Effectiveness of Learning Software for Teaching Curricula and their Influence on Developing Thinking Skills and Achievement among Senior Students

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Abstract

The developments taking place in the world in terms of informational modernity, called the knowledge-technology revolution. Such developments have relied on the use of computers, which have become the main sphere of an individual's life in various educational, sports, and other disciplines, in the service of the learners. Hence, the importance of research in keeping pace with the educational process of what has happened in the world in terms of inventions and developments, which accommodate technology education and becomes an integral part of its curriculum and teaching methods in line with the characteristics of society.

The research problem lies in that many of the teachers adopt the traditional method in teaching the curricula without updating the teaching method by incorporating the educational software for this course lesson, and the extent of its influence on developing thinking skills and achievement for fourth-stage students in the Department of Physical Education and Sports Sciences - College of Basic Education at Mustansiriya University that teaches this course in the curriculum of this stage.

The researchers concluded that these students are equal in their acquiring of thinking skills and obtaining information, concepts, and subjects of the curricula, and there is an association in the achievement test for the study group.

Keywords: *Achievement, Learning Software, Thinking Skills*

Background

Recently, the world is witnessing amazing developments, as the individual faces high-speed rhythms of an explosion of knowledge which are characterized by permanence and continuity of information bursts which is called (the technological knowledge revolution)[(1)] where the computer is considered its main gateway and invades all areas of life, especially in terms of education and sports. The computer, with its software, has many characteristics and advantages that make its use in educational fields and various situations because it is the language of communication in this era. The development that occurred in educational software placed learners among many options, including the difference in time and place, the type of training and education, improving opinions and improving the educational experiences of students through interactive science experience. The content of any academic curriculum occupies the

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information and activities related to skills, attitudes, problems, and exercises and mental activities, and the aim of these content is to develop methods of thinking of all kinds. It is the path to theoretical and applied creativity in various fields of science, knowledge and art. In spite of the increased risk and importance of the educational process, especially in this era, which is called the computer era or the age of technology and the information revolution, which plagues people from every side, encircles and encompasses him, as it becomes worthless if he does not know it or deal with him. Since the person is civil and social by nature, he cannot keep himself abreast from it or remain isolated from the world and the developments, inventions, and events taking place around it that make him obliged to keep pace with development and look forward to what is happening in it.

As such, the importance of this study lies in keeping pace with the educational process with what is happening in the world in terms of information revolution, inventions, and developments that assimilate educational and technological process and become part of its curriculum, methods, and teaching methods in line with the characteristics of society.

The research problem

Many teachers resort to filling the learners' minds with information and facts about the traditional method that makes them receptors of what is thrown at it without thinking, which led to a decline in the efficiency of educational process. While, the curriculum subject, like other subjects, is not limited to the cognitive aspect alone, but there are other aspects that are higher than that, foremost of which is thinking. The researchers decided to study the effectiveness of educational software for the academic curricula and its influence in developing thinking skills and academic achievement for fourth-stage students.

This study aims to (1) identify the effectiveness of educational software in the curricula and their influence in the development of thinking among fourth-stage students, and (2) identify the effectiveness of educational software in the curriculum course and their influence in the development of achievement among fourth-stage students.

Research Hypotheses

1. There are statistically significant differences in the thinking skill for the curricula course for the fourth stage between the study and control groups.

2. There are statistically significant differences in the achievement for the curricula course for the fourth stage between the study and control groups.

Materials and Methods

An experimental design was used to guide this study. The study included a sample of (95) seniors who were recruited from Department of Physical Education and Sport Science for the period from October 7th, 2018 to December 13th, 2019. The study subjects were assigned into study group (n = 44) and control group (n = 44).

Equipment and Devices

Structured interview

Achievement test in curricula course

Thinking Scale which includes five skills (determining the problem, selecting the hypotheses, hypotheses testing, change, and design)

Achievement Test

To prepare the achievement test, the researchers selected some content of the curricula which include the old and new curriculum, the curriculum content, curriculum development, and curriculum evaluation. The researchers selected these contents owing to the plenty of new concepts for students besides the plenty of information presented for each item and their overlap with each other, in addition to the fact that these contents are suitable for preparing a group of units that can be formulated and help to develop thinking.

