

DISTANCE LEARNING.

EFFECT OF EACH OF COMPUTER ASSISTED INSTRUCTION AND ORDINARY METHOD OF TEACHING SCIENCE UPON THE ACHIEVEMENT OF THE PRIVATE UNIVERSITIES IN JORDAN.

DR. SALMA ZAKI NASHEF.

Al-Zaytoonah University.

Amman, Jordan.

E-mail: amal_slm@yahoo.com

amman-inheart@hotmail.com

salma@sama.jo

ABSTRACT.

The research aims to find out the possibility of the achievement of the students “Class Teacher” specialization being affected by the method of instruction in when they are taught a biology unit in the private universities in The Hashemite Kingdom of Jordan.

The study’s society composed of “Class Teacher” specialization in Jordan for the 1st semester in the academic year 2006-2007.

The sample was chosen randomly from one of the private universities, and divided into control and experimental groups, the 1st was taught by the ordinary method and the 2nd by the distance learning (CDS) the same subject which is a biology unit prepared by the researcher.

An achievement test prepared by the researcher was used to measure the achievement, after applying it to a pilot study, and measure its validity and reliability. The results were calculated by the two way analysis of variance to know the significant difference between the means of the two groups.

A significant difference was found in favor of teaching the unit with the ordinary method.

Key Words: Distance Learning, Computer Assisted Instruction, Ordinary Method.

1. Introduction.

Education is known as a modification of behavior. All the deliverables of educational institutes including schools, colleges and universities have the student as their objective with the three dimensions of his personality, i.e. the cognitive, the psychomotor and the affective domains.

Education is also a general concept that includes methods of teaching. A method of teaching is a process that involves the procedures undertaken by the teacher to achieve certain various objectives for the students. Some of the ordinary methods of teaching include lecturing, discussion, group work, lab, practical demonstrations, distance learning, programmed instruction, solving problems, Inquiry, discovery and others.

Technology has also been introduced to teaching in order to improve performance and develop the teaching-learning process. It is argued that technology contributes in teaching in different aspects (1):

What is important here is the issue of distance learning which involves using the computer which has become a vital and important instrument nowadays. In addition, distance learning has become an important source for gaining knowledge and solving problems.

Computer Assisted Instruction (CAI) is one of the computer programs has adopted in teaching since the 1970s.

The computer assisted learning employs different methods such as

- Connecting the computer to the television
- Automating instruction
- Simulation
- Linear and multiple programming

In computer assisted learning used in this

research we will use one part of the fourth method which is linear programming.

Accordingly, programmed instruction is considered as one of the early educational attempts and practices in individualized learning. Following came other attempts that resulted in different forms of individualized learning such as Instructional Kits, Mini courses, Instructional Modules, Instructional Packages and Keller plan or Behavioral Learning.

In this way, programmed instruction might have had a great influence as a method of individualized learning. This influence relies on different factors such as nature of the educational material, type of students and their level of intelligence and educational level of the students.

Here we will move to talk about programmed instruction. Programmed instruction is believed to

be an implementation of psychological principles that evolved based on rules of scientific methods.

This method came from behavioral learning theories whose pioneer is considered to be Skinner. These

theories assume that occurs when the students' responses to stimuli are reinforced. The material might be presented in the form of a book or an educational machine.

One of the most important programs in this regard is the linear program which going to be employed

in this research. This program was introduced by Skinner who relied basically on the behavioral theory in education. In this theory, the educational material is introduced for all learners who use the same sequence in the program, that is they move step by step in studying the program and answer the same questions .

(1) Farjani, Abdel Athiem (1997). Technological Education and Educational Technology, P 194.

1. 1. Research Problem .

The research problem is represented in the following question:

Is there a significant difference due to the method of teaching science upon the achievement of the student of “Class Teacher” specialization in private universities in Jordan?

1. 2. The Importance of the Research

The research significance arises initially from the increased emphasis placed on the importance of technology and its inclusion in the teaching learning process. It also arises as a result of the huge technological improvement in this century represented in the spread of computers, CDs, the internet, videos, video conferences, mobiles, satellites, and others.

This makes it necessary for everyone to cope with the new era and adapt to its changes and benefiting from the technological revolution and discarding its disadvantages. In addition, recommendation of studies have highlighted the importance of using the computer in teaching and indicated that students who learn through this process are more successful than others who are taught using other methods.

The great openness worldwide with the different technological methods which facilitated this openness has motivated the researcher to think about the distance learning and its importance, and hence to conduct this research in order to figure the best methods of teaching that correspond with the needs of our time whether technological or ordinary.

