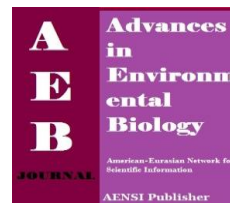




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Multimedia Standardization of AIDS Learning and Comparing its Application in Individual and Blended Learning

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ABSTRACT

The AIDS is the fourth cause of death throughout the world and the only way to control is administering the preventing actions. Learning the individuals at risk especially young and teenagers is increasingly significant. In this study, multimedia which is compiled based on instructional design model has been used as a learning instrument for the teenagers. The study main objectives include: (1) multimedia standardization of AIDS learning using Mayer's seven principles and multimedia production standards (2) comparing application of AIDS multimedia learning in blended and individual learning methods. The study method is semi-empirical and pseudo-experimental. The statistical community include AIDS multimedia and 120 teenage girl introduced by sport and teaching centers. The respected community was categorized into two groups composed of 60 individuals through the selective choosing sampling in terms of average score, educational level and field of study. One group was exposed to the multimedia individually and another group to multimedia in a blended manner. Two checklists as the data collection tools were assigned for multimedia assessment which one was based on Mayers' principles and another on multimedia production standards. Checklist's reliability coefficient was measured through re-tests, and professors' viewpoint was used for their validity determination. In order to compare multimedia application in the individual and blended learning methods, the admission and final assessment tests and opinion toll questionnaire was used to determine the learners' satisfaction. Descriptive statistics, frequency parameters, percentage, mean, standard deviation and conceptual statistics (t-test) were used to analyze the data by the help of Excel and SPSS-15, which results are depicted in tables. The significant findings of this study include: applied principles in AIDS multimedia learning on the teenage girls according to Mayer's principles with achieving the mean score 03.07 in the optimal range and applied multimedia principles according to multimedia principles with score 03.01 in a relatively range were evaluated. Following comparing post-test and pre-test scores' results and after six weeks learning it was revealed that multimedia application via individual and combined procedures using t-test with $p > .005$ showed a significant difference and reliability of information with $p = .004$ in blended procedure was higher than individual one. There was a significant relationship between average score, educational field, post and pre-test scores and 6 weeks learning and $p < .005$. Therefore, production of multimedia requires observing the standards. This supports the development of appropriate and optimized application of multimedia learning capabilities. In the young and teenage years, presence of the teacher along with using multimedia for establishment of interaction in the learning area is more effective.

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INTRODUCTION

The emergence of digital and computer age was influential in human's accessibility to miscellaneous and profitable instructional media and material in the learning domain. The production of instructional media and material based on computer capabilities has been rapidly increased and it has some advantages including fascination, speed, and quality. In different countries, different studies have been undertaken for effective application of this technology. The multimedia system based on computer means simultaneous combination of elements including image, sound, text, animation and so on for sending a message to the learner. The rationale for multimedia presentation of material in the form of words and images is to apply the entire capability of individuals in processing the information. Multimedia environments must be designed based on the way of

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learning. Multimedia messages which are designed in terms of human mental function results in more effective and significant learning than those neglectful of this potential. The cognitive theory of multimedia learning assumes that human information processing system has two distinct canals for visual/lingual and audio/lingual processing that each one takes privilege of a limited processing capability. The active learning requires administering coordinated series of cognitive processing suchlike comprehension, argumentation and so on during the learning. Multimedia learning composed of five steps:

- selecting the relevant words among the text or presented oral reproduction
- Selecting the relevant images among presented images
- organizing the selected words in the form of coherent and continuous verbal reproduction
- integrating verbal and visual reproductions with prior knowledge