Scientific Bases of Testing

The content, concurrent, internal consistency,

criterion, and subjective validity tests were used as follow:

1. Formulating behavioral objectives for the test by Bloom's taxonomy of cognitive levels (remembering, comprehension, application, analysis, synthesis)[2].

2. Determining the percentage of content concentration/the percentage of each unit of content was determined.

$$Concentration\ Percent = \frac{Number\ of\ Lessons\ of\ Content\ PerSemester}{Number\ of\ Lessons\ Assigned\ for\ Study\ Application} * 100\%$$

1. Determining the number of questions: Four questions have been prepared that include the unit of the prescribed course, considering the convergence of cognitive levels for the objectives of the content of the course, and the total of questions of each lesson is proportional to the percentage of concentration. A questionnaire that demonstrates the appropriateness and validity of the scientific material and the behavioral goals was distributed explaining to a panel of experts to measure the objectives by items and the belonging of the item to the level of objectives and the appropriateness of alternatives for each item. After considering the experts' opinions, some questions were modified, and others were omitted.

2. Preparing a table of specifications for the test: Thirty questions were determined, considering the convergence of the distribution ratios of cognitive levels of the content objectives and the concentration ratio. Therefore, the researchers prepared a table of specifications in which the distribution proportions of cognitive levels of the content and concentration proportions were balanced to give a large goal.

Number of questions for each part = Percent of level of objective * concentration proportion * total number of questions

Table 1. Specifications of achievement test

Level of objectives		Remembering	Comprehension	Application	Analysis	Synthesis	Total
Lecture	Concentration proportion/ Objectives proportion	25%	35%	20%	10%	10%	10%
Old Curriculum	10%	1	0	0	0	2	3
New Curriculum	10%	0	1	1	1	0	3
Content	10%	0	1	2	0	0	3
Curriculum Implementation	20%	1	2	1	1	1	6
Factors affecting in Curriculum Implementation	10%	1	1	1	0	0	3
Curriculum Development	20%	2	2	0	2	0	6
Evaluation	20%	2	2	1	0	1	6
Sum	100.0%	7	9	6	4	4	30

In table (1), the researchers have arranged the test items according to the content. That is, the sequence of items on the test paper is according to a logical sequence of the content of the subject, so that the items are related to the topic, consecutive, and within one form.

2. Reliability

The reliability coefficient was calculated by repeating the test on the same individuals twice under similar conditions, and the stability was also calculated using equivalent versions. The researchers applied two versions of the test on the same group members for an interval that usually ranges between two weeks, a correlation coefficient was found between the results in the two cases, and this method overcomes the bias of the recall effect.

Final modification of the test items

After the final modifications on study instrument which was composed of the question booklet which included the name of the test, the page of instructions and the test vocabulary of (30) paragraphs, distributed over the five cognitive levels, the remembering (7 items), comprehension (9 items), application (6 items), analysis (4 items), and synthesis (4 items).

Thinking test instrument

The researchers prepared the thinking test. The objective of the test was determined by identifying the problem and hypotheses and testing their validity. The content test was also formulated, as three main scales were used, which are the scale of Saleh, Al-Rawadi, and Al-Deghem. The scale deals with subjects of the school curriculum. The researchers considered some important criteria for setting up the thinking test, which include that the test is appropriate for fourth-stage students and it is intended to measure thinking. Then the test was presented in its preliminary form to a panel of experts in the field of curricula, teaching and learning methods in order to bring it out in its final form.

Equivalence of the sample

The achievement test and pre-thinking were applied to the experimental and control groups for the purpose of equivalence of the two groups (Table 3).

