes that two sub-brain hemispheres are responsible for verbal processing stimuli and the other responsible for visual stimuli. Based on this theory, the provision of information becomes through two channels instead of one, enhancing the ability to store the information provided [21]. Thus, the mental maps underline the benefit of the theory of double coding to benefit from visual templates when the learners use the information provided to them through two forms: the visual in the form of pictures and drawings, and the verbal in the form of a narration to build knowledge.

- **Cue Summation Theory**

This theory depends on that the greater the number of stimuli used, the greater the occurrence of learning. Attention is the first and main step in the learning process, and it precedes awareness. It does not occur without stimuli. When the intensity of the stimulus changes, attention occurs [22]. Among the foundations upon which mind maps are based is the multiplicity of stimuli. The maps diversify the stimuli, presenting information in more than one form, such as texts, drawings, colors, and interrelations.

2.Research problem

The study has been driven by the personal observation of the researcher, who is an assistant professor at Umm Al-Qura University. During his teachership, he noticed the students' cognitive aspects and practical skills related to mind mapping. That is to say, mind mapping skills among students of the common first year at Umm Al-Qura University are beyond the required skills. Furthermore, prior research and recommendations ensued from previous studies that urged using the interactive video provided more impetus for conducting the current query [5-4-23]. Based on the discussions above, the present study has been conducted with the following questions and objectives in mind.

3. Research Questions

The research problem could be stated in the following central question:

- What is the effect of educational video on developing mind mapping skills among students of the common first year at Umm Al-Qura University ?

This question has been divided into the following sub-questions.

1. What is the impact of the educational video, regardless of its type (conventional - interactive), on the development of each of (a) the cognitive aspect related to mind mapping necessary for students of the common first year students, and (b) quality of mind mapping among the target students.

2.What is the impact of the different types of video presentations (conventional - interactive) on the development of each of (a) cognitive aspects related to drawing mind maps necessary for the common first-year students, and (b) quality of mind mapping among them.

4.Objectives

The study attempts to achieve the following objectives:

- Measuring the impact of using educational video, regardless of its type (conventional - interactive), on the development of cognitive aspects related to mind mapping and their quality among the common first year students.
- Measuring the impact of the different types of video presentations (conventional- interactive) on the development of cognitive aspect related to mind mapping and their quality among the common first year students.

5.Key Terms

***Interactive video*:**

It is a non-linear video in which many classic and more complex functions can be presented, such as tables, indexes, hyperlinks, quizzes, and others, making the video interactive.

***Mind Mapping*:**

A mind map is a strategy used to express ideas through diagrams, pictures, drawings, text, and colors instead of using words only. It relies on visual memory in an illustration that is easy to review and remember with easy rules and instructions.

Instructional video

It is an educational method, based on a set of videos selected by the teacher, through which the student's informational

and cognitive concepts are expanded in various educational fields.

6. Methods, Population, and Sampling

Population

The research population consisted of students of the common first year at Umm Al-Qura University during the first semester of 1443 (Hijri Calendar).

Sample

The cluster random sampling method was used to nominate the sample of the study from the regular first-year students during the first semester of the academic year 1443 (Hijri Calendar) at Umm Al-Qura University.

Tools and Materials

The following section describes the tools, materials, and experimental treatments to probe the relevant data. These tools and materials are described below.

First: Mind Mapping Skills

The skills of mind mappings the first-year students undertake were beneficial to determine a list of the skills, with a particular reference to the relevant skills in the course of learning skills designed for the common first-year students.

Second: Experimental Treatment

Two types of educational video patterns were designed: the conventional pattern, and the interactive video pattern. The designs of the such video are based on unique models and steps through adopting an appropriate design model such as Al-Natsheh (2012) and the Ibrahim (2012) models. In this study, Al-Natsheh's model was chosen for the following reasons:

- It is one of the easiest models with a few steps.
- The model is characterized by the simplicity of its procedures.
- The ability to implement each of its stages.
- The applicability of the model in the research for it fits the data and objectives of the research.

As shown in Figure 1, the general model consists of 3 main stages, and each of these stages includes several operations and sub-stages as described below.

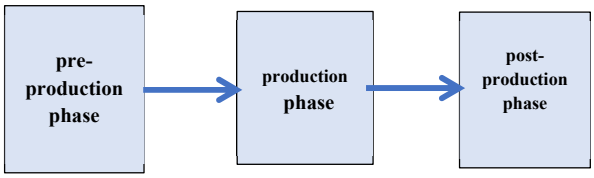

Figure 1. Al-Natsheh's (2012) Model of video design

According to [24], the phases of the model can be outlined in three phases: the pre-production, the production, and post-production stages.