Visual processing and spoken words processing necessarily happens in the visual channel and auditory/verbal channel, respectively, but printed words processing happens initially in visual channel and then it goes to verbal and auditory channel. There are three main hypotheses on a cognitive theory of multimedia learning: dual-channel hypothesis, limited-capacity hypothesis, active-processing hypothesis. Dual-channel assumption means that there are discrete channels in the human mind for processing visual and audio information. During visual and audio multimedia presentation of instructional material, both memory visual and verbal channels are used to convert information into an appropriate model. Limited-capacity assumption means human has some limitations in processing information in each channel and in a certain time. When individual is exposed to an image or animation, he/she is able to retain just a partial part of the images in its mind in a certain time. Active-processing assumption means individual is actively involved in cognitive processing in order to generate a coherent and comprehensible mental reproduction of its experiences. This active cognitive processing include: attention guiding, organization of entered information, integration of entered information with prior knowledge. Human is active processor that attempts to make sense of multimedia presentations. The instructional designers must consider relationship between short-term (active memory) and long-term memory in the mind. Several research documents indicates that active memory plays a significant role in storage and processing of information for carrying out complex cognitive tasks suchlike comprehension, argument and learning. Based on active memory pattern, visual information and verbal information are decoded and processed in active visual memory and active verbal memory, respectively.

Most of the technology-assisted trainings are sufficiently not effective. Sometimes, these trainings as the learning bottlenecks generate cognitive load, especially for learner's active memory, rather than facilitating and promoting learning. The cognitive load means a series of mental activities that impose themselves on active memory in a certain time. Michigan University in America carried out a study on learning styles and application of multimedia which its findings is summarized as follows. The learners welcome active learning style, film screening and establishment of a interactive atmosphere in learning environment, while students take more advantage of intuitive learning, abstract material and argumentative procedures; visual learners welcome film screening and programs with visual searchers. Holistic learners prefer to consider instructional topics and material through a more broad perspective. The study "the effect of interaction on user's output in the multimedia environments" was undertaken by Rama Morretti in 2002. The results indicated that presence of interaction within the multimedia environments positively affects learners' cooperation, attitude and eventually is learning level. A study known as "the attention-guiding effect and cognitive load in the comprehension of multimedia animation" was carried out by Amadeo and his colleagues in the Toulouse University in France in 2010. This study was undertaken to investigate effect of cueing on cognitive load and comprehension of animations which depicted a dynamic process in a neurobiology domain. In this study, cueing consisted of zooming in important information at each step of the process using a purple square. Thirty-six undergraduate psychology students were exposed to an animation three times. Half of the participants received an animation without cueing while the other half received the same animation with cueing. Measures of cognitive load and comprehension performance were administered twice. The analyses revealed two main results. First, extraneous cognitive load was reduced by cueing after three exposures. Second, retention of the isolated elements was improved in both animation groups, whereas comprehension of high-element interactive material (i.e., the causal relations between elements) increased only in the cueing condition. Furthermore, a problem solving task showed that cueing supported the development of a more elaborate mental model. The cueing supports the learner not only select significant elements, but also disregard marginal factors. At the beginning of each stage, a purple square was revealed on the relevant domain to attract the learner's attention, and then zooming was administered in the domain about which all the information was presented. The current study, based on cognitive load theory, attempts to indicate that attention guiding using symbols and signs suchlike cueing in multimedia animation helps individual to focus on significant stuff and comprehend it more effectively and this diverts his/her attention from marginal and unimportant details which increase the cognitive load [1].

Considerable attempts have been undertaken in Iran to apply cueing in the learning including initiating and development of virtual university, distance education and instructional multimedia productions and so on. But nowadays the scope of instructional multimedia production is extended into limitless areas. The studies show

that advantageous instructional multimedia effectively fulfills the learners' needs when it is designed and produced under the scientific and standards and principles. Observing Myer's seven principles in designing multimedia is recommended which includes: 1- principle of multimedia 2- principle of special congruity 3- principle of temporal congruity 4- principle of coherence 5- principle of modality 6- principle of redundancy 7- principle of individual differences. In addition, multimedia production standards include interaction, assessment of learning, feedback presentation, guidance presentation, provide entertainment, picture/text adaptability, voice/text adaptability, application of digital video images, adaptation of text, animation, adaptation of voice and music to the content, replying to learners' probable questions, an environment for note-taking, searching, etc. [3].

