

Designing and Producing a Proposed Web-based Training Program for developing Multimedia Production Skills: Primary Stage Female Teachers in Jeddah, Kingdom of Saudi Arabia



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ABSTRACT

Educational literature shows the importance of employing instructional technologies for activating students' learning. This is why teachers must be trained in designing, producing and using instructional technologies tools in the light of scientific principles of instructional design. One of the most instructional techniques teachers to be trained on is multimedia.

The research problem stemmed from the weakness of multimedia production skills (based on instructional design principles) of primary school teachers. Thus, this research work sought to test the effectiveness of a web-based program for developing multimedia production skills of female teachers.

This research aims to explore the multimedia production skills weaknesses among female teachers, identifying concepts and skills related to multimedia production in the light of instructional design principles. Also, developing a suggested Web-based training program for enhancing multi-media production skills of primary stage female teachers and measuring the effectiveness of this program .

The significance of this research stems form being the first research that adopts a suggested training program for developing intermediate female teachers' skills for multimedia production in the light of instructional design principles as well as preparing a checklist of training need and required skills.

Keywords: Multimedia, Multimedia production skills, Web-based training, Instructional design.

1. INTRODUCTION

Educational systems play a crucial role in preparing society members to cope with their contemporary age and confront its challenges. In order to effectively play such assigned role, these systems should make the full use of modern educational technologies and train teachers on how to use them in practice. This conclusion is emphasized by a

plethora of previous educational research that repeatedly highlighted the fact that teachers' training on educational technology use is the most pivotal factor influencing its actual implementation.

This research employed descriptive and experimental research methods. The experiment was applied to a sample consisting of 32 primary school teachers in Jeddah with a pre-test/ post-test one group design. For measuring the effectiveness of the training program, the research used an achievement test for measuring cognitive aspects of multimedia production, and performance observation checklist for measuring multimedia skills.

The research questions have been answered and research hypotheses have been tested through the statistical analysis of data by using paired-samples T-test, and Blacke Modified Gain Ratio. This research yielded a checklist of training needs and required skills for female teachers dealing with multimedia production in light of instructional media principles. The results showed the effectiveness of the suggested training program in the developing teachers' knowledge and skills in the production of multimedia.

The research recommended offering training programs for in-service teachers (both males and females) on the production of various instructional technologies in the light of instructional design principles using Web-based instruction systems. It also recommended offering specialized courses in the production of multi-media and instructional design.

Multimedia enjoys several teaching and learning theories associated features that increase learning effectiveness [17]. In essence, multimedia blends written texts, pictures, drawings, photos, graphics, audio, video and

other similar elements improving learning from a multi-senses perspective.

Besides, instructional design is widely considered a pivotal field for educational technology including a group of core knowledge and skills necessary for any school teacher or curriculum designers. As a result, it constitutes the bridge between theory and practice through which we can identify required prescriptions for accomplishing desired educational outcomes [4].

It's against such backdrop that this research aims at developing a Web-based training program for in-service primary female teachers tackling multimedia production skills in light of instructional design principles. The main rationale is that despite the fact that we have some previous studies discussing training programs provided for developing such skills, its majority focuses on pre-service, not in-service-teachers

The aims of this research include the following:

- 1 To identify multimedia production skills weaknesses among primary female teachers;
1. To reveal multimedia production associated concepts and skills in light of instructional design principles needed for primary female teachers;
2. To develop primary female teachers' multimedia production knowledge and skills in light of instructional design principles;
3. To develop a proposed Web-based training program for developing multimedia production knowledge and skills in light of instructional design principles; and
4. To measure the effectiveness of the proposed program for developing multimedia production knowledge and skills in light of instructional design principles.

This research is limited to the following:

1. Location limitations: Al Taawon national primary school for girls in Jeddah.
2. Topic Limitations:
 - ❖ Web-based training of primary female teachers on PowerPoint-assisted multimedia production concepts and skills in light of instructional design principles; and
 - ❖ Measuring multimedia production knowledge is limited to Bloom's first three levels, i.e. knowledge, comprehension and application.

The suggested technology that author depend to develop approach is structured from :

- Multimedia:

It's operationally defined in this research as "delivering lessons with the help of computer in a way combining a number of such elements as texts, pictures, audio, animations and videos via PowerPoint program".

Multimedia Production Skills:

It's operationally defined in this research as "required skills for producing educational multimedia in light of instructional design principles. It's measured in the current research with female teachers' obtained scores in the applied relevant observation checklist".

