

The survey of design, implementation process and evaluation of educational animation

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Abstract: Animation is one of the most interesting visual phenomena educating scientific realities as descriptive and in the form of imaginary stories to the learner. Providing the scenario and selecting effective characters in an educational animation can facilitate the education of complex and abstract concepts. Today, there is some software to provide 2-D, 3-D and probe-based animations facilitating the complex operation of providing animation. Animation affects sight and hearing senses for better and rapid learning of the concepts. The researchers by being inspired of learning theories can present suitable theoretical basics to increase the abilities of animations in learning and teaching process. To provide and produce effective animation in education, we should consider design, execution and evaluation of educational animations. Thus, the main purpose of this study is to determine a good structure to provide an effective educational animation. This study was done by quality method and Delphi method was used for data collection. In this method, the comments of specialists were collected for three stages and after the conclusion was presented in a checklist with 23 items in general stage of design, 59 items in special stage of design, 6 items in production and execution stage and four items in evaluation of the animation. The review of literature of the previous studies on key points was determined in this study to consider in design, execution and educational animation evaluation process. In this study, the concept of educational animation and its characteristics, learning-teaching theories and the studies are determined and the conclusion and discussion are presented in this regard.

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1. Introduction

In traditional systems, “education” was considered only the basis of the growth of talents and only the teachers were used who considered the book as the main information source. Today, by replacing the word “Learning”, learning is with the methods, tools and new communication environments. The recent progresses in computer industry and ICT, the emergence of multi-media facilities and communicative technologies presented new methods for the designers, planners, managers and executors (Afzalnia, 2005). These changes had considerable influence on learning-teaching process by changing the role of learners, the change of the role of teachers, more participation of students with their peers, the increase of using extracurricular resources, the improvement of design skills and presenting the items. What makes computer-based educational programs different from other programs and media are their abilities in creating animated displays and symbols facilitating learning and it increased the use of printing, graphic, type and access to information resources and this increased the fame of this media in learning. Today, producing computer –based interactive educational programs by receiving response from the learner and providing comparative and descriptive feedback of it, improved the

attractiveness of these programs. In this environment, the perception and receiving the scientific complex concepts as deeper and easier by the combination of voice, image, animation, and graphic are provide (Roblyer, Edwards, 1997). Animation as a dynamic multi-medium by involving more than one sense, had great influence on learning. The studies showed that multi-media spaces provide the information in the form of animation, voice, photo, picture, graphic and text for the user, by increasing the productivity, create quality and fundamental change in learning process. Explosive growth of compact disk systems and multi-media software in all educational level showed this claim. It seems that in our country, compared to other social life aspects, the education is less affected by new technology changes. Although during the recent years, the education is not ignored by these changes and these changes are not consistent with the up-to-date changes and its high capacity. It should be considered that using technology in education can have some disadvantages. There are some studies to reduce these disadvantages and effective use of this technology in various countries. Based on the results of this studies and attempts, some standards are formulated helping the effective use of abilities in education. In this paper, animation is investigated as a technology-based education

method and a media. Then, design, execution and evaluation of animation stages are discussed for effective use of its abilities and capabilities.

Educational animation and its characteristics

One of the most important applications of animation is using it in education. When learning and teaching are raised, animation can have effective help in this process. When data are transferred orally or are written on the board, only the speech transfers the contents in one dimension and as its images and charts are used, in two-dimensions, the required data are observed. By using design and information in three dimensions and even four dimensions, we can observe a complex and abstract scientific-empirical process. Animated images not only are attractive for the children but also help considerably the adults in receiving the items. Animation can display scientific realities of basic sciences as physics, chemistry and math as real or present these realities in the form of imagination and storytelling. This method is more attractive for children and adolescents. The definite example of these works is magic bus soap opera in which the children get smaller with their teacher and enter with a bus into the human being body and observed its various parts. Thus, animations can display the items that can not be observed. Thus, education with animation is a new science and needs considerable studies and investigation. The negative and positive effects are used in the studies (Alamdari, 2010).