Avazzadeh in an instructional-multimedia study assessed English language course in the second grade of primary school based on Mayer's principles and multimedia production standards. Applied multimedia was qualified, while other instructional multimedia such as tablet and pen, frost, happy software were unqualified in terms of observing Mayer's principles and instructional CD production standards [3]

In the study "application of Reigeluth instruction design model in virtual education" conducted by Farideh Hamidi and her colleagues in Shahid Rajae Teacher Training University in 2010, some findings were acquired as follows. Merrill claimed that most of this multimedia can be effective when it is provided under the principle of instructional design. So, Reigeluth's instruction design model was applied in this study for content design of multimedia. Participants were 60 young and teenagers 6-15 years old. To collect data, participants were asked to present their feedback on various instruction methods suchlike computer training, traditional training, and a combination of these two. The results indicated that children were interested in combined learning, i.e. using educational CD, computer and teacher.

The multimedia is effectively used in various areas. For instance, in the medical sciences, it is utilized to instruct different medical concepts to students, teachers, professors, etc. The study "designing and evaluating enzyme biochemistry software for dentistry students" undertaken by Soleiman Mahbub and et.al in the Babol university indicated that software capabilities enhances the students' learning precision compared with other instructional procedures and by installing software in university's instructional site, students were able to access to it whenever and wherever possible. In the study "investigating and comparing the educational effect of anatomic areas of extra-oral radiographies" conducted by Fatemeh Azzodidni Ardakani in Yazd University, it was concluded that 37.05% of students were strongly agreeable and 53.01% were agreeable with software learning. 84.04 of students believed that software is able to assess students' clinical skills in recognizing and identifying anatomic areas. In this study also researchers used multimedia AIDS learning for children and compared its application in both individual and blended procedures. AIDS is the fourth cause of the death throughout the world that has no certain treatment and its only effective way of control, especially to young and teenagers at risk is taking preventing actions (The Ministry of Health & Treatment, p. 25). In addition, application of multimedia because of more fascination and speed facilitates AIDS learning and supports further development in the learning area. This AIDS learning multimedia self-teaching procedure was designed based on training program method. It is an educational design model which splits educational content into short and comprehensible parts and each is divided into shorter learning steps for learners. The learner passes these learning steps consistent with its own abilities to fulfill desired objectives [2]. In this study, at first, germane multimedia was used under the Mayer's principles and multimedia production standards and after undergoing some improvements. Objectives and problems of study are as follows:

- Multimedia Standardization of AIDS learning for teenagers in accordance with program learning model under Mayer's principles and multimedia production standards
- Comparing application of multimedia learning in both individual and blended methods

Study Questions:

- Is Multimedia AIDS learning in accordance with Mayer's principles?
- Is Multimedia AIDS learning in accordance with multimedia production standards
- Is there any significant difference between applications of multimedia AIDS learning in two individual and blended methods?

Method:

This study is semi-empirical, pseudo-experimental. First, multimedia AIDS learning is assessed and then investigated in terms of its application in both individual and blended AIDS learning methods for teenagers. The statistical community included 120 teenagers introduced by sports and educational centers. The content of multimedia was evaluated based on participants' need and prior study findings. The content was designed based on educational design model or learning program in the form of educational frames, so that after determining the recaps including significance of issue, concepts, transmission methods, AIDS preventive actions, etc, the learner's progressive steps in the form of learning program frames in PowerPoint environment were prepared. The main multimedia frames, reconstructive frames and additional frames were Carnegie purple, green and