Web-Based Learning:

It's operationally defined in the current study as "using Internet-based Websites for supporting provided training programs including their used instructional materials as well as using asynchronous electronic communication tools between female trainers and their trainees via E-Mail".

Instructional Design:

It's operationally defined by the researcher as "a group of systematic practical procedures associated to multimedia instructional design phases using the PowerPoint program including the following five major steps of instructional analysis, design, development, production and evaluation".

2. THE RELATED WORKS

The following lines discuss some previous studies focusing on multimedia effectiveness in education:

Multimedia is considered one of the most significant modern educational technology tools that enjoyed tremendous interest from educational researchers and practitioners alike during recent decades. In particular, unprecedented developments in the field of computer had largely affected ongoing multimedia development from a mere educational medium in the past to design advanced computer programs and software blending all texts, graphics, audio and video elements together in an integrated manner accomplishing learning effectiveness.

Overall, a plethora of previous studies repeatedly emphasize multimedia effectiveness in teaching required concepts, experiences and skills for students at different educational stages and levels.

Author of [7] conducted a study entitled "required standards for computerized multimedia programs production and use and their effect on preparatory school students'

achievement." His research sample comprised 48 male and female students randomly divided into two equal groups: an experimental and a control. Eventually, the study concluded positive results for the proposed standards for computerized multimedia programs production and use.

Study [9] conducted a study entitled "effectiveness of a hyper multimedia-based instructional design based on Dick & Carey' Model in developing achievement among Educational Technology Branch students enrolled into Banha Faculty of Specific Education." The study focused on evaluating the effectiveness of the proposed model in promoting both cognitive and psycho-motor aspects of achievement employing a research sample comprising 60 students. Results concluded experimental group students outperform their control group peers in achievement due to multimedia use.

Finally, Work [11] contributed another work entitled "effectiveness of a proposed multimedia program in developing educational Websites design skills among computer teacher education students." His results showed that multimedia use has supported the development of educational Websites design skills among research sample comprising 25 male and female senior fourth-year Computer Teacher Education Department, Damietta Faculty of Specific Education, Mansura University.

2.1 Studies on Teachers' Training on Instructional Design

The past few decades have witnessed tremendous attention to instructional design because it focuses on specific educational goals and is closely associated to teaching certain aspects of instructional content to students, e.g. lessons or modules, according to desired educational goals and outcomes [9]

No wonder that several previous studies emphasize the pivotal importance of instructional design as a fundamental educational technology field at the same time they recommend exerting more efforts to develop teachers' instructional design knowledge and skills.

Author [15] experimental study entitled "Effectiveness of computer-assisted educational technology in developing female practice female teachers' competencies in applying instructional design steps and its relationship to learners' types" revealed that computer-assisted educational technology is effective in developing female practice female teachers' required cognitive and psycho-motor competencies for applying instructional design steps. The research sample comprised 58 female practice female teachers enrolled into Girls' College, AinShams University. Data were collected using an achievement test as well as an observation checklist for instructional design practical skills.

Moreover, [5] conducted another study entitled " effects of instructional design professional development on teaching performance, perceived competence, self-efficacy, and effectiveness " whose most prominent results emphasized the training provided for experimental group had positive effects on developing participants' knowledge of instructional design and its adoption in practice. The research sample comprised 18 academic staff members 12 of whom participated in a training program for instructional design procedures, principles and applications whereas the other six formed the control group. Notably, the delivered training program was constructed based on ADDIE Model (i.e. Analysis, Design, Development, Implementation and Evaluation) whose principals were derived from Educational Psychology.

Finally, results concluded [12] study entitled "An investigation of the effects of model-centered instruction in individual and collaborative contexts: The case of acquiring instructional design expertise" Showed that instructional models-centered teaching is effective in developing teachers' knowledge and skills in the field of instructional design. Notably, the study sample comprised 126 pre-service teachers belonging to four different departments enrolled into a teaching methodology and educational technology course.

2.2 Studies on Developing Multimedia Design and Production Skills

Multimedia design and production skills as well as competencies are widely considered among the most significant core competencies to be mastered by teachers nowadays, especially in light of the increasing pedagogical importance of designing and using modern educational technology tools in education.

Multimedia production competencies are defined as a group of intellectual and practical practices that enable teachers to design and produce educational computerized software characterized by the combination of a number of instructional media together via an authorizing system [16]

As a rule of thumb, such competencies mastery is widely viewed as a main factor increasing the general level of teachers' instructional effectiveness as emphasized by some relevant previous studies in the field as follows:

[1] conducted a study entitled "employing systems approach for teaching instructional multimedia computer programs production." The study sample comprised 45 Educational Technology Department students enrolled into Faculty of Education, Helwan University. The researcher employed the pre-test post-test one group experimental design using two tests for multimedia production knowledge and skills eventually concluding positive results for his proposed model.

