Designing a Micro-Learning-Based Learning Environment and Its Impact on Website Designing Skills and Achievement Motivation Among Secondary School Students

Mohammad Eidah Messfer Almalki[†]

Umm Al-Qura University, Makkah, Makkah, SA

Summary

The study aimed to elucidate how to design a learning environment on the premise of micro-learning (ML) and investigate its impact on website designing skills and achievement motivation among secondary school students. Adopting the experimental approach, data were collected through an achievement test, a product evaluation form, and a test to gauge motivation for achievement. The sample was divided into two experimental groups. Results revealed statistically significant differences at $0.05 \geq \alpha$ between the mean scores of the two groups that experienced ML, irrespective of the two modes of presenting the video in the pre-test and post-test, as for the test of websites design skills, product evaluation form, and achievement motivation test. Besides, there have been statistically significant differences at $0.05 \geq \alpha$ between the mean scores of the first experimental group that had exposure to ML using the split-video presentation style and the scores of the second experimental group that underwent ML using continuous video presentation style in the post cognitive test of website design and management skills in favor of the group that had segmented-video-presentation ML. Another salient finding is the nonexistence of significant differences at $0.05 \geq \alpha$ between the mean scores of the first experimental group that underwent segmented-video-presentation ML and the grades of the second experimental group that received ML with continuous video presentation style in the post-application of the product scorecard of websites designing skills and the motivation test. In light of these salient findings, the study recommended using ML in teaching computer courses at different educational stages in Saudi Arabia, training computer and information technology teachers to harness ML in their teaching and using ML in designing courses at all levels of education.

Keywords:
Micro-learning (ML), website design, achievement motivation

1. Introduction

Information and communication technologies (ICTs) have significantly impacted education, imposing new learning modes and teaching methods and the curricula type.

It also affected communication between learners, their teachers and educational institutions. This significant change has brought about new learning environments where they can access various learning resources and materials that correspond to the technological advances we experience. The learning environment in the current era has undergone many changes resulting from the massive change in the field of ICT, which has led to new learning environments that were previously unknown.

Undoubtedly, such emergent learning environments are interactive that can keep pace with the superior ability of students to deal with modern ICTs. They attract learners' attention to electronic learning and its multiple applications in such an advanced digital age. Such ICT-based learning modes are gaining ground in educational institutions.

Micro-learning (shorted as ML) is one of the recent trends in the educational field and one of the applications of e-learning. Micro-learning represents a strategy and a current trend in the educational process [1]. Micro-learning is the presentation of educational content in digital form in pieces or small pieces, through which information can be absorbed quickly and easily [2]. Through ML, information or content is divided into small digital parts and then presented to the learner to learn each part and then move to the next part, without prejudice to the information as a whole. Micro-learning focuses on designing mini-educational activities through mini-learning steps in a digital environment to be a reality and a daily part of students' lives[3].

ML has taken its theoretical underpinning from learning theories, especially cognitive learning theories. These are concerned with attention and understanding issues, receiving and processing information, and retrieving it again, in addition to the learner's awareness of what he has acquired of knowledge and information, which helps to increase his activity and improve his education [4].

ML is also related to the communicative theory of ML, which seeks to clarify how learning occurs in electronic environments and the skills required for learning in the digital age. This theory believes in self-learning and continuity of learning. Among its principles is that e-learning is not primarily technical, and using technology facilitates teaching and learning. This has paved the way for new roles for both the teacher and the learner [5]. ML depends on essential principles, including specific

objectives, small content, short time, learning on demand, and simplicity [6].

Videos constitute the most popular and famous ML applications [6]. Video-based learning is one of the learning methods that have an increasing demand in the education process. [7] postulates that video-based learning is one of the modern trends in the education process. It is expected to witness a significant increase in its use in the educational process.