Stage1: Pre-production

This stage includes the following steps.

- Determining the idea and topic to be addressed
- Determining educational goals, including cognitive, emotional, or psychomotor
- Conducting research about the target group
- Conduct research on the topic of the educational video
- Determining the duration of the instructional video
- Determining the visual processing style of the ideas and concepts in the video tutorial:
- Preparing a summary of the video.

Stage 2: Production

This stage begins with the shooting of the educational video and ends with the shooting of the educational video.

Stage 3: Post-Production

This stage takes place after the completion of the imaging process, and this stage contains the following steps:

- Video review
- Arranging and classifying the effects to be added to the video tutorial.
- Composing and selecting the appropriate music.
- Recording the script of the final script

At this stage, the final videos of the editing process were produced. This was done by using Camtasia Studio (Camtasia, 2019).

- **Montage:**

This means re-installing the video parts creatively, in terms of ideas, meanings, feelings, rhythm and movement, to achieve an artistic unity for the entire educational video.

7.Research Measurement Tools

The researcher developed the following tools to collect the required data so as to accomplish the study objectives. The following tools were designed.

A. Achievement test

Gauging the effect of interactive video on mind mapping design required an achievement test to measure the cognitive skills relevant to mind maps. The test was prepared as a multiple-choice test of 10 items according to the following steps:

- **Purpose of the Test**

The objective of the achievement test is to ascertain the extent to which the educational goals have been achieved in the lesson of mind mapping in the course of Learning Skills designed for the first preparatory year.

- **Number of Items**

The test items were prepared in light of these considerations.

- Reviewing relevant scientific studies and research.
- Taking into account the time allotted for the test

- **Answer keys**

The answer key has been prepared for the achievement test; each student chooses the correct answer in the answer key. When the correct answer is given, the student gets only one point, and in the event of the wrong answer, they get zero, and then the correct answers are calculated to give the student a total score.

- **Test Validity**

The achievement test in its initial form was presented to a group of 10 specialists in the fields of curricula, teaching methods, educational techniques, psychology to ensure that the test measures what it was set for as well as the relationship of the question to the achievement goal that it measures.

- **Piloting**

The achievement test was piloted on a sample of 34 common first-year students at Umm Al-Quara University with characteristics similar to the research sample. The test was prepared via Google Forms and was conducted during the class of Learning Skills.

- **Test Reliability**

The reliability of the test was measured in two ways:

1.Kuder Richardson20

It was found that the Kuder-Richardson coefficient (kr20) for the achievement test items has a high degree of the overall reliability of the cognitive test, and this indicates the reliability of the achievement test questions.

2. Split half

This indicated that the achievement test stability ratio is achieved to a high degree, so that it is reasonable to rely on this degree in applying the achievement test to the basic research sample in the current research.

- **Approval of Final draft**

Based on the aforementioned steps and procedures, the final draft of the test was approved to be used with the sample of the study. It contained 10 items with 10 points.

1. Mind Mapping Evaluation Form

A product evaluation form was prepared to measure the extent to which the research sample mastered the skills of mind mapping. In order to measure the effect of using interactive videos on mind mapping skills, the evaluation form was designed to assess the performance skills of the target sample. The form was designed in the following steps:

- **Purpose of the Evaluation Form**

The product evaluation form aims at verifying that the common first-year students possess practical skills of mind mapping in the course of learning skills.

- **Form construction**

The product evaluation form was designed on the following:

1. Resources

A list of skills of mind mapping was adopted for the current study; the list has been validated and ensured that it is valid for use.

2. Objective of the Form

The product evaluation form aims to verify the acquisition of performance skills of mind mapping by the common first-year students in the learning skills course.

3. Construction

The product evaluation form was first prepared after reviewing the relevant literature and surveying the opinion of some specialists in educational technologies. The final draft of the form included 13 items distributed over three axes. The number of the items in the final version are 12 items, divided into three axes; each item was given a weight on a graded scale, namely, 1,2,3, and 4. They correspond to (not available, a small degree, a moderate degree, a large extent), to determine the level of mind mapping skills the students are familiar with.

4. Validity of the product evaluation form

After completing the preparation of the initial draft of the form and writing the instructions page, it was presented to the arbitrators to benefit from their opinions and notes, after which the amendments approved by the arbitrators were made.

