THE EMPLOYMENT OF THE TECHNOLOGICAL INNOVATIONS IN THE EDUCATIONAL PROCESS

AMAL ABDEL FATTAH AHMAD

Sweidan

Professor of Educational Technology,

Dean of the Faculty of Graduate Studies for Education

Cairo University, Egypt

Abstract

Teachers are the cornerstone in the educational process. Employing the technological innovations does not mean minimizing the importance of the teacher's role as some may imagine. The employment of technology in the educational process is considered one of the most important and contemporary topics. The aim of this paper is to develop skills of the employment of technological innovations for preparatory stage teachers. This research contributes to the effective employment of the technological innovations in the preparation and explanation of the educational lessons. Teachers' correct usage of the technological innovations will enhance the process of education. Besides, the development of the skills of employment of technological innovations of teachers may overcome difficulties that face preparatory stage teachers in dealing with technological innovations in the educational process. Finally, it provides a training program of the skills of employment of technological innovations of teachers.

1. Introduction

Teachers are the cornerstone in the educational process. Any change or development in the educational process cannot be done without developing teachers' performances through integrated training, i.e., academic and vocational and cultural. There is also a crucial need for developing teachers' educational and technological ability to interact with the requirements of the specialization and the latest developments in the technical era.

Employing the technological innovations does not mean minimizing the importance of the teacher's role as some may imagine. Rather, it adds a new aspect to this role

which should vary to cope with shifts in the educational goals, i.e. , from knowledge transition to basic skills development and self-learning promotion.

The employment of technology in the educational process is considered one of the most important and contemporary topics. Nowadays, the ability of youth to face challenges and demands of change creatively defines nations. In turn, employing technological innovations in education allow teachers to present the academic content in a more efficient and dynamic way. It also helps teachers to provide better educational services and guidance to their students. It saves time for teachers to discover students' talents and points of weakness. In addition, it promotes students' mental skills and increases their systematic and abstract thinking. Accordingly, they become more aware of their ways of thinking and learning.

Ali Abdel Moneim indicated that "applying technological innovations in teacher's preparation programs has become an urgent need justified by evidence when considering the nature of the age that we live in, and requirements of education. Technological innovations developed clear imprints on the education system in general, and teacher's preparation programs in specific as a power, which is difficult to stop, affects positively or negatively on aspects of the educational process. "

The employment of technological innovations must be linked to problems of education. Technological innovations should not be applied for technological dazzling. There are many problems facing the processes of teaching and learning, which we should work to solve:

1. Individual differences.
2. Suitable learning time.
3. Learning speed rate.
4. Motivation.
5. Psychosocial state
6. Correcting and developing performance (for teacher and learner).

There are several novel models in the field of technology, both in the field of technological devices and in the field of developed scientific materials and programs. These technological innovations are computer, Internet, Email, Internet search engines, instant messaging, file transferring over the Internet. They also include multimedia, video conferencing, service provided by the internet through direct communication between users using sound and image together, educational Satellite, e-books, smart board. The smart board is considered one of important technological innovations for the educational process, through which technological innovations and skills could be applied. The smart board has a great importance in educational situations, and it also has many positives for students and teachers as follows:

- Allowing control of graphics, images and writings in terms of display size for easy understanding or reading.

- Easiness to use if teachers have been trained well to use it.

- Cleanliness; there is no need to clean materials or remove dust of chalk; regular way may hurt the teacher and the student health.

- Helping teacher to identify and highlight the main ideas simplifying them, so that addresses one and clear target for each slide show.

- Easiness to use with other teaching aids; they are combining fixed and dynamic sound image.

- Encouraging the teacher to use the most educational media with visual, motor and auditory entrances with ease through the presentation of pictures or video or sounds.

- Cutting the monotony of educational situations hence the role of teacher is producing information.

- Saving time and effort and energies of teacher. Smart board provides less effort and shorter time.

- Clarity and contrast of writings which help to improve the learning process and the degree of perfection.   .

- Attracting the attention of students, so it helps to comprehend the lesson better.

- Helping to accommodate student's difficult and complex concepts which need a lot of time to learning.

- Helping to raise the level of attention and focus of students.

In addition to the mentioned advantages, smart board is also characterized by the possibility of using most of the Microsoft Office programs and the possibility of serving online free programs which helps to broaden the experience of the learner. Considering the importance of technological innovations and their advantages in the educational process, the researcher finds that technological innovations need to be activated in schools where there are such boards and developing skills of using technological innovations in the educational process for teachers to affect positively on the educational process.