In parallel, there has become a great demand for individuals to design personal websites and join social networks, especially in light of the diversity of sites and social networks. These sites and networks require the ability to create and manage them correctly. [8] indicated an increase in the use of personal websites and social networks, with the importance of training on how to design and use them correctly. [9] underscored the importance of awareness of the optimal use of social networks[10] recommended making the best use of personal websites and social networks. Accordingly, there is a need to develop web design skills for learners and improve their achievement motivation by presenting two video modes (segmented - continuous) based on micro-learning principles.

2. Research Questions

The overriding research question that guided the investigation is this: What is the effect of micro-learning on developing website design skills and achievement motivation among secondary school students? It gave way to address the following sub-questions:

1. What are the website design skills do secondary school students need to develop?
2. What is the effect of ML, irrespective of the two modes of video presentation (segmented-continuous) on the development of:
   (a) cognitive aspects related to website design skills for secondary school students
   (b) the quality of the design and management of websites and social networks necessary for secondary school students.
   (c) motivation for achievement among secondary school students.
3. What is the impact of the difference in the two modes of video presentation (segmented-continuous) in ML on the development of:
   (a) cognitive aspects related to web design skills needed for secondary school students
4. (b) the quality of the design and management of websites and social networks necessary for secondary school students.

5. (c) motivation for achievement among secondary school students.

3. Methods, Population, and Sampling

The population of the study consisted of secondary school students in the second level of the course system in government-run schools within the Makkah Educational Administration. The study took place during the second semester of the school year 1442 (Hijri calendar). According to the statistical guide for the year 1440-1441, 40478 students were enrolled in 136 schools (Makkah Education, 1440), and they were the population of the study at hand.

The regular second-level students at Salman Al-Farsi High School in Makkah were sampled through random cluster sampling technique during the second semester of the schooling year 1442.

The following section describes the tools, materials, and experimental treatments the researcher used to probe the relevant data that correspond to the research questions and objectives:

Website Designing and Management Skills

A list of website designing skills was prepared. The list used in educational content of the web design unit in the computer and information technology course (1), was prepared in the following steps:

1.**Resources:** the list was prepared with a particular reference to the curriculum document for the computer and information technology course (1), including its objectives, educational content and educational activities.

2.**Main Areas of the List:** The researcher identified a list of website design skills in eight main axes, after reviewing the sources of building the list. The list of web design skills for secondary school students in the computer and information technology course (1) consists of eight basic axes.

3.**Initial Draft of the List:** After completing the identification of the main areas of the list of web design skills, an initial list was prepared that includes a set of sub-skills under each axis, and the list thus included eight (8) main areas, containing 71 sub-skills.

4.**Validity of the List:**

A. face validity: The content of the list was matched with the educational literature related to the research, previous studies, and then displaying the list. The list was prepared for presentation to the arbitrators.

B. Expert Validity: The researcher presented the list in its initial form to 26 arbitrators specialized in curricula, teaching methods, educational technologies, computers, and psychology to get their opinion and remarks on the appropriateness of the list. Other aspects were taken into consideration, including the appropriateness of the sub-skills for each axis, the suitability of the skills for the target

age group, and the extent to which the scientific validity and linguistic integrity of the skill phrase are taken into account. According to these experts' comments, some items were modified.

5.Final Draft of the List: After completing the amendments and additions proposed by the arbitrators, the list was approved in its final form on 71 sub-skills, divided into eight 8 axes.

Experimental treatment

Two types of educational video patterns were designed: the split video pattern, and the continuous video pattern. The designs of the such video are based on unique models and steps through adopting an appropriate design model such as [11] and [12] 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, the general model consists of 3 main stages, and each of these stages includes several operations and sub-stages as described below.
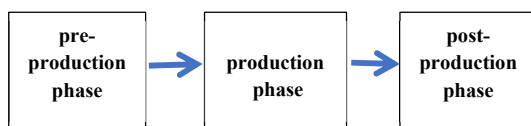

Figure 1. Al-Natsheh's (2012) Model of video design

According [11], the phases of the model can be encapsulated into three phases: the pre-production, the production, and post-production stages.

Stage1: Pre-production

This stage includes some steps.