According to the views of Schnutz Volv (2003) the concept of educational animation is defined by three various levels as technical, semiotic and psychological.

Technical level is any technical tool being used to produce or transfer animated symbols. With the change in computer graphic industry, various tools were given to the designers by which we can use for the production and display of various and interactional educational messages.

Semiotic level is any animated symbol being transferred in the animation and psychological level is the conceptual and cognitive processes of the learner being used during the observation or understanding animation (Rahimidust, 2011).

Animation, namely computer animation is used for its easy application for educational aims including educational applications of animation as:

- The display of phenomena, rules and principles
- Attraction
- Using symbols to directing the consideration of the learner to important educational items

Learning practice via practice

Attractive animations can make the abstract concepts as educating the electromagnetic waves more meaningful in the mind of the learners (Unal, 2010). Via the animations, we can help the learners to describe the real world conditions. According to Shaker (2002) these technological tools help the students to measure some of the quantities and design some models in their mind. This causes that they reduce their negative views to complex concepts learning. Their excitement is increased for learning. In addition, by animation we can improve the understanding of the students and focus-based skills. The animations target most of the senses of the students including sight, hearing, and reading. Thus, the achieved knowledge is more permanent by this way (Azadmir, 2006).

According to Najar (1996), the animations give 3-D thinking skill to the students. Thus, they understand the concept rapidly and focus more on key data. Educational animations by giving the items can be classified as interactive or non-interactive. In the first type, the learner via the mechanisms being designed can communicate with animation, can change the size, value, display speed and reviewing the difficult parts. In non-interactive animations, the images are shown by similar speed and definite time and the learner can not change it. The main characteristic of this kind of animation is the instability of images. In this kind of animation, the learner is passive. In terms of animation functions, the interactive one is related mostly with practice function and non-interaction one is related with displaying the phenomena (Rahimidust, 2011).

Learning theories and review of literature

Theoretical and strategic basics based on the studies provide good conditions for rapid and easy learning. The research evidences show that working memory has important role in doing complex cognitive consignments. Working memory is a mental system storing and processing the data temporarily for a series of complex cognitive assignments as understanding, reasoning and learning (Kriz, S., & Hegarty, M., 2007). The people with more efficient working memory had high academic achievement compared to the people with low efficient working memory (DeKoning, B., 2011). Based on working memory models, visual information is encoded and processed in active visual memory and speech data are encoded in speech working memory. Most of technology-based educations don't have adequate efficiency. These educations instead of facilitating learning for the learner, namely for his working memory as learning

bottle neck, create cognitive load and make the learning slowly (Seviler, 1988). Cognitive load is the sum of mental activities being imposed on active memory (Cooper, 1990). Some of the theorists believe that learning difficulty of an issue is aroused of its internal and external cognitive load. Internal cognitive load is related with the nature of materials and learning content. When the learning content is simple, its internal cognitive load is low. In this case, adequate mental resources exist for learning in a person. Even if considerable external cognitive load is imposed via learning on him. When the learning content is complex, its internal cognitive load is high, because learning complex items requires more mental energy. If external cognitive load is high, the sum of cognitive load of mental learning and capacity are more than limited capacity of working memory. Thus, learning leads into the failure. A study titled "The effect of directed focus of the learner and cognitive load in animation perception" was done by Amadeo et al in Tolus University of France in 2010 and the results are as following: This study was about the effect of Cueing on cognitive load and the perception of the animations that the displayer of the dynamic process were in neurobiology. Cueing in this study was including zooming important information in each stage of the process by a purple square. 36 BA psychology students were exposed three times to animation display. In three sessions, the animation was repeated for them. Half of the participants received animation without cueing while the others observed the same animation with cueing. Cognitive load evaluation and perception performance were done. In the above analysis, two major results were achieved. First, the external cognitive load after three times contact with animation was reduced by cueing. Second, the maintenance of separate elements of animation was improved in both groups while the reasons of the relations between the elements were understood only in cueing condition. In addition, in problem solving, it was defined that cueing helped the development of wide mental model. Cueing method helped the learner to select both important elements and ignore side elements of animation. At the beginning of each stage of long time potentiation, a purple square was appeared on the related region to attract the attention of the learner to that region. Then, zooming was done. The current study based on cognitive load theory investigates that consideration-based guidance by some symbols as cueing in animation helped an individual to focus their consideration on important issues. This consideration deviated a person attention from focusing on marginal issues increasing the

