

**