- Determining the idea and topic to be addressed

The idea to be addressed was to develop web design skills and improve the achievement motivation of secondary school students.

- Determining educational goals, including cognitive, emotional, or psychomotor

The educational video is hoped to achieve these goals. The Computer and Information Purification textbook 1 and the Student's Computer and Information Technology 1 book are checked.

- Conducting research about the target group:

This is about the scientific level of the target group, individual differences between them, age, trends and interests on the topic of the educational video. Also, the characteristics of learners are taken into account in this step.

- Conduct research on the topic of the educational video:

In order to obtain accurate, comprehensive and updated information, the content of the web design unit in the Computer and Information Technology course (1) was analyzed. The educational content included (4) theoretical educational lessons and (8) practical exercises. This content aims to achieve 9 educational objectives, and to achieve 24 performance skills, 2 emotional goals.

- Determining the duration of the instructional video:

This step created segmented educational videos of very short duration (1-3minutes) and continuous educational videos of longer duration (5-15) minutes.

Determining the visual processing style of the ideas and concepts included in the video tutorial:

This means how the idea or concept is presented, such as through slides, video clips, still images, or animations.

- Prepare a summary for the video:

It is the initial scenario for the video, which is later developed to be the final scenario. This was done and reviewed with specialists, and some modifications were made to the educational videos.

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.

Research Measurement Tools

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

A. Achievement test

Measuring the impact of ML on website design and management skills required an achievement test to measure the cognitive skills relevant to social network design and management. The test was prepared as a multiple-choice test of 40 items according to the following steps:

- Ascertaining the purpose of the test

The objective of the achievement test is to identify the extent to which the educational goals have been achieved in the unit design and management of websites and social networks in the computer and information technology course (1).

- Determining the number of items

The test items were prepared in light of these considerations.

•Reviewing relevant scientific studies and research.

•Discussion of specialists in the field of curricula and teaching methods, in addition to computer teachers in the secondary stage.

•Taking into account the time allotted for the student's test

- Answer keys

The answers form has been prepared for the achievement test; each student chooses the correct answer in the answer form. 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 number of correct answers is calculated to give the student a total score.

-Test validity

The achievement test in its initial form was presented to a group of 26 specialists in the fields of curricula, teaching methods, educational techniques, psychology to ensure the suitability of the test to measure what it was set for as well as the relationship of the question to the achievement goal that it measure.

-Piloting

The achievement test was piloted on a sample of secondary school students at Salman Al-Farsi School so that it is similar to the research sample, and the number of sample members reached (30) students. In light of the COVID-19 pandemic, students were tested during the time allotted for the Computer and Information Technology course (1).

-Test Reliability

The reliability of the test was measured in two ways:

1. Kuder Richardson20

It was found that the Couder-Richardson coefficient (20) for the achievement test items has a high degree of the overall stability 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 possible to rely on this degree in applying the achievement test to the basic research sample in the current research.

-Final draft approval

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 40 items with 40 points.

2. Website design skills evaluation form

A product evaluation form was prepared to measure the extent to which the research sample mastered the skills of website design. In order to measure the impact of using ML on developing web design skills, the card was designed to assess the performance skills of web design skills for secondary school students in the computer and information

technology course (1). The form was designed in the following steps:

- Determining the purpose of the evaluation form

The product evaluation form aims at verifying that the secondary school students possess practical skills of social website design and management in the course of Computer and information technology (1).

- Form construction

The product evaluation form was designed on the following:

1. Resources

A list of skills of designing and managing websites and social networks was adopted for the current study; the list has been validated and ensured that it is valid for use.

2. Objectives

The product evaluation form aims to verify the acquisition of performance skills for designing and managing websites and social networks for secondary school students in the computer and information technology curriculum (1).

3. Construction

The product evaluation form was first built after reviewing the relevant literature and surveying the opinion of some specialists in educational technologies. The final draft of the form included (24) paragraphs distributed over four axes.