cognitive load. Finally, a better understanding is created in a person (Amadio, 2010). Another study titled "The effect of prevalent control in education animation" was carried out by celer, kresten and Seviler in 2010. In this study, it was reported that comparative studies about animation and non-animated imagination arts brought contradictory results. It seems that in some conditions, animation instead of improving learning is a barrier. Animation requires processing attempts compared to non-animated imaginative arts. Because it is possible to create high cognitive load, cognitive load theory emphasizes on the importance of controlling working memory requires simplifying learning process and providing a theoretical framework for studying the processing method and learning of education animation. The current study aimed to investigate the design of animation to optimize the educational efficiency. Of three animation versions with concurrent tradition and a tradition version was used only for day and night consecutive education for elementary students. 72 boy students of the elementary school of a boy college in Sydney Australia, to which the education subject was not given, were classified randomly in one of three experimental groups. Three animations were displayed: The first animation was continual, the second one had separate sections, and the third had play-stop buttons on continual version. First animation didn't have any relation with user and animation and students without any pause observe the total animation. Second animation: It was divided into eleven sections and after each part, the animation was stopped automatically. The continuance of the display dependent upon the decision of the students. Third animation: In this version, play-stop button existed and allowing the students to see animation with good speed. They can stop animation at any time. In the first version, the students only listened the report interpretation and didn't deal with the animation. This version is necessary by which we can determine the report is understood separately or there is extra data in animation? The scores of efficiency, cognitive load were calculated by mental difficulty scoring, performance evaluation. In second and third animation, the learning performance was high and cognitive load was low in comparison with the first version and validity was observed. Above all, play-stop group despite the students had pressed the button rarely, had better performance than the first group. This result showed that only play-stop button besides the instruction about using it increased the related cognitive load. Finally, the learning performance of the students was high in this version. Better

performance of second and third versions compared with the first version showed that user control on his learning is an effective issue in learning and comprehension. In a study titled "The effect of using animations in scientific success of the new sciences teachers by Unal et al. in 2010 in Inono University of Turkey. The results were achieved as: In the current study, the effect of animation technique on learning the features of electromagnetic waves for new sciences teachers was investigated. This study was done by the aid of experiment and control group. The success evaluation test before and after testing each group had considerable difference between control and experiment group. The results of this study showed that the animations applied in this education environment were one of the strongest tools because they reduced the negative views of the learners to learning the complex issues (Demir, 2006). False misinterpretation of electromagnetic waves and its features provided some problems in teaching by new teachers and difficulty in learning these waves due to their abstract nature. Some animations were provided in accordance with educational goals. The success of the teachers in presenting the content by animation in control group showed that learners want to achieve knowledge in short term and they want to face with attractive things in learning process. For example, attractive animations can make abstract concepts meaningful in the mind of the learner. In a study titled "The role of animation on 3-D concepts education" carried out by Leila Roshangar et al. In Tabriz medical sciences University in 2009. The results showed that using animation in 3-D concepts learning was effective and had considerable influence in learning imaginative theory text books. In this study, 100 students of medical sciences who passed fetus textbook were selected. The average learning and comprehension of the students in the chapters using animation had significant difference compared to the items not using them. In another theory titled double channel theory, it is shown that human being for data processing by audio-visual materials had separate channels (Clark, 2001). Thus, this theory can be used for important points in providing educational animation. Cognitive multi-media theory is another process theory describing active cognitive processes in learning via multi-media materials. According to this theory, learners at first select the visual and speech data from the stimulus. Then organize them as visual and speech revisions and finally integrate these mental reviews with each other and the previous knowledge (Mayer, 2005). Meta-cognitive skills are necessary skills for learning. Meta cognitive strategies are the strategies being applied to supervise

cognitive strategies and their control. Meta cognitive strategies are classified into three groups: Planning strategies

a. Supervision and evaluation strategies

b. Organizing strategies

These three strategies are used to produce interactive animations.