5. Reliability of the Form

Assessors who had experience in teaching learning skills were consulted. Each of them evaluated the form independently of the other. After that, the cards were collected and emptied, and the percentage of agreement was calculated according to the following equation

$$C.R=\frac{M2}{N1+N2}$$

M2= The number of cases agreed upon by the correctors

N1+N2= Total items analyzed

$$C.R=\frac{18}{10+10}=0.9$$

The coefficient of agreement among the residents reached 90%, which is a sufficient indicator of the stability of the tool.

Experimental Treatment Procedures

Experimental pre-treatment procedures (**pre-test**)

Achievement Test

The achievement test was administered in the first and second experimental groups, at the time of the learning skills class, through the use of Google Forms, and after obtaining the grades of both groups after completing the correction processes. Before starting the experiment, a T-test was used to identify the differences between the two experimental groups, as shown in Table 1. As data in the table shows, there are no statistically significant differences between the mean scores of the students of each of the first experimental group and the second experimental group in the pre-application of the achievement test, which indicates that the two research groups are equal before.

Table 1. Results of T-test of the Mean Scores of the two Experimental Groups in the Achievement Test

Group		N	Mean	T	Sig.	Sig. type	Levine test
Experimental Group	1	31	5.5	0.172	0.864	Sig.	0.072
	2	34	6				

4. Results and Discussion

Q:1,Part1

Hypothesis 1:

There are no statistically significant differences at the significance level (0.05≥α) between the mean scores of the two experimental groups as a whole that studied the educational video, regardless of the type of video, in the pre and post applications of the cognitive test related to the skills of mind mapping. The t-test of the interconnected samples was applied to testify this hypothesis, and the results are tabulated below.

Table 2. Results of T-test of the Interconnected Samples and their Statistical Significance

Achievement Test	N	Mean	SD	t	F	Sig.	Cohen's coefficient	Effect size
Pretest	65	5.14	1.014	-12.913	64	0	1.602	H
posttest		8.28	1.691					

Apparently, as in the table, the t-value of the interconnected samples related to the achievement test is -12.913 at the degree of freedom 64, and the level of significance (0.000), which indicates that there are statistically significant differences at the level of significance (0.05) between the mean scores of the two groups as a whole in the pre and post applications of the cognitive test related to the skills of mind mapping in favor of the post-application. This results in rejecting the null hypothesis – There are no statistically significant differences at the significance level (0.05≥α) between the mean scores of the two experimental groups as a whole that studied the educational video in the pre, and post applications of the cognitive test related to the skills of mind mapping.

Moreover, Table 2 indicates that the effect size "Cohen coefficient" is 1.602, which is a large effect size [25], if the effect size is between 0.2 and 0.5 or less, it is called the "small" effect, and if the effect size is between 0.5 and 0.8 or less, it is called the "medium effect" And if the effect size is more than 0.8, it is called a "big" effect, and this means that the effect that results from the use of educational videos, regardless of their type, is a significant impact on the cognitive aspect related to the skills of drawing mind maps, which confirms the effectiveness of using educational videos regardless of their type. Regardless of the type of video (conventional-interactive videos).

Touched on above, we conclude that educational video (regardless of the conventional or interactive videos) has a significant impact on the development of the cognitive aspects related to the skills of mind mapping. Perhaps, this result stems from the advantages of using the educational video, such as presenting information in more than one form that the mind can process more effectively. Thus, the learners can retain and absorb the information and choose the appropriate time and place for learning, which allows them to focus on learning better.

Q:1,Part2

Hypothesis 2:

There are no statistically significant differences at the significance level (0.05≥α) between the mean scores of the two experimental groups as a whole that studied the educational video, regardless of the type of video, in the pre and post applications of the product evaluation form. The t-test of the interconnected samples was applied to testify this hypothesis, and the results are outlined in Table 3.

Table 3. Results of T-test of interconnected samples and their Statistical Significance (Hypothetical test vs. posttest)

Motivation test	N	Mean	SD	t	F	Sig.
hypothetical	65	40.5	3.316	8.659	64	0
Post		44.06				

The pre-mean was calculated hypothetically because the product evaluation form could not be applied before giving the lesson or the educational video. Therefore, it was calculated hypothetically through the following equation:

Sum of the highest mean value of the product evaluation form + the lowest mean value ÷ 2

As displayed in Table 3, the t-value of the interconnected samples related to the product evaluation form is 8.659, with a freedom degree of 64 and Sig. 0.000. It indicates statistically significant differences at the level of significance (0.05) between the average scores of the two groups as a whole in the two applications, pre and post of the product evaluation form related to the skills of mind mapping in favor of the post-application. This result leads to the rejection of the null hypothesis. That is, there are no statistically significant differences at the significance level 0.05≥α between the mean scores of the two experimental groups as a whole that studied the educational video regardless of the type

of video presentation in the pre and post applications of the product evaluation form of the mind mapping skills.
It is concluded that educational video, regardless of the type of video (conventional - interactive), impacts the performance aspects of mind mapping. This result can be attributed to the possibility of using educational video to fill the gaps of conventional education due to the ease of dealing with educational videos and being more attractive and flexible for learners.