The number of the items in the final version are 19 items, divided into five axes; each item was given a weight listed according to a graded scale, and the following weights were given (1-2-3-4), (not available, to a small degree, to a degree Medium, to a large extent), to determine the level of possession of secondary school students in the computer and information technology curriculum (1), of design and management skills for websites and social networks.

4. Validity of the product evaluation form

After completing the preparation of the initial draft of the product evaluation 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 product evaluation form

Two assessors who had close experience in teaching computer and information technology for the secondary stage were hired. Each of them evaluated the product 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= M2/(N1+N2)

M2= The number of cases agreed upon by the correctors

N1+N2= Total items analyzed

C.R= 32/(19+19) = 0.84

The coefficient of agreement among the residents reached 84%, which is a sufficient indicator of the stability of the tool.

Achievement Motivation Test
- Determining the goal of the Test

The scale was designed in order to measure the level of achievement motivation of first year secondary students in the computer and information technology course (1), towards the web design unit, in addition to using the results of administering the test in checking the research hypotheses and answering its questions.

In light of the characteristics of first-year secondary students and their relevance of those dimensions to the nature of the educational content and the micro-learning environment, the research adopted seven dimensions of achievement motivation: self-confidence, mastery, perseverance, competitiveness, independence, ambition, enjoyment, which are expected to develop the ML environment has many dimensions of students' achievement motivation.

- Test Construction

The phrases related to the achievement motivation test were built and formulated, where the scale in its initial form consisted of 32 items in two dimensions and it has been reformulated to make the total of the paragraphs (25) with one dimension, with 25 positive items, and the conditions for sound scientific formulation have been taken into account. Concerning the expressions of the achievement motivation test and their suitability to the characteristics of the research sample of secondary school students, taking into account the simplicity of the method, clarity, scientific accuracy, and short phrases formulation.

- Test Scoring

The test was constructed according to the Quadruple Likert Scale, wherein the score is 3 when the statement fits with student behavior highly, 2 when the statement fits with student behavior in an average way, 1 when the statement matches with student behavior low, and 0 when the statement does not apply to the student's actual behavior.

- Validity of the Test

The validity of the achievement motivation test was confirmed by reviewing the content of the tool and ensuring its conformity with the content of the theoretical framework and previous studies. Education and the field of psychology in order to verify the following.

After completing the steps for preparing the test, the validity of the test in its final form was checked. After presenting it to the arbitrators, necessary changes were made and the test was approved finally approved. It consists of 25 statements with a graded correction key (3 - 0, and the minimum degree was (0), and the maximum was (100).

Experimental Treatment Procedures

Experimental pre-treatment procedures (pre-measurement):

They are the procedures that aim to verify that there are no differences between the two experimental groups before starting any treatment, by applying the research tools to the two groups, and detailing it as follows:

C. Achivement Test

The achievement test was administered in the first and second experimental groups, at the time of the computer and information technology course (1), through the use of Google Forms on the Madrasati school platform, 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.

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	First	31	16.81	1.964	0.054	Not sig.	0.448
	second	30	14.03				

As Table 1 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.

The achievement motivation test

The achievement motivation test was applied to the research sample, represented in the first and second experimental groups, at the time of the computer and information technology course 1, through the use of Google Forms in the Madrasati school platform, and after obtaining the scores of both groups after completing the operations Correction, the T-test was used to identify the differences between the two experimental groups, before starting the experiment,   (see Table 2).

Table 2. Results of T-test of the Mean Scores of the two Experimental Groups in the Achievement Motivation Test

Group		N	Mean	t	Sig.	Sig. type	Levine test
Experimental Group	First	31	62.71	-0.947	0.347	Not sig.	0.532
	second	30	66.20				

It is clear from Table 2 that 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 tribal application of the achievement motivation test, which indicates that the two research groups are equal before.

4. Results and Discussion

Q1: The answer to the first question ensued from a list of web design skills in its final form, which consists of 8 main skill axes that contain 71 Sub skills.