violet, respectively. To transit from one frame to another one or from one step to another, the learner must pass the designed test and choose the correct answers; otherwise he or she descends into reconstructive and additional frames. In these frames, the reason of choosing false answer and necessary guidance is provided. AIDS multimedia is composed of various parts including program guide, study guide, study objectives, entrance exam, introduction, 1st primary step, 2nd primary step, 3rd primary step, 5th primary, final exam, required instruments and equipment and resources. After designing, multimedia was assessed by educational technology experts based on checklist and after some improvements and rectifications, it was delivered to students. Using selective choosing sampling in terms of average score, educational level and field of study, students were divided into two groups. First sixty participants were individually learned (only by software). Before and after delivering multimedia, students received pre-test, post-test and opinion poll questionnaire. Second groups' learning was real and they were exposed to multimedia in the form of educational workplace, under the combined method. The combined instruction is defined as instruction using multimedia in the form of instructional workplaces under the blended method, instruction using multimedia in the presence of the teacher as a guide, group discussion and group activity. This group also, before and after test, received pre-test and post-test questions and poll opinion forms. Six weeks after learning, when they referred to receive license, they were tested again, without making already aware of this test to investigate persistence of information in both methods (individual and combined). The information collection instrument for multimedia assessment is two checklists which one was formulated based on Mayer's principles and another on multimedia production standards. Checklist consistency coefficient was measured through re-test method and Mayer's principles checklist reliability coefficient was measured in the first test and re-test. The correlative coefficient between those two was $r=93$. Multimedia production standards checklist reliability coefficient was measured in the first test and re-test. The correlative coefficient between those two was $r=95$. To determine validity and reliability of checklists, professors' idea was utilized. To compare multimedia application in non-admittance and combined (face-to-face and non-admittance), admission and final assessment tests were used and to determine learners' satisfaction level, opinion poll form was applied. Admission and final assessment tests were a combination of teacher-made questions and standardized questions designed by Kermanshah Ministry of Health and Treatment and Medical Sciences. Following gathering data, to analyze them, descriptive statistics and frequency parameters, percentage, standard mean along with designing tables and diagrams were used. In addition, to quantify checklist's data, Leakert's criterion was used based on definition as follows:

At all 0, barely 1, a little 2, somewhat 3, much 4, too much 5; 5 accounts for observing all principles in accordance with checklist, 4 for observing 60-80%, 3 for observing 50%, 2 for observing 30-40%, 1 for 20%. In the end, multimedia was categorized in terms of obtained score mean, study objectives and questions, as follows:

03.05 was appropriate, 01.05 to 03.05 relatively appropriate, 0 to 2 inappropriate. In addition, paired and independent t-test was used and statistical software SPSS-15 and Excel was applied to formulate and categorize gathered data.

Findings:

Some findings were acquired based on presented questions in this study, as follows: Girl participants in this study are 15-18 years old. The participants' educational level was ranged from high school freshmen to third year. Their major include human sciences, experimental sciences, mathematics, techniques and careers.

First question of study: does multimedia AIDS learning accord with Mayer's principles?

Table 1: The results of multimedia standardization.

Indices \ Criteria	Too much	Much	Moderately	A Little	Very little	None
1- principle of multimedia	-	-	3	-	-	-
2- principle of special congruity	-	4	-	-	-	-
3- principle of temporal congruity	-	4	-	-	-	-
4- principle of coherence	-	4	-	-	-	-
5- principle of modality	-		3	-	-	-
6- principle of redundancy	-	4	-	-	-	-
7- principle of individual differences	-	4	-	-	-	-
Total						2.6
Mean						3.7

According to table 1: applied principles in multimedia AIDS learning for teenagers obtained 03.07 scores and it was considered appropriate, i.e. Mayer's principles have been appropriately observed in production of this multimedia.

Second question of study: does multimedia AIDS learning accord with multimedia production standards?

Table 2: the results of multimedia standardization in accordance with multimedia production standards.

Indices \ Criteria	Too much	Much	Moderately	A Little	Very little	None
Interaction	-	4	-	-	-	-
assessment of learning	-	4	-	-	-	-
feedback presentation	-	4	-	-	-	-
guidance presentation	-	4	-	-	-	-
entertainment	-	-	3	-	-	-
picture/text adaptability	-	4	-	-	-	-
voice/text adaptability	-	4	-	-	-	-
Voice/picture adaptability	-	4	-	-	-	-
application of digital video images	-	-	3	-	-	-
adaptation of text	-	4	-	-	-	-
adaptation of animation	-	-	-	2	-	-
adaptation of graphic	-	-	-	2	-	-
adaptation of voice	-	4	-	-	-	-
adaptation of voice and music to the content	-	4	-	-	-	-
replying to learners' probable	-	4	-	-	-	-
an environment for note-taking	-	-	-	-	-	-
Search possibility	-	-	-	-	-	-
Total						54
Score Mean						54/17= 3.1

According to table 2, applied principles in multimedia AIDS learning for teenagers obtained 03.01 scores and it was considered relatively appropriate, i.e. Mayer's principles have been relatively observed in production of this multimedia.