2. Study method

This study was applied and the study method was quality one in which Delphi method was used for data collection. In this method, to use the required standards in producing an educational animation, the comments of experts were used. In the first stage, the key points and standards of the previous study were defined and were sent for validity for ten education technology experts. After the summary of the comments in the second stage, the comments were collected for the same people and in the third stage, after the summary and correcting the problems, the corrective comments were sent again for the experts and after the final approval were compared with the previous studies and a standardized checklist was designed, its reliability was proved by test-retest method in some examples of educational animations with convenient sampling by educational technology experts. In the appendix of this paper, the required checklist was presented.

3. Findings

In this part, all the points by the experts about the design process and educational animation evaluation were classified for effective use.

a. Animation design stage: The design stage is divided into general and specific stages. The general stage is related to the educational media and methods and specific stage is related to the design of each media and education method that is used and designed by its specific features (Jame Bozorg, 2007).

(a-1) General stage in animation design: In this stage, the underlying design is provided. The goals, effective solutions, subject, addressee, current condition and what should be investigated (Jame Bozorg, 2007).

- The investigation of the current situation: To investigate the existing situation, the followings are considered:

- The significance of education subject
- The severity of learning-teaching problem of the learners
- The necessity of using animation related to education subject
- Defining previous educational activities
- Defining the media being used in this regard
- The deficits and barriers

- It should be determined using animation is good for removing the problems of learning-teaching or not?

- Determining the audiences: The features of audiences should be considered in terms of culture (language, religion, education and life method), demographic features including age, gender, school, etc and behavioral and psychology features (comments attitude, habits and behavior). The learning, abilities and visual perception, audio-visual, abstract nature should be considered. The selected education media should be consistent with the abilities, interests and needs of the learners. For example, animation content should be presented with the understanding language of the audiences. In selecting the words, images, music, tone, speed, items, the interests of audiences should be considered (Aqazadeh, 2006).

- Determining the goals based on the need of the learners: Each communication process including education communication processes are formed following special goals. In educational situations, the aims are achieved and the final result of the work is learning and teaching. These aims are determining factors in total communication and in selecting the media and good education method. The suitable media is consistent with the education aims, content and education activities. For example, if the educational aim is to achieve a definite practical skill. Some media as real objects are the best media.

- Defining the best educational items: Objects, headlines and education content in accordance with the behavioral goals in learning-teaching process.

- The selection of the type of media and education method: For correct selection of the media and education method, we should consider the following: (Amir Teimuri, 2006).

- a. Learners features
- b. Educational goals
- c. Education content
- d. Inclination of the learners to the media and specific education method
- e. Availability
- f. Place condition
- g. Social, economical and cultural issues
- h. Type of activity and the participation of learner in learning teaching process

a-2) The specific stage in animation design: In this stage based on the specific features of animation designed it and the following points are designed:

- 1- Animation type
 - The animation we want to design is 2-D, 3-D or web-based?
- 2- Animation content
 - Accuracy

- Is animation content presented a scientific reality in the form of imagination and storytelling?

- Is the story and animation is consistent with the content and subject.

- Is an animation content present a scientific reality as continual.

- Is the content of animation discontinued and in the form of separated sequences and automatically.

- Is animation content and its display speed is controlled by stop-play by learner.

- Is an animation content present a scientific reality as valid.

- Is animation content is designed consistent with special education model.

- Is composition of giving the content is consistent with the introduced model?

*Note: Formulating animation educational content is suitable by Meril, Ragloth and Ganieh method.

-How animation content is valid scientifically.

-How much accuracy is observed in writing scenario term?