Q:2,Part1

Hypothesis 1:

There are no statistically significant differences at the level of significance (0.05≥α) between the mean scores of the two experimental groups as a whole that studied micro-learning, regardless of the two styles of video presentation in the pre and post applications of the cognitive test related to web design skills. To test this hypothesis, t-test was used, and the results are outlined in Table 3.

Table 3. 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	61	15.44	5.644	13.437	60	0	1.720	high
posttest		24.80	6.615					

As data in Table 3 indicates, the t-value for the interconnected samples and related to the achievement test is 13.438 at the degree of freedom 60, and the level of significance 0.000. It indicates the existence of statistically significant differences at the level of 0.05 between the mean scores of the two groups as a whole in the pre and post cognitive test related to web design skills in favor of the post application. Hence, the null hypothesis is rejected - there are no statistically significant differences at the level of significance (0.05≥α) between the mean scores of the two experimental groups as a whole that studied micro-learning, regardless of the two styles of video presentation in the pre and post applications of the cognitive test related to design skills Internet sites.

Table 3 also indicates that the effect size of the Cohen coefficient is 1.720, which is a large effect size according to [13]. The effect between 0.5 and 0.8 or less is called the "medium" effect, and if the effect size is more than 0.8, it is called the "large" effect. This means that the effect that results from videos in the micro-learning environment, regardless of its length, significantly affects the cognitive aspect—associated with web design skills, which confirms the effectiveness of using micro-learning irrespective of the video presentation style (segmented - continuous).

It is concluded that the use of ML, regardless of the length of time allocated to educational videos and their size (fragmented-continuous), has a significant impact on the development of the cognitive aspects associated with web design skills. This result could be attributed to the advantages provided by ML, such as presenting information in the form of small parts so that the mind can process it more effectively. Thus, the learners can retain and absorb the information before moving on to the next activity or unit. They can also choose the time and the right place, allowing them to focus on learning better.

Q:2,Part 2

Hypothesis2:

There are no statistically significant differences at the level of significance (α 0.05) between the mean scores of the two experimental groups as a whole that studied micro-learning, regardless of the two styles of video presentation in the pre and post applications of the product evaluation from for web design skills. Using the SPSS, a t-test was applied with this hypothesis in mind. It correlated samples to find out the difference between the mean scores of the two groups as a whole in the pre and post applications of the product evaluation form related to web design skills. The results are displayed in Table 4.

Table 4. Results of T-test of the Correlated Samples and Statistical Significance

product Evaluation form	N	Mean	SD	t	F	Sig.	Cohen's coefficient	Effect size
pretest	61	64.4	7.854	3.071	60	0.003	0.393	small
Posttest		67.69						

Table 4 shows that the t-value for the interconnected samples and related to the product evaluation form is 3.071 at the degree of freedom 60, and the significance level is 0.003. It indicates statistically significant differences at the level of significance 0.05, between the mean scores of the two groups as a whole in the two applications, before and after, of the product evaluation form related to web design skills in favor of the post-application. Hence, the null hypothesis is rejected - there are no statistically significant differences at the level of significance (0.05≥α) between the

mean scores of the two experimental groups as a whole that studied micro-learning, regardless of the two styles of video presentation in the pre and post applications of the cognitive test related to design skills Internet sites. In statistical terms, the null hypothesis (H0) is rejected, and the alternative hypothesis (H1) is accepted.

As displayed in Table 4, Cohen's coefficient is 0.393, which is small effect size. This means that there is an effect resulting from the use of videos in the ML environment, regardless of its duration, which affects the associated performance aspect. Web design skills confirm the effectiveness of using ML irrespective of the video presentation style (segmented-continuous).

That is to say, the use of ML, regardless of the length of time allocated to educational videos and their size (fragmented-continuous), has an impact on developing the performance aspects related to web design skills. This result could be attributable to using ML to fill the gaps in design quality more quickly. It is easy to focus on the specific areas to be developed without the need for other sites.