[14] conducted another study entitled "a proposed program for enabling Educational Technology Department students to acquire some educational virtual reality software production skills." The researcher employed a purposive sample selected from Educational Technology Department senior fourth-year students enrolled into Faculty of Specific Education, Ain Shams University randomly divided into two groups: experimental and control. Results revealed the effectiveness of the proposed program in increasing required knowledge and skills among experimental group students compared to their peers in the control one.

Finally, Tanta University of Egypt applied a project for training 15 professors as well as 30 other assistants belonging to the university-affiliated college staff members on Websites design and development for their taught courses using interactive multimedia with the aim of promoting Web-based teaching and learning[3].

Based on literature review, the researcher concluded the pivotal significance of male and female teachers' mastery of instructional design and multimedia production skills that can be developed via providing them with suitable training. In addition, previous literature clearly shows there are no previous studies dealing with Web-based training and its effect on developing such inevitable skills among both male and female teachers.

It's against such backdrop that the researcher can formulate and test the following two hypotheses for her research via the proposed training program, namely:

- ❖ There is significant difference between the mean scores of female teachers on the achievement pre- and post-tests for multimedia production knowledge in favor of post-test results.
- ❖ There is significant difference between the mean scores of female teachers on the observation pre- and post-tests for multimedia production performance skills in favor of post-test results.

3. Research Problem and Questions

Based on the researcher's previous experiences and work during the past few years, the author observed Saudi female teachers, especially intermediate ones, lack necessary skills for employing educational technology in their classrooms, particularly multimedia production skills, at the same time they are in dire need of being acquainted with instructional design principles for various educational tools, products, modules and lessons.

In a nutshell, the research problem can be formulated into the following main question, namely: "What is the effectiveness of the proposed Web-based training program

in developing multimedia production skills among primary female teachers in Jeddah, KSA?"

The following sub-questions stems from such main question, namely:

1. What are the multimedia production skills that must be mastered by primary female teachers?
2. What is the form of the proposed program for developing multimedia production knowledge and skills among primary female teachers?
3. What is the effectiveness of the proposed program in developing multimedia production knowledge among primary female teachers?
4. What is the effectiveness of the proposed program in developing multimedia production performance skills among primary female teachers?

4. Research Methodology

This section focuses on providing a detailed explanation for the research methodology, i.e. research design, sample selection, data collection tools, design of the proposed training program as well as statistical analysis techniques as follows:

4.1 Research Method

In tandem with the current research purposes, two research methods are employed, namely: Descriptive-Analytical Method: It's used for answering the research both first and second questions.

Experimental Method: It's used for answering the research third question employing the pre-test post-test one group experimental design

4.2. Research Sample

The research overall sample consists of 32 female teachers divided into 12 female teachers selected from Al Taawon national primary school for girls in Jeddah and 20 other volunteer female teachers to participate in the current program belonging to a number of disperse public schools in south Jeddah.

4.3 Research Instruments

The researcher collected her study data using the following two instruments, namely:

An achievement test for measuring the cognitive aspects associated to multimedia design and production practical skills in light of instructional design principles; and

An observation checklist for multimedia production skills in light of instructional design principles.

4.4. Design Approach of the Proposed Training Program

The research experimental treatment included a proposed Web-based training program for developing female teachers' instructional design skills for multimedia programs. The researcher verified the validity of her proposed program from both theoretical and practical dimensions via its application to a pilot sample comprising 15 primary female teachers in Jeddah as well as its scholarly arbitration by a panel of peer reviewers.

Eventually, in its final form, the proposed program consisted of an electronic Website including the program's goals, content as well as accompanying instructional materials and activities (i.e. flash displays for modeling multimedia production skills in light of instructional design principles). Also, the program included self-evaluation questions automatically scored by the Website. In addition, the Website was supported via allowing easy communication between the researchers and trainees by E-Mail.

4.5. Data Analysis Procedures

In this research, the following statistical techniques were employed using the SPSS 11.1 version, namely:

- Descriptive Statistics (i.e. mean cores and standard deviations for pre- and post-tests);
- Paired-Samples T-Test for statistical significance; and
- Black's Modified Gained Ratio equation for calculating the effectiveness of the proposed training program.