Q:2,Part 1
Hypothesis3:

There are no statistically significant differences at the significance level (0.05≥α) between the mean scores of the first experimental group that studied the conventional educational video and scores of the second experimental group that studied the interactive video in the post test of the cognitive skills of mind mapping. The t-test of the independent samples was applied to testify this hypothesis, and the results are outlined in Table 4.

Table 4. Results of T-test of Independent Samples and their Statistical Significance (Mind Mapping test)

Group	N	Mean	SD	Levin	t	F	Sig.	Cohen coefficient	Effect size
Experimental 1	31	6.90	1.3	0.014	-9.735	63	0	2.25	H
Experimental 2	34	9.53	.788						

As Table 4 indicates, the t-value of the independent samples and its significance for the difference between the mean scores of the two groups in the post-application of the test is -9.735, and the significance value of the Levine homogeneity test is 0.014. This means that there is homogeneity between the scores of the two groups at the degree of freedom (63). The significance level is (0.000), which indicates statistically significant differences at the level of significance (0.05) between the mean scores of the first experimental group and the scores of the experimental group. This result leads to the rejection of the null hypothesis which states that "there are no statistically significant differences at the significance level (0.05≥α) between the mean scores of the first experimental group that studied the conventional educational video, and the scores of the second experimental group that studied the interactive educational video in the posttest related.

Table 4 also shows the big effect size of the Cohen coefficient is (2.25). This means that the effect of presenting interactive educational videos is significantly more significant than conventional educational videos, which confirms the impact of using and preferring interactive educational videos over traditional educational videos regarding the cognitive aspects. It is concluded that the students who studied using the interactive educational videos acquired the skills of mind mapping more than their peers who had the conventional educational videos in the first group.

This result could be attributed to the fact that the clips presented to them interactively helped the students move in the learning process according to their differences of questions. The interactive videos enable students to understand the passages presented to them through the questions and the feedback accompanying these questions.

Q:2,Part 2
Hypothesis4:

There are no statistically significant differences at the significance level (0.05≥α) between the mean scores of the first experimental group that studied the conventional educational video and scores of the second experimental group that studied the interactive video in the post application of the product evaluation form. The t-test of the independent samples was applied to testify this hypothesis, and the results are outlined in Table 5.

Table 5. Results of T-test of Independent Samples and their Statistical Significance (Product Evaluation Form)

Group	N	Mean	SD	Levine	t	F	Sig.
Experimental 1	31	44.03	1.014	0.302	-0.076	63	**0.946
Experimental 2	34	44.09	1.691				

As shown in Table, the t-value of the independent samples and its significance for the difference between the mean scores of the two groups in the post-application of the product evaluation form is -0.076. The significance value of the Levine homogeneity test is 0.302, which means that there is homogeneity between the scores of the two groups at the degree of freedom 63. The significance level is 0.946, which indicates no statistically significant differences at the level of significance 0.05 between the average scores of the first experimental group and the scores of the second experimental group as for the product evaluation form. This result leads to accepting the hypothesis. Apparently, there are no differences between the averages of the first experimental group that studied the traditional educational video and the second experimental group that studied the interactive educational video in the post-application of the

product evaluation card. This means that there is no difference and superiority in performance and skills between the group that studied the educational video conventionally and the group that studied with the interactive educational video.

5. Recommendations

Through the findings of the research, the researcher recommends the following:

1. Benefiting from the interactive video in the teaching processes in the common first-year courses.
2. Holding courses for faculty members to train them to use interactive videos and benefit from teaching.
3. Taking advantage of the electronic content of educational materials for the different stages of creating interactive video content.

6. Suggestions

Based on the findings and recommendations, the following suggestions are put forward:

1. Conducting similar studies on larger samples in other contexts in Saudi Arabia to elucidate the possibility of generalizing the IV results and comparing the findings.
2. Conducting similar studies on the classes of the different educational levels, different subjects, and units of general education subjects.
3. Conducting a study on the attitudes of faculty members towards interactive video in education.
4. Conducting a study on the requirements for interactive video uses in education in Saudi Arabia.

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