Q:2,Part: 3
Hypothesis 3:

There are no statistically significant differences at the level of significance (0.05≥α) between the mean scores of the two experimental groups as a whole that studied micro-learning, regardless of the two styles of video presentation in the pre and post applications of the achievement motivation test for secondary school students, was tested by using the t-test of the correlated samples to find out the difference between the mean scores of the two groups as a whole in the pre and post applications of the achievement motivation test, using the statistical software package SPSS. The results are outlined in Table 5.

Table 5. Results of T-test of Correlated samples and their Statistical Significance

Motivation test	N	Mean	SD	t	F	Sig.	Cohen's coefficient	effect size
pre	61	64.43	14.378	16.983	60	0.000	2.174	
Post		79.79	11.745					high

Table 5 shows that the value of the t-test for the interconnected samples and related to the achievement motivation test is 16.983 at the degree of freedom 60, and the level of significance 0.000. This indicates the existence of significant differences at the level of significance 0.05,

between the mean scores of the two groups as a whole in the two applications, before and after, of the achievement motivation test in favor of the post-application. This result leads to the rejection of the null hypothesis. It has been assumed that 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 micro-learning, regardless of the two styles of video presentation in the pre and post applications of the achievement motivation measurement.

As shown in the table, Cohen's coefficient is 2.174, which is large effect size. This means that the effect that results from videos in the ML environment, regardless of its length, is a significant effect on the motivation test. Achievement confirms the impact of ML, irrespective of the video presentation style (segmented-continuous), on learners' motivation. Hence, the use of ML, regardless of the length of time allocated to the educational videos and their size (fragmented-continuous), has a significant impact on increasing students' achievement motivation. Perhaps, this result stems from the fact that ML helps to meet the human need for immediate gratification.

Q:3,Part:1
Hypothesis4:

There are no statistically significant differences at the level of significance (α 0.05) between the mean scores of the first experimental group that studied micro-learning in the style of the segmented video presentation and the scores of the second experimental group that has ML in the style of video presentation. To test this hypothesis, a t-test for independent samples was used using the SPSS. The results are displayed in Table 6.

Table 6. Results of T-test of Independent Samples and their Statistical Significance

Group	N	Mean	SD	Levin	t	F	Sig.	Cohen coefficient	Effect size
1	31	28.06	5. 360	0.659	4.488	59	0	1.152	High
2	30	21.43	6.140						

Table 6 shows that the value of t for 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 4.488. The significance value of the Levin homogeneity test is 0.659 means that there is homogeneity between the scores of the two groups, at the degree of freedom 59. The significance level is 0.000, indicating statistically significant differences at the level of significance 0.05 between the mean scores of the first experimental group and the scores of the second experimental group. This result leads to the rejection of the null hypothesis that there are no statistically significant

differences at the significance level α 0.05 between the mean scores of the first experimental group that studied micro-learning with a presentation style the segmented video, and the scores of the second experimental group that studied ML in continuous video presentation style in the post application of the cognitive test related to web design skills.

Table 6 also shows the Cohen coefficient of 1.152, which is large effect size. This means that the effect of presenting segmented videos in the ML environment is largely more significant than presenting video clips Continuous, which emphasizes the impact of using segmented videos and preferring them to continuous videos in an ML environment in terms of cognitive aspects.

It is concluded that the students who used segmented videos acquired web design skills more than their peers who used continuous videos in the second group. This result can be attributed to the fact that the sections presented to them in a fragmented form, each of which focuses on explaining only one skill, which may help students to remember and understand better and facilitate the delivery of complex ideas and large contents sequentially after their fragmentation and simplification, which helps in reaching an understanding of the total content Reducing the cognitive burden on learners, which helps them to achieve better and easier.

Q:3,Part_2
Hypothesis 5:

There are no statistically significant differences at the level of significance (α 0.05) between the mean scores of the first experimental group that studied micro-learning using the segmented video presentation style, and the scores of the second experimental group that studied ML in the presentation style the continuous video in the post application of the product evaluation form for the skills of web design . The t-test of the independent samples was applied to find out the significance of the difference between the mean scores of the first experimental group and the second experimental group in the post application of a product evaluation form, using the SPSS.