The researcher also thinks of the distance learning (CAI) if it shows a significant difference as a solution of some of educational problems as the increased number of students in class, or shortage of qualified staff, or special needs of students like shyness & hesitation, & finally aggregation of

students to make groups that help sometimes in creating violence.

1. 3. Operational Definitions.

Distance learning: The kind of learning in which the learners (students) are far away from teachers; that is the student teaches himself. In this way distance learning can be considered as individualized instruction and often as self-instruction. In this research, distance learning takes place through CDs that contain the material and/or the mobile for sending messages to inquire about any academic concern.

Computer assisted instruction (CAI): The type of instruction that takes place via the computer, not necessarily the internet. In addition, it is not necessary for the computer to be used in all lectures through the semester. Rather students may use the computer on their own without the presence of their teachers for one single unit This takes place through using the CDs & floppy.

Ordinary Method: “Lecturing” when the teacher processes the material continuously plus some discussion & with the use of data show.

Teaching: The procedures the teacher takes to achieve the various objectives for the students.

2. The Literature.

Cantrel (1993), has argued that using the computer is efficient in evading the embarrassment the students might feel when failing to answer questions.

In addition ,Leonard (1989), found out that biology students in high schools who studied using the computer have shown a statistically significant influence that exceeds the ordinary method especially regarding period of learning. This corresponds with the study of Ajeowole, Je gede and Okebukola in

1990.

Springer (1978), also indicated that computer assisted learning is considered as a strong motive for students and it enriches the scientific content in the curriculum

Studies of Beth Wilson have shown that the critically prepared computer material allows for presentations that are more active and efficient than those presentations prepared by chalkboards and books. One of the most important features of this method is the use of motion pictures especially in mathematics and science. For example teaching some difficult concepts such as “temperature” through the computer might clarify certain aspects that cannot be clarified using ordinary methods.

Studies have also pointed out that computer assisted instruction can be used instead of ordinary methods in cases it is difficult to prepare the educational situation or if it is costly. In this regard, Choi (1989), found out that computer simulation is as active as a real situation and it gives teachers and students the opportunity to tackle issues of interest such as weather, chemises, biology and other topics. In addition, there were other topics on the internet that students can study such as genetics, space and astronomy and oceanography.

There were some studies that indicated the disadvantages of using computer assisted learning. In this regard, Roth, Smith and Woszyna (1996), argued that the computer environment has a tiny influence as an instruction method and that the activity among students in this method is low. They conducted a research to assess the activity of the students in physics course. They found out that the concern of the students is directed towards learning the software rather than physics.

Atkin (1984), pointed out that the trend of teachers to use computers has a great influence in the efficiency of teaching.

On the other hand, there are studies that have pointed out that the following factors play a role in the success of learning whether in ordinary method or through distance learning.

- Willingness to ask the teacher for help
- The serious orientation towards the course
- Working in a field that facilitates the progress in career through preparing the environment in which there is academic progress as Ross and Powell (1990) **** pointed out.
- Getting a university degree as has been indicated by Bernet and Bugbee (1993)*****.

3. Methods and Procedures.

3.1. Research Population and Sample.

The research population consisted of students of Faculty of Arts, Educational Sciences Department, Class Teacher Major in the Jordanian private universities in the first semester for the academic year 2006-2007. The research sample was randomly chosen from students of Zaitonah University in Amman where the researcher lives. The number of the sample was (84), and they were randomly divided into two groups. The experimental group, which was (41), and the control group, which was (43).

*** Schlosser & Anderson (1994), documented in Collier, E (2006).

****, *****, Documented in “Distance Education At A Glance, Guide 9: Distance Education: Research”, from at University of Idaho Home.

The experimental group was taught through distance self-learning using CDs that contain the instructional material. The control group was taught through lecturing, discussion and illustration using Power Point prepared by the researcher and through the multimedia projector of what is called Data Show.

After the instruction, both groups sat for an assessment test prepared by the researcher to assess the impact of each method on the achievement of students.

3.2. Measurement Tool.

The researcher prepared an assessment test (Appendix) that consisted of a (22) multiple-choice questions that assesses the achievement of students in "Classification of organisms and the cell". The validity of the tool was tested by a group of experts from Al-Zaytoonah University Staff who have PHD in measurement and evaluation, curricula and instruction, Arabic and Science. The reliability of the tool was assessed through its application on a test sample from Al-Zaytoonah University students too, which is different from the research sample.