The problem of the research:

Based on what is mentioned above, the problem of the research can be stated as teachers' weakness in the skills for employing technological innovations in the educational process.

Research questions:

The current research answers the following main question:

What is the effect of the employment of the technological innovations in the educational process?

It also provides answers for several subsidiary questions:

1. What are the skills of employing the technological innovations targeted for development in teachers through the use of smart board?

2. What is the design of the training program for the development of the teachers' skills of employing the technological innovations?

3. What is the effect of the use of the technological innovations on teachers' cognitive achievement?

4. What is the effect of the use of the technological innovations on the development of the teachers' skills?

The aims of the research:

The current research aims to develop skills of the employment of technological innovations for preparatory stage teachers.

The importance of the research:

The current research may contribute to the following:

- The effective employment of the technological innovations in the preparation and explanation of lessons.

- Teachers' correct usage of the technological innovations will enhance the process of education.

- The development of the skills of employment of technological innovations of teachers.

- Overcoming difficulties that face preparatory stage teachers in dealing with technological innovations in the educational process.

- Providing a training program of the skills of employment of technological innovations of teachers.

Research Delimitations:

The current research is limited to:

Employing skills of technological innovations in the educational process:

- **First skill:** the use of Academic Guidance electronically.

- **Second skill:** the use of electronic control.

- **Third skill:** the use of admission tests electronically.

- **Fourth skill**: the use of electronic correction.

- **Skill fifth:** the production of the General Diploma books electronically

The research sample

The research group was selected randomly from the general diploma students. The experimental group consists of 30 students.

2. Research Methodology

The research follows the descriptive analytical approach in the presentation of theoretical framework and related studies, as well as the experimental approach to study the causal relationships between the independent and dependent variables.

Experimental design research

Experimental design is shown in the following table:

Table (1) the Experimental Design to Research

Statistical treatment	Test and observation card (pretest)	Experimental treatment	Test and observation card (posttest)
Experimental group	Experimental group	Functional report	Experimental group

Research variables

The research includes the following variables

1. Independent variable: the employment of technological innovations.

2. Dependent variable: the development of the skills of teachers.

Research instruments:

- Achievement test to measure the cognitive aspects associated with the employment of skilled technological innovations.

- Observation Card of practical performance to employ technological innovations skills.

Research Procedures:

To achieve the goals of current study, researcher will do the following actions:
1. present analytical study of related studies in order to set a theoretical framework

of the research, and preparation of an initial list of technological innovations skills, designing research tools, and analyzing results of research.

2. Identify the skills of employing technological innovations submitted them to experts in the field of educational technology.

3. Put the final form of skills in accordance to opinions of the jury members.

4. Identify the learning objectives to be achieved in order to employ technological innovations skills, submitted them to the experts in the field of educational technology for approval.

5. Prepare a list of educational goals in its final form after making adjustments in accordance to the views of the jury members.

6. Set up a content to employ the skills of technological innovations, in the light of skills' list and a list of educational goals, and then presented to the experts in the field of educational technology for approval.

7. Set up of a content of the skills in its final form after making adjustments in accordance to the views of the jury members.

8. Design training program using smart board, which deals with the employment of technological innovations skills, and presented to the experts in the field of educational technology for clearance.

9. Build the program in its final design after the adjustments in accordance to the views of experts.

10. Design achievement objective test ; to measure the achievement associated with the aspect of cognitive skills employing technological innovations, use it after confirming its reliance and constancy.

11. Design observation card to measure the performance of the practical skills of employing technological innovations, submitted it to the experts in the field of education and psychological technology, to ensure the reliance of this card.

12. Design observation card of pre and posttest in its final form in accordance to the views of the jury.

13. Choose the experimental group to do the exploratory and basic research experiment.

14. Conduct exploratory experiment to search.

15. Perform basic research and experiment through:

- Achievement test and observation card application.

- The application of the training program and explaining the cognitive and psychomotor content and skills for the experimental group teachers.

- The application of the achievement test and observation card performance.

16. Calculate teachers' performance rate of employing technological innovations skills.

17. Provide statistical processing of the research results.

18. Results and interpretation will be discussed in the light of the theoretical framework, and related studies.

19. Provide recommendations and suggestions for further research.

Definition of terms:

Technological innovations: Halafawi (2006) states that technological innovations can be identified as an idea or a product comes in the form of an integrated system, or another sub-integrated system; to serve as creative and innovative solutions to the problems of Education.

Technological innovations are also identified as recruitment of technological means in the educational process. It is an educational integrated system for transferring

learning in order to increase the teacher and the learner performance to deal with the educational process and solve problems, combining several types of educational stimuli; to achieve specific educational goals.