5. Research Results and Discussion

The researcher conducted a pilot study with the aim of making sure of the presence of an actual problem in multimedia production skills mastery in practice in light of standardized instructional design principles among primary female teachers employing a random sample comprising 15 female teachers at the 114 Primary Schools in Jeddah.

The pilot study results clearly indicated remarkable shortcoming in provided theoretical and practical training for female teachers, either pre- or in-service, on multimedia production skills majority participants (i.e. 73.3%) didn't study instructional design or multimedia production in their academic preparation programs, either theoretically or practically. Also, another 66.6% of participants suffered

from lack of training experiences for multimedia production provided in-service; thus negatively reflected on the actual level of multimedia use in classrooms. Besides, lack of training negatively affected a percentage of 66% of participant female teachers' ability to use some relevant assisting software in multimedia production.

It's against such backdrop that we conclude that the current research problem manifests itself in lack of multimedia production skills among primary female teachers in light of instructional design principles. As a result, theirs is a dire need of constructing and evaluating the effectiveness of a proposed Web-based training program for developing such skills.

- **Answering First Question:**

First question of this research stated " What are the multimedia production skills that must be mastered by primary female teachers? ". For answering this question, the researcher depended on literature and theoretical framework review as well as her research procedures via preparing a training needs and required skills checklist for female teachers dealing with multimedia production in light of instructional media principles.

- **Answering Second Question:**

Second question of this research stated " What is the form of the proposed program for developing multimedia production knowledge and skills among primary female teachers?" . For answering this question, the researcher employed her research procedures that included the design and peer-review arbitration of the proposed training program.

- **Answering Third Question:**

Third question of this research stated " What is the effectiveness of the proposed program in developing multimedia production knowledge among primary female teachers? " .For answering this question, the researcher formulated her study first hypothesis stating " There is significant difference between the mean scores of female teachers on the achievement pre- and post-tests for multimedia production knowledge in favor of post-test results". In order to verify such hypothesis, the participant

female teachers' mean scores and standard deviations for the achievement pre- and post-tests as well as their statistical significance were calculated. The following table (1) indicate the study descriptive statistics:

Table (1): Descriptive Statistics for the Achievement Pre- and Post-Tests

Administration	Number	Means	Standard Deviations	Means Differences
Pretest	32	20.53	4.436	28.97
Posttest	32	49.50	1.566	

Furthermore, Paired-Samples T-Test was used for identifying the statistical significance of participant female teachers' mean scores in the applied achievement pre- and post-tests (see table 2)

Table (2): Statistical Significance for Mean Scores in Achievement Pre- and Post-Tests

Administration	Number	Means	Standard Deviations	freedom degrees	T Value	Significance
Pretest	32	20.53	4.436	31	45.56	significant at (0.01)
Posttest	32	49.5	1.566			

Based on comparison between calculated and tabulated T values at the 0.01 level and 31 freedom degrees, it's concluded that calculated T value is larger than its tabulated one. In other words, there is significant difference at the 0.01 level between the mean scores of participant female teachers' mean scores in the applied achievement pre- and post-tests in favor of post-test results. As a consequence, the researcher accepted her study first hypothesis.

In order to identify the effectiveness of the proposed training program in developing multimedia production knowledge, the researcher employed Black's Modified Gained Ratio equation. Results came as follows (see table 3)

Table (3): Black's Modified Gained Ratio for Multimedia Production Knowledge.

Administration	Means	Full Mark	Gained Ratio
Pretest	20.53	53	1.42
Posttest	49.5		

As shown in the above-mentioned table (3) , Black's Modified Gained Ratio for participant female teachers' achievement in multimedia production knowledge was calculated at 1.42, an appropriate accepted value as an indicator for effectiveness as it exceeds Black's minimum value of 1.2 only. As a consequence, the researcher concluded that the proposed training program is effective in developing multimedia production knowledge among primary female teachers; thus answering the research third question.

• Answering Fourth Question:

Fourth question of this research stated " What is the effectiveness of the proposed program in developing multimedia production Performance skills among primary female teachers? ".For answering this question, the researcher formulated her study second hypothesis stating " There is significant difference between the mean scores of female teachers on the observation pre- and post-tests for multimedia production performance skills in favor of post-test results ". In order to verify such hypothesis, the participant female teachers' mean scores and standard deviations for the observation checklist pre- and post-administrations as well as their statistical significance were calculated. The following table (4) indicate the study descriptive statistics:

Table (4): Descriptive Statistics for the observation checklist Pre- and Post-Tests

Administration	Number	Means	Standard Deviations	Means Differences
Pretest	32	34.66	5.147	35
Posttest	32	69.66	3.199	