-Is the selected character consistent with its educational content?

- How much is the animation content gives up-date information for the audience.

- Is the consistency of animation content observed with educational goals?

- is web-based animation content consistent for loading in the web

-Is animation content consistent with its type (2-D,3-D).

- The lack of consistency

- Are speech, animated image, text, vector, chart and voice are used consistent with education content.

- Is there any consistency between animated images and voice

- Is there any consistency between voice and text for presenting content

*Note: The studies show that the animations with speech have high effectiveness compared to the animations presenting the same speech as written on the image. If the animation is presented with speech, as learner senses (sight and hearing) are involved both, animation message is divided between two senses and the learning output is increased (Seviler, 2005).

- is animation time consistent with the difficulty and easy learning of education subject?

*Note: complex and difficult education issues need longer time for display to the learner.

- is cueing in animation consistent with the educational content and subject.

- Clarity:

- How is animation content understandable.

- When referring to the new specialized terms, how much good examples and explanations are presented for easy understanding?
- Relevancy
- How much animation content is applied for the audience and is relevant with the need of the audience.
- How much animation content is consistent with behavioral and psychological properties of the audience?
- How much the animation content is consistent with the demographic and cultural attributes of the audience?
 - Appealing
- How much is the animation content attractive
- In animation content, how much favorite image and graphic special features are used.
- How much animation content is presented as real?
 - Credibility
- To present the animation content, how much acceptable resources and characters are used.
- Creativity
- How much this animation is different with the similar samples?
- How much creativity and innovation is used in animation content
- 3- Animation structure
 - Animation ID
- Are the date, production place and the institution of animation defined?
- Is the profile of animation authors and order givers with their specialization are given to the audience?
- Are required data to be connected with the ordering organization are given to the audience.
- Is the required guidance to use animation is given to the audience
- Is the minimum software and hardware are introduced to display animation to the audience.
- Animation multi-media elements
- How much are readable the fonts being used in animation text
- How much is beautiful the fonts being used in animation text
- Are the size of fonts good for the audience
- How is the quality of voices and music
- How much is attractive the music being applied in animation
- How is the quality of animated images (3-D or 2-D)
- How is the graphic quality?
- Animation resources
- Is animation introduces the resources being used in providing the content

- Based on the subject of animation, how much up-to-date resources are used
 - The design of animation pages
- The order of displaying education animation pages are consistent with the special education model
- Is the combination of giving the pages consistent with the introduced model
- How much the pages design use consistent color combination
 - Animation capabilities
- Can interact with the audience
- Can be developed
- Can help the audience
- How you evaluate its publication
- How you evaluate guiding the audience in animation
- How you evaluate its installation
- b. Execution and production of animation: After the animation design, we can execute it. For suitable use of the animation, the following points are considered:
 - 1- Animation test and test performance before using in learning-teaching process: before using animation in wide level, it is required that some audiences see the animation and their comments should be applied in correcting the weaknesses and strengths of animation.
 - 2- Providing instruction to give to the audience: After removing the problems of animation it is better to prove an instruction for the use of audiences of animation.
 - 3- Animation package: The animation is packed in a good package and can be given to the audience.
 - 4- The method of audience access to animation: Marketing and defining the audience access to animation is done in this stage.
 - 5- Determining the price and sale place of animation: The price is determined consistent with the animation abilities. The selling place is accessible for the audiences.
- c. Animation evaluation stage: Finally the animation should be evaluated by main audiences. The evaluation is a method to test the success of a definite activity by the aim of improving the activity. In the designed animation, some conditions should be fulfilled that the audiences evaluate the animation and give their corrective comments for the animation providers.
 - In the designed animation, a program is considered for its evaluation?
 - In evaluation program, how much the effect on audiences is considered
 - In evaluation program, how much the effect of its problems is defined?