Split Half method was used to calculate the reliability of the tool that was (1). It was then considered ideal to measure the achievement

3.3. The Unit.

The unit was entitled "Classification of organisms and the cell" from Biology course. Through this unit the researcher addressed the categorization of the species focusing on the scientific aspect supported by Data Show presentation. This was joined by lecturing and discussion that was considered as the ordinary instructional method in this research. The researcher designed the unit

through Power Point. The application in the ordinary method took (3) lessons, each lasts 50 seconds.

The unit was formerly applied on students from Zaitonah University to have their feedback and suggestions regarding it, and to assess its appropriateness in terms of wording, language and other factors pertinent to students.

3.4. The Research Variables.

The research included two variables; the independent variable represented in the instructional method and the dependent variable represented in students achievements.

Instructional method was twofold. The first method was represented in the ordinary method (lecturing and discussion) along with Data Show from the faculty members. The second method was distance learning through CDs in the absence of the faculty members. It used to take place in the time suitable for the student. The student used to contact the faculty member to inquire any point regarding the unit through the E-mail and the mobile.

3.5. The Research Procedures .

Research procedures were represented in the following:

1. The researcher designed a tool to measure the achievement of the student in the unit entitled "Classification of organisms and the cell" This was represented in an achievement multiple-choice test.
2. The researcher selected a unit from the course "Scientific Concepts and Methods of Teaching 1", which is a specialization course for Class Teacher major in Educational Sciences Department in Zaitonah Private University. It was designed through

Power Point along with illustrative graphs.

3. The researcher got a formal permission from Zaitonah University Administration to apply the research on the university students.
4. The unit was applied on the sample, which was divided into two sections. The first one consisted of (43) and the second consisted of (41). The ordinary method along with the Data Show was used with the first group. Distance self-learning through CDs was used with the second group through linear programmed instruction. The first group was the control and the second was the experimental.
5. Both groups sat for achievement test after application of the unit.
6. The achievement test was corrected and grades were deduced.

What is new in this research was the real application of the linear programmed instruction that was for long only theoretically stated without a real attempt for application in teaching. Second, this method was applied technologically through CDs. Third; instruction through this method was distance self-instruction without direct assistance from the faculty member. This might help in solving some future educational and academic problems such as the shortage in faculty members or the increase in the number of students in classes or the lack of financial support.

3.6. Statistical Treatment.

Two Way Analysis of Variance (2WANOVA) was used to assess the impact of the instructional method on the achievement of students of Class Teacher major in Al- Al-Zaytoonah University.

4. Research Results, Discussion and Recommendations.

The test that consists of 22 items of multiple choices mentioned before in the study procedures as the measurement tool of the study in order to recognize the impact of the instruction method on the students achievement. The test was corrected after teaching the unit entitled "Categories of Species and the Cell" in two methods, the ordinary method & the distance learning (CDS). The following data were collected (Table 1).

Table 1

Clarifying Means, Standard Deviations, Variances, and number of students in the control and experimental groups

	X (grades of students who studied in ordinary method)	Y (grades of students who studied using distance learning)
Average	15.6	13.6
Standard deviation	1.58	1.97
Variance	2.5	3.61
Number of students	43	41

Then the 2 WANOVA was used to analyze data and obtain the results clarified in Table 2

Table 2

Clarifying results of T-Test on the experimental group

calculated T	5.1
Critical (from table) T	±1.292
Degrees of Freedom	82

It is clear that calculated t is more than the critical t. Hence the null hypothesis stating that the means are equal is rejected. That is there are statistically significant differences on the side of the ordinary

method of teaching the unit.

The result can be justified as a result of the students' reliance on the ordinary method of teaching especially since it was accompanied with data show in addition to their reliance on the same teacher and his style of instruction. It can also be explained in relation to the feeling of student regarding distance learning (using the computers mainly in teaching the unit in this research) since they feel it is a novel method considering it as a kind of academic luxury.

The result can also be explained in relation to the feeling of the students in the control group that the unit they had been taught (categorization and the cell) taken from the course " Scientific Concepts and their Methods of Teaching 1" that is electively registered by the students, while students in the experimental group had been taught the same unit but without registering in the course mentioned earlier in spite of the fact that the course is compulsory for both groups, in addition to the orientation of the students towards the scientific courses, although students of both groups were considered homogenous since they were of the same specialization, namely " Class Teacher" and from the same faculty, Faculty of Arts .