Table 2. Achievement test and pre-thinking for the study and control groups for the purpose of groups equivalence

Variable	Groups	Number	Mean	Standard Deviation	t	Significance
Achievement test	Study	44	12.5	2.88	.18	Non-significant
	Control	44	11.95	2.75		
Thinking	Study	44	16.35	2.19	.65	Non-significant
	Control	44	16.77	2.85		

Table (2) displays that the *t* value (0.18) at p = 0.05 indicates that there are no statistically significant differences in the achievement test between the study and control groups. For the thinking test, the *t* value (0.65) at p = 0.05 indicates that there are no statistically significant differences in the thinking test between the study and control groups.

Pilot test

The two tests were pilot-tested on a sample of 30 fourth stage students who were not included in the final study sample to know the success of the instructions in the test, the clarity of its items, and the determination of the test time.

Preliminary Experiment

The pretest was conducted on October 16, 2018 for the achievement test and on October 17th, the thinking test was conducted.

Validity

The constructive validity was calculated for the thinking test using the Pearson coefficient which was 0.89.

Reliability

The internal consistency was calculated using the split-half method which was 2.82 which is considered high consistency coefficient.

Main Experiment

After completing the final modification on the two tests, the researchers applied the content of the course material to the experimental group, unlike the control group that is studied in the conventional way. The duration of the exams was (5) weeks, at a rate of (2) hours per week, and an equal time between the two groups was considered. The researchers taught the subject without bias, and the thinking and achievement test was applied for the period from 7/10/2018 to 12/29/2019.

Posttest

The achievement test and the thinking test were applied to the fourth-stage students on two consecutive days under conditions like these of the pretest.

Data Analyses/Statistics

Data were analyzed using the statistical package for social science (SPSS) for windows, version 26.

Results and Discussion

Table 3. Mean and standard deviation of the thinking test for the two group in the posttest

Variable	Group	Number	Mean	Standard Deviation	t	Significance
Thinking	Study	44	18.04	2.87	0.09	Non-significant
	Control	44	17.13	2.88		

Table (3) reveals that the means of students' grades for the study group are greater than these of the control group (18.04 vs 17.13 at p-value = 0.01) respectively which indicates non-significant differences between the study and control groups for the thinking test. As thinking is a complex process of the higher actual processes that require a long time and intensive and long teaching programs and cannot be developed quickly and to an acceptable degree within a relatively short period of time.[3]

Table 4. Mean and standard deviation of the achievement test for the two group in the posttest

Variable	Group	Number	Mean	Standard Deviation	t	Significance
Thinking	Study	44	22.05	2.68	3.05	significant
	Control	44	19.05	2.27		

Table (4) displays that the means of students' achievement for the study group are greater than these of the control group (22.05 vs 19.05 at p-value = 0.01) respectively which indicates statistically significant differences between the study and control groups in favor of the study group. As thinking is a complex process of the higher actual processes that require a long time and intensive and long teaching programs and cannot be developed quickly and to an acceptable degree within a relatively short period of time. The researchers taught students in the experimental group using educational activities as the educational software increases the effectiveness and realism of students' learning and helps bring the topic closer to the lesson from the student's level of perception. It also improves the learning and teaching process both for the teacher and student.[4]

Also, educational software develops actual capabilities by providing more than one component of this programming, such as written and audio texts, animated images, and sound effects, which is reflected in their increased academic achievement, especially levels of understanding and application.[5]

Conclusions and Recommendations

Conclusions

1. It was found in the pretest for the thinking test that students of the study and control groups are equal in their acquisition of thinking skills, which indicates the absence of statistical significance between students of the two groups.

2. In the pretest for the achievement test, it was found that students of the study and control groups are equivalent in terms of information and concepts included in the subjects of the curriculum.

3. It is evident through the posttests for the achievement test that there is a statistically significant relationship in favor of the study group.

Recommendations

1. Incorporating programs for developing thinking of all kinds into the curricula of the Faculties of Physical Education and Sports Sciences and teachers' preparation.

2. There is a need to provide special scales to measure thinking of all kinds and apply them to students of different stages.

3. Reconsidering the examination questions so that they measure all cognitive levels according to Bloom's taxonomy and do not focus on measuring lower levels only.

4. Conducting further similar studies in the rest of the other courses and at the different educational levels.

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