Table 7. Results of T-test of Independent Samples and their Statistical Significance

Group	# Q	# P hḍq	# VG	Ohy]q#hnw#	# #w	# I	# V]j1
1	31	69.23	6.722	0.061	1.566	59	*0.121
# ł2	30	66.10	8.703				

not statistically significant at 0.05*

As displayed in Table 7, the t-value for 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 card is 1.566, and the significance value of Levin's test for homogeneity is 0.061. It means that there is homogeneity between the scores of the two groups, at the

degree of freedom 59, and the level of significance is 0.121. This indicates that there are 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 in the dimensional scale of the product evaluation form. This result leads to accepting the hypothesis.

It appears that there are no differences between the averages of the first experimental group that studied ML in the style of fragmented video presentation and the second experimental group that underwent ML in the continuous video presentation style in the post-application of the product rating form. This means that there is no difference and superiority in performance and skills between the group that studied in segmented video presentation mode and the group that studied in continuous video presentation mode. This result can be attributed to the fact that the contents of ML may not be arranged in a specific contextual order that helps to understand the subject to be learned.

Q:3,Part:3
Hypothesis 6:

There are no statistically significant differences at the level of significance (α 0.05) between the mean scores of the first experimental group that studied micro-learning in the style of the segmented video presentation and the scores of the second experimental group that studied micro-learning in the style of video presentation continuous in the post-application of the achievement motivation test among secondary school students. This hypothesis was tested using the independent samples t-test to find out the significance of the difference between the mean scores of the first experimental group and the second experimental group in the post-application of the achievement motivation test, using the SPSS.

Table 8. Results of T-test of Independent Sample and their Statistical Significance

Group	N	Mean	SD	Levin test	t-value	F	Sig.
1	31	79.42	11.656	0.699	-0.264	56	*0.8.6
2	30	80.17	12.023				

*not statistically significant at 0.05

Table 8 shows that the t-value for the independent samples and its significance for the difference between the mean scores of the two groups in the dimensional application of the achievement motivation test is -0.246, and the significance value of Levin's test for homogeneity is 0.699. It means that there is homogeneity between the scores of the two groups, at the degree of freedom 59. The significance level is 0.806, indicating no statistically significant differences at the level of significance 0.05 between the mean scores of the first experimental group and the scores of the second experimental group in the post scale of the achievement motivation test. This result leads to the

acceptance of the hypothesis. This result can be attributed to the fact that there may not be a significant difference in the design of the segmented video presentation mode and the continuous video presentation mode, which may increase motivation for learning when one of the two modes is used.

5. Recommendations

Based on the findings of the study, the following recommendations are put forward:
- Benefiting from ML in designing computer courses in various stages of education in the Kingdom of Saudi Arabia.
- Training computer and information technology teachers to adopt ML and benefit from it in teaching.
- Inclusion ML in some courses for the preparation of computer and information technology teachers.
- Take advantage of the electronic content of educational materials for the different stages in creating content for ML.

6. Suggestions

Based on the results and in light of what has been recommended, the following points are suggested:
- Conducting similar studies on larger samples in other cities in the Kingdom of Saudi Arabia to find out the possibility of generalizing the results of ML and comparing them among themselves.
- Conducting similar studies on the classes of the different educational levels and different subjects and units of general education subjects.
- Conducting similar studies in the postgraduate levels and working on producing an educational unit through ML.
- Conducting a study on the attitudes of computer teachers towards ML in education.
- Conducting a study on the requirements of ML in education in the Kingdom of Saudi Arabia.

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Mohammad Al-Maliki: received a master's degree in information technology in the year 2010 from the Sydney University of Technology. He worked as an information technology lecturer at Umm Al-Qura University in Makkah Al-Mukarramah, after that he obtained a doctorate in the year 2021 from Umm Al-Qura University in the field of educational technologies. He is now working as a professor Assistant in the field of educational technology.
His research interests include educational technology, e-learning, and computer use in education.