Third question of study: is there any significant difference between individual multimedia AIDS learning and blended one?

Table 3: The comparison of students' scores in individual and blended methods.

Indices \ Test Criteria	Average scores in individual learning	Standard deviation in individual learning	Average scores in combined learning	Standard deviation in combined learning	t-test	P.Value
Pre-test	12.2	2.2	11.5	2.6	.456	.799
Post-test	16	2.2	18.5	1.25	3.27	.002
6 weeks after learning	13.5	1.7	16	2.1	2.905	.004

According to table 3:

- There was not a significant difference between standard deviation and mean of pre-test scores in both individual ($s=02.02$, $x=12.02$) and blended ($s=02.06$, $x=11.05$) learning methods (along with removing effect of t-test) and $p=0.799$. Students' scores related to pre-test of two mentioned methods were not significantly different.
- There was a significant difference between standard deviation and mean of post-test scores in both individual ($s=16$, $s=02.02$) and blended ($s=01.25$, $x=18.05$) learning methods (along with removing effect of t-test) and $p=0.005$ and it shows that effect of multimedia application in individual and blended learning methods is different.
- There was a significant difference between standard deviation and mean of scores after six weeks in both individual ($s=01.07$, $x=13.05$) and blended ($s=02.01$, $x=16$) learning methods (along with removing effect of t-test) and $p=0.004$ and it shows that retention of information in individual method is more than blended method.
- There was a significant relationship between average score, level of study, pre-test, post-test scores and $p=0.005$.

Discussion and Conclusion:

Considering findings of this study and similar ones, observing standards and principles in producing multimedia plays a vital role. Multimedia applied in our study is appropriate based on Mayer's principles and is relatively appropriate in terms of multimedia production standards. A comparative evaluation of results obtained in this study and Avaz Zadeh's study results in the area of English language learning multimedia production standards indicates that there is a consistency between them, so that some criteria was not fulfilled in the multimedia domain such as web searching, users' note taking, representing appropriate animation, etc. in addition, results of this study was consistent with Hamidi's study on applying teaching designing model in preparing multimedia content. In addition, results are consistent with Soleiman Mahjub's study results and his colleagues in Babol University in which it is suggested that software capabilities could be used to teach students more effectively. But in the Mahjub's study, students selected software solely as a learning instrument, while in

our study they confirmed accompaniment of teacher in the class and it could be said that multimedia is more effective in learning of older students. According to results of third question on objective of study, it could be said that there is a significant difference between application of multimedia in individual and blended methods and application of multimedia in this girls' age group is better and more effective in blended method. Retention of information on them after six weeks is more significant in blended method. In addition, learners' satisfaction with individual learning and with blended learning was 70 and 985, respectively. These results were consistent with study carried out by Ramamoretta and et.al which evaluated effect of interaction on multimedia application outcome. Interaction has a more positive and appropriate effect on learners' participation in the learning environment and eventually on learning outcomes. Furthermore, results of this study were consistent with Hamidi's study results on application of blended method for young and teenagers' learning. Therefore, for an optimized and correct application of instructional multimedia, standards and principles (some is suggested in this study) should be observed and author strongly recommends that each institute, firm or company active in the area of instructional multimedia production utilize them. Applying multimedia and computer-assisted programs have significantly contributed to development of individual's healthy life style. In the area of young and teenagers' learning, it is better to administer blended methods along with multimedia applications because this age group enjoys expressing and sharing their feelings and ideas.

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