The checklist of design, execution, evaluation process of educational animation	
General stage of animation design	
	Score of each question
a. The investigation of the existing condition (need assessment)	
1- Are the documents of existing condition (need assessment) available? No <input type="checkbox"/> Yes <input type="checkbox"/>	
2-How much the problem of learning and teaching is investigated?	12345
3-How much is the importance of problem is investigated?	12345
4-Are the audiences being investigated?	12345
B:Formulating educational aims	
1- Are the documents of educational aims available? No <input type="checkbox"/> Yes <input type="checkbox"/> if yes, score the following questions.	
6-How much are the goals available?	12345
7-How much the goals are separated into partial goals including the determination of the type of change, required time to create it and target population?	12345
8-To what extent the goals are measured?	12345
9-Are the goals being classified based on learning-teaching problems?	12345
c. Identification of audiences	
1- Are the documents of defining the audiences available? No <input type="checkbox"/> Yes <input type="checkbox"/>	
11-How much are the demographic attributes of audiences as age, gender, job, literacy are investigated.	12345
12-How much are the cultural attributes of the audiences as language, religion and ethnicity are investigated.	12345
13-How much are the behavioral- psychological attributes of audiences as behavior and habits, attitude and knowledge are investigated.	12345
14-How much are the educational needs of the audiences are investigated?	12345
15-The visual, hearing, abstract understanding are investigated consistent with the age of the audience?	12345
d. The selection of media and education method	
16- Are the documents of selecting new media available? No <input type="checkbox"/> Yes <input type="checkbox"/>	
17-In case of good previous media, the production of the new media is necessary to what extent?	12345
18-How much the type of media is consistent with the demographic attributes of the audiences including age, gender, language, and education?	12345
19-How much the type of media is consistent with the goals of educational message?	12345
20-How much the type of media is consistent with existing budget and resources?	12345
21-How much the type of media is consistent with the participation and type of activity of the audience?	12345
22-How much the type of media is consistent with the interest of the audience?	12345
23-How much is the type of media consistent with educational content?	12345
II. The design of special stage of animation:	
1- Type of animation	
2-D <input type="checkbox"/> 3-D <input type="checkbox"/> Web-based <input type="checkbox"/>	12345
Animation content	
a (Accuracy)	
2-Is the animation content presented a scientific reality in the form of imagination and storytelling.	12345
3-Is the story and imagination is consistent with content and subject.	12345
4-Is the animation content presents a scientific reality as continual.	12345
5-Is discontinued animation content in the form of separated sequences are presented as automatically.	12345
6-Is animation content and its display speed controlled by stop-play by the learner.	12345
7-Is the animation content presenting a scientific reality as valid	12345
8-Is animation content consistent with special education model.	12345
9-Is composition of presenting content is consistent with the introduced model.	12345
10-How much is the animation content valid in terms of scientific.	12345
11-How much accuracy is observed in writing scenario terms	12345
12-Is the selected character in animation is consistent with its education content.	12345
13-The animation content how much presents the new information	12345
14-Is the consistency of animation content is observed with education goals	12345
15- Is the content of web-based animation consistent for loading in the web?	12345
a. The lack of consistency	
16-Are speech, animated image, text, vector, chart and voice are used consistent with the education content.	12345
17-Is there any consistency between animated voice and images for presenting content	12345
18-Is there any consistency between animated images and text to give content.	12345