It might be that the feeling of responsibility for the students of the course" Scientific Concepts and their Methods of Teaching I" studying the unit whether sooner or later since it is enrolled in the curriculum has made them more motivated to study it than the other group whose members study only for exam purposes since the course is not enrolled in their curriculum. This has made them less motivated and serious in studying it and reflected on their achievement.

The scientific subjects taken by the students who take the course Scientific Concepts and their Methods of Teaching I" in the control group, as a pre learning might helped them in understanding the scientific material more than those who did not take such

course, the experimental group.

The use of data show in the ordinary method might also have had influence in the good achievement of the control group.

The nature of the material might also have had influence in the results since the specialization of most students is rather literary.

What is worth considering is that students did not inquire about any of the points in the unit through the E-mail or the mobile although the researcher advised them to use such methods if necessary. The researcher cannot decide whether this comes as a result of the inability to use the E0mail or because there was no access to the internet or due to the cost of the mobile messages or their ignorance to this method which is considered novel and unconvincing for them.

4.1. Recommendations:

The researcher recommends taking the following points into consideration in order to maximize the benefit of using the ordinary method & at the same time of providing necessary opportunities to make use of distance learning by computers:

- Emphasizing using technology in teaching especially regarding tools and methods such as multimedia projector, overhead projector, opaque projector & others.
- Emphasizing the improvement of the ordinary method through the integration of other methods such as discussion .
- Increasing the number of researches related to instruction especially regarding distance learning through involving other variables such as level of students, sex, level of faculty member or the scientific material and other variables.

- Involving a unit as a part of the graduation requisites for "Class Teacher" major so that it is taught through distance learning through computers in order to train students on such kind of learning that might be the permanent style in the future.

- Conducting instruction programs in different subjects and for different courses so that they meet the different levels of students and to be used in distance learning especially CDs ,DVDs and others.This should be done by a work groups of different specializations.

- Developing more realistic programs through simulation and motion and addressing scientific subjects that can be simulated such as the blood circulation, breathing, breeding, dividing, growth, immune, solar systems and others.

- In service and pre service training for teachers to use different tools as assets in teaching such as the computer and different projectors.

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Appendix

Measurement Test about the Unit

“Classification of Organisms & the Cell”.

Put a circle around the correct answer of the following:

- “Horse” is classified as:
a. monera b. protista c. metazoan
d. metaphyta
- “bacteria“ is classified as :
a. monera b. protista c. metazoan
d. metaphyta
- No chromosomes are available in one of the following:
a. monera b. protista c. metazoan
d. metaphyta
- One of the following has both animal & plant characteristics:
a. protozoa b. roses c. trees
c. birds
- Chains of chemical reactions take place in the organism are:
a. respiration b. nutrition c.
metabolism d. movement.
- “Catabolism and anabolism” is:
a. metabolism b. respiration c.
movement d. nutrition.
- The process that enable organisms to have energy is :
a. metabolism b. respiration c.
growth d. nutrition.
- The process that enable generating energy is:
a. nutrition b. respiration c.
reproduction d. growth.
- One of the following represents sexual reproduction:
a. budding b.fusion of male and female
cells c.
- One of the following plants moves:
a. rose b. apple trees c. insect
eaters d. grapes.
- The movement towards or against the stimulus is the :
a. nutrition b. growth c.
synthesis d. response.
- One of the following is not the main part of the cell:
a. nucleolus b. plasmic membrane
c. cytoplasm d. nucleus.
- The percentage of water in the cytoplasm equals:
a. 20-30 b. 35-55 c. 115-125
d. 75-90
- “Supply the cell with ATP” is the function of :
a. Golgi bodies b. mitochondria
c. nucleolus
d. endoplasmic reticulum .
- Production of proteins and oils is the function of:
a. Golgi bodies b. mitochondria
c. nucleus
d. endoplasmic reticulum
- One of the following constitutes:
a. plastids b. centrosome c.
golgi bodies d. nucleolus.
- Chromosomes are available in:
a. Golgi bodies b. nucleus c. plasmic
membrane d. mitochondria.
- One of the following allows spread of substances between cytoplasm and nucleus:
a. Golgi bodies b. nucleus
c. plasmic membrane
d. mitochondria.
- DNA is found in :
a. nucleus b. mitochondria
c. plasma d. nuclear
membrane..
- No nuclear membrane is available for:
a. a. monera b. protista c.
metazoan d. metaphyta.
- Fungi is classified among:
a. a. monera b. protista c.
metazoan d. metaphyta.
- Adaptation for a long time produces:
a. metabolism b. response c.
respiration d. evolution.