Furthermore, Paired-Samples T-Test was used for identifying the statistical significance of participant female teachers' mean scores in the observation checklist pre- and post-tests (see table 5)

Table (5): Statistical Significance for Mean

Scores in observation checklist Pre- and Post-Tests

Administration	Number	Means	Standard Deviations	freedom degrees	T Value	Significance
Pretest	32	34.66	5.147	31	39.98	significant at (0.01)
Posttest	32	69.66	3.199			

Based on comparison between calculated and tabulated T values at the 0.01 level and 31 freedom degrees, it's concluded that calculated T value is larger than its tabulated one. In other words, there is significant difference at the 0.01 level between the mean scores of participant female teachers' mean scores in the observation checklist pre- and post-tests in favor of post-test results. As a consequence, the researcher accepted her study second hypothesis.

In order to identify the effectiveness of the proposed training program in developing multimedia production performance skills, the researcher employed Black's Modified Gained Ratio equation. Results came as follows (see table 6)

Table (6): Black's Modified Gained Ratio for Multimedia Production Performance Skills.

Administration	Means	Full Mark	Gained Ratio
Pretest	34.66	75	1.33
Posttest	69.66		

As shown in the above-mentioned table (6) , Black's Modified Gained Ratio for participant female teachers' multimedia production performance skills was calculated at 1.33, an appropriate accepted value as an indicator for effectiveness as it exceeds Black's minimum value of 1.2 only. As a consequence, the researcher concluded that the proposed training program is effective in developing multimedia production performance skills among primary female teachers; thus answering the research fourth question.

Conclusions and Recommendations

This research aim to evaluate the effectiveness of a proposed Web-based training program in developing primary female teachers' multimedia production skills in light of instructional design standardized principles.

Overall, the achieved results came in complete tandem with the general trend of relevant previous literature in the field supporting other similar conclusions reached by [15],[10], [5] and [12] that highlighted positive effects for training teachers on developing their instructional design skills. Moreover, the current research also emphasized those significant conclusions reached by several other previous studies indicating that suitable training is a significant tool for developing multimedia production skills.

More specifically, the proposed training program effectiveness in developing female teachers' multimedia knowledge and skills in the current research in light of instructional design principles can be explained due to the following factors, namely:

- ❖ Participant female teachers' enthusiasm for the experiment, their desire to develop their performance in multimedia production and willingness to receive training on instructional design principles and multimedia production;
- ❖ Female teachers' familiarity with PowerPoint program and its applications;
- ❖ Using Web-based training assisted in increasing its overall effectiveness via making female trainees benefit from the potentials of individualized teaching provided by the program's Website in learning according to their pace as well as taking into account those female teachers' family and occupational conditions, so that this will enable them to choose the most plausible time for their learning and training as well as benefit from the Website and its practical displays for modeling multimedia production skills in a way contributing to their skills mastery; and
- ❖ The proposed training program focuses on linking its theoretical information to their relevant realistic examples for classroom events; thus making such theoretical information meaningful.

Against such backdrop , the researcher provided the following recommendations, namely:

- ❖ To teach specialized courses in instructional design and multimedia production to in-service male and female teachers at the Saudi Arabia faculties of education;
- ❖ To provide training programs for in-service male and female teachers tackling multimedia production and instructional design;
- ❖ To use Web-based learning systems in training both pre- and in-service male and female teachers;
- ❖ To train male and female teachers on the instructional design for several educational outcomes, e.g. Computer-Assisted Instruction (CAI) and Web-Based Learning (WBL);
- ❖ To provide required financial and human resources able to assist in ongoing efforts to produce multimedia software at the Saudi Arabia schools level; and

- ❖ To conduct continuous ongoing evaluation of male and female teachers' ability to apply instructional design principles and systems production for educational purposes.

Finally, the researcher suggest the extension of the current study results via conducting further relevant research studies in the foreseeable future tackling such topics as:

- ❖ Check the effectiveness of a proposed program for training female teachers on multimedia production using other computer programs, e.g. Director and Macromedia Flash;
- ❖ Investigate the effectiveness of a proposed program for training female teachers on multimedia programs instructional design using other models, e.g. "Al-Gazar" as well as "Dick and Kerry";
- ❖ Test the effectiveness of a proposed "instructional design" course for faculties of education students in developing their multimedia production skills;
- ❖ Analyze effectiveness of Web-based training in developing virtual reality software production skills among in-service male and female teachers; and
- ❖ Examine effectiveness of a proposed training program in developing Web-based multimedia production skills among in-service male and female teachers.

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