19-Is there any consistency between form and text to give the content.	12345
20- Is animation display time consistent with difficulty and learning easiness of education subject?	12345
21-Is cueing in animation consistent with the education content.	12345
c Clarity	
22- How much is the content of animation simple and understandable?	12345
23-During referring to the new terms, to what extent the suitable examples are presented easily?	12345
d (Relevancy)	
24-How much animation content is applicable for the audience	12345
25-How much the animation content is consistent with the behavioral and psychological attributes of the audiences?	12345
26-Animation content is consistent to what extent with the behavioral and psychological attributes?	12345
e (Appealing)	
27-To what extent the animation content is attractive?	12345
28-How much visual and graphic special features are used in animation content?	12345
29-To what extent animation content is displayed really.	12345
f.(Creativity)	
30-How different is animation in terms of content with the similar samples?	12345
31- How much innovation and creativity is used in animation content?	12345
g (credibility)	
32-The organization or animation organization to what extent are trusted by the audiences?	12345
33-How many resources and valid characters are used for the audiences	12345
b. Animation structure	
a- ID	
34-Are the date, production place and animation institution is defined?	12345
35-Are the profile of animation authors are presented with their specialization?	12345
36-Are the required data given to the audience to communicate with the ordering organization?	12345
37- Is the required hardware for animation (CPU, required memory, voice card type, image card type) is given to the audience?	12345
38-Is the minimum software for animation (including the type of navigating system and side graphical programs) is given to the audience?	12345
b. The applied media in animation	
39-How much are read the applied fonts in animation text?	12345
40-How beautiful are the fonts used in animation text?	12345
41-Are the animation text fonts good for the audience?	12345
42-How is the quality of music applied in animation?	12345
43-How consistent is the music applied in animation?	12345
44-How is the quality of the images used in animation?	12345
45-How is the quality of the graphic used in animation?	12345
46-How is the quality of the applied tables and charts in animation?	12345
C Animation resources	
47-Is the animation presenting the sources being used in content providing?	12345
48- Based on the animation subject, how much the update resources are used?	12345
c. Animation pages design	
49-The order of animation pages is designed in accordance with special model.	12345
50-How much the design of animation is with consistent color with the content?	12345
51-How suitable is the composition of animation?	12345
c.Animation capabilities	
52- How you evaluate the interactivity of animation with the audience?	12345
53-How you evaluate the search ability of the animation?	12345
54-Is animation be upgraded?	12345
55-How you evaluate the helping ability of animation?	12345
56-How you evaluate print ability of animation?	12345
57-How you evaluate navigation ability of animation?	12345
58-How you evaluate install and uninstall ability of the animation?	12345
59-How is using ability of animation for disabled people?	12345
III Animation performance	
1-Pretest was used before animation performance	12345
1-Is instruction of giving information to audience is provided for animation?	12345
2-How is the quality of animation packing?	12345

3-To what extent the animation is available for the audience?	12345
4-How consistent is the animation price with its abilities?	12345
5-The price of animation to what extent is consistent with audience shopping ability	12345
IV Evaluation/ animation evaluation	
1- Is there any plan for evaluation/animation evaluation is considered? No <input type="checkbox"/> Yes <input type="checkbox"/>	
2-The animation evaluation to what extent evaluated achieving the education goals?	12345
3-The evaluation of animation to what extent evaluated the effect on audiences (knowledge, attitude and behavior change)	12345
4-The evaluation of animation to what extent evaluated its deficits?	12345

Based on design stages, the animation performance and evaluation of checklist are designed by the researcher by which an animation is evaluated. Finally, a checklist was presented in the form of artificial intelligence fuzzy logic to be a model to use this method in the evaluation of the educational media and methods.

4. Discussion and conclusion

In the past, educational design and planning were widely based on concepts-transfer method. In this method, the educational objectives were vague and based on case judgments and personal comments. Now the development of knowledge and scientific findings had many questions including "how human beings learn? What is the best method of providing and producing the educational media and materials? What are the potential and flexible factors for more development and benefit of learning-teaching methods?

These questions improved the interest of teachers and educational authorities about the detection of new methods and attitudes. Using animation in learning-teaching process is very famous. But the studies showed that the animation capabilities are not used completely in education and some of them are not successful in transferring message. The results of the studies showed that applying learning theories increased the consideration to visual data processing and using animated images design in providing educational animation and increased the efficiency of animation in learning-teaching process. Also, observing the principles and standards in design, execution and evaluation of animation make the aim of producing good educational animation as easy. This study was done by qualitative method and the comments of the experts were asked regarding design process, execution and evaluation of education animation and besides comparing the results with the previous studies results, a framework was designed and it is proposed that the educational planners, experts and educational managers use this framework as general principles in providing educational animation and besides producing an effective animation, we can avoid the loss of resources and energy.

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