Technological innovations are also identified operationally as " recruitment of technological media in the educational process in order to increase the ability and skills of teacher in dealing with the problems and difficulties of the educational process to improve the quality and output of the educational process."

List skills of technological innovations are in the form of the following main skills:

- **First skill:** the use of Academic Guidance electronically.

- **Second skill:** Use of electronic control.

- **Third skill:** use of admission tests electronically.

- **Fourth skill:** the use of electronic correction.

- **Fifth skill**: the production of the General Diploma books electronically.

The researcher analyzed the previous skills into sub-skills, according to the following steps:

Firstly, Reviewing Books, literature related studies.

Secondly, Conducting Interviews with some of the professionals working in the field of educational technology.

Thirdly, Ordering Sub-skills of each skill, in the form of a graded hierarchy. The Researcher prepares a list in its initial form, which consisted of five key skills, and 55 sub-skills. The jury agreed to the validity of that list, modified formulation of some skills. Then, the first question of the research is answered.

Fourthly, identifying the educational objectives of the training program:

Determining educational objectives may help the current study as follows:

- Determine the desired change in behavior trainees, which they have to learn.

- Determine the nature of the training program, its components and its properties, through the formulation of the program's objectives in procedural statements that describe the new behavior of the trainee.

- Building content accurately fits those objectives to be achieved.

- Building achievement test and observation card commensurate with those goals.The researcher has formulated behavioral and procedural objectives along with cognitive and performative in an initial list. The initial list was submitted to jury of specialists in educational technology, curriculum and instruction to know their opinions in the following:

  • The suitability of the target list to the skills that have been identified for the training program.

  • The accuracy of the drafting of each of these objectives.

  • The accuracy of objectives' terms to achieve the behavior of learning. The agreement ratio of jury on the list of targets was (98.50%), where the researcher calculates the ratio of the agreement using the equation, "Cooper, 1974"

Fifthly: Selection and organization of the content of the program:

The following criteria have been considered when choosing content:

- It should be linked to behavioral and procedural objectives.

- It should be reliable.

- There is a balance between its comprehensiveness and depth.

- Be appropriate for the experience of the trainees, their needs and abilities.

- To be sequenced logically; sequence from the simple to the complex, and from easy to difficult. The researcher has developed scientific content in its initial form, which has been presented to a group of experts to express their opinions in the following points:

- The extent to which the scientific content achieve the objectives.

- The accuracy of drafting of scientific content.

Scientific content in its final form consists of five main modules:

- **Module I:** The first skill: use of Academic Guidance electronically.

- **Module II**: The second skill: Use electronic control.

- **Module III**: Third skill: use of admition tests electronically.

- **Module IV:** fourth skill: use of electronic correction.

- **Module V:** fifth skill: the production of books of General Diploma electronically.

Sixthly: setting the suggested design of training program:

In the light of the objectives, content of the training program, and the need for diversity training methods to achieve the needs of the trainees, the researcher put initial design of means and methods of training program where they were divided into seven columns:

- **First column**: Behavioral objective to be achieved should be registered.

- **Second column:** records the type of experience required to achieve the objective, whether directly or indirectly.

- **Third column:** records training method followed to achieve the objective.

- **Fourth column:** registers training methods used to achieve the objective.

- **Fifth column:** registers training content which was chosen to achieve the objective.

- **Sixth column:** records the timing of each activity pursued to achieve the objective.

- **Seventh column:** registers justifications of using training methods and the use of training facilities.

The jury members have agreed to the need to make some adjustments on that perception. These modifications were represented in modifying the formulation of some terms mentioned in the design.

Seventhly: determining the activities carried out by the trainees:

- Noticing what offered to the trainees well.

- Trying to gain skills of technological innovations during training.

- Using smart board to apply what the trainee sees of skills during the training program.

- Looking at their own training program content and trying to master its knowledge and skills.

- Answering achievement test.

Eighthly: Designing instruments for evaluating trainees

Tools for evaluating trainees were the achievement test to measure the cognitive aspects of the trainees, and observation card to measure performance of the trainees.

1. Achievement Test:

In light of the list of educational objectives, scientific content, the researcher built achievement test that measures the cognitive aspects of training program content among the trainees.

2. Observation Card to Measure Performance:

The researcher built observation card to measure performance of trainees in skills aspects of the training program.

2/1 - The aim of observation card to measure performance:

The aim of observation card to measure performance is to access to accurate scale to measure the performance level of the trainees' practical skills included in the training program.

2/2- Building observation card to measure performance:

It was built in the light of the educational objectives and scientific content of the training program.

Observation card to measure performance consists of five parts, which are as follows:

- **Part I:** trainees' performance skills in the use of the first Skill: Using Academic Guidance electronically.

- **Part II:** trainees' performance in the second skill: Use electronic control.

- **Part III:** trainees' performance skills in the use of third skill: Use admition tests electronically

- **Part IV:** the performance of the trainees in the fourth skill: use electronic correction.

- **Part V:** trainees' performance skills in the use of the fifth skill: the production of books of General Diploma electronically.

Ninthly: conducting pilot study

Pilot study has been conducted on a group of teachers which consisted of (20) teachers, randomly selected. Teachers of pilot study have no prior knowledge of the skills employing technological innovations. The experiment was conducted in the laboratory which has a smart board, devices and other tools needed to conduct exploratory trial. Achievement test, which relates to cognitive skills employing

technological innovations, was conducted. As well as observation card was applied to measure skills of trainees to employ technological innovations, after being exposed to training program employing technological innovations through smart board.

Procedures of pilot study:

Procedures of pilot study were as follows:

The researcher gives trainees an idea of the training program and its goals and purposes. During a training program, the researcher focused on observing the trainees, the extent of their commitment and their attention, and their reactions to the training program. The researcher responds to trainees' inquiries, problems and obstacles they faced to be avoided in the basic experiment. The objective achievement test and performance card were applied on the exploratory group after exposure to the training program to ensure the effectiveness of this program in improving technological innovations skills, as well as to ensure the reliability of each of the achievement test, and performance card.

The results of the pilot study:

- It indicated the suitability and validity of the program to be applied.

- It indicated the stability of both achievement test and observation card to measure performance.
- Difficulties faced by the researcher and students of experimental Group were identified to be avoid when doing the basic experience of research.
- There were some problems relating to computers, but they were solved.

Tenthly: Administering basic experiment of research:

Basic experiment of research was conducted as follows:
1. Choosing the place of implementation of the basic experiment: Conducting pre and post tools, teaching of educational content by a method of functional report.

2. The time of application of the basic experiment:

The designed program has been implemented.

3. The Research Sample:

The experimental group consisted of (30) teachers who were selected randomly. They have no prior knowledge of the skills of technological innovations.

4. Pre-application of the achievement test and observation card:

The pre application of the achievement test and, which deals with the cognitive skills associated with employing technological innovations. Observation card has also been applied to measure skills of employing technological innovations, to determine the extent of knowledge trainees have before conducting the program.

Participants have been trained on the training program and scientific objectives and content to equip them with the skills of employing technological innovations through smart board.

5. Post administration of the achievement test and observation card and statistical treatment to draw conclusions: After the completion of the implementation of the basic experiment and tools, students' grades in each of the achievement test, and observation card to measure performance, monitored and entered into the computer through the SPSS statistical analysis software, in preparation for the statistical processing.

3. Interpretation and Discussion of the Results

The current research results can be summarized in the following points:

• There were statistically significant differences at the 0.05 level of significance between the scores of the experimental group in the pre and posttest level relating to the employment of technological innovations, owned by Smart board, in favor of the posttest administration . This means that the average level of achievement of teachers

of experimental group is better than their level in the pretest.   This means that training program using a smart board has effective impact in improving the knowledge concerning the employment of skilled technological innovations.

• There were statistically significant differences at the level of 0.05 between the performance of experimental participants' group scores in employing technological innovations for the favor of post-performance. This means that the proposed training program using a smart board has effective impact in improving the performance skills to employ the skills of technological innovations owned by the Smart Board.

Recommendations:

In the light of the findings of the current research, which was represented in the effect of the proposed training program in improving performance level of employing of the technological innovations skills required for smartboards, the current research recommends the following:

1.   Providing all educational stages with technological innovations .

2.   Equipping schools withcapabilities that enable the achievevent of the maximum benefit from technological innovations.

3.   Providing training courses for the employment of technological innovations in the educational process in order to raise teachers' abiltity to use the technological innovations.

4.   Resolting for experts to ensure that the training process will achieve the desired benfits and do not result in mere lecturing .

5.   Providing a manual guide which shows the necessary rules in dealing with the impact of technological innovations as well as clarifyies how employed in the educational process.

6. Activating the use of technological innovations available within schools and employing them in the educational process. Showing teachers their effective role in the educational process.

7. Providing smartboards within classes with adue care to their accessories.

8. Raising teachers' awareness of the importance of the modern technological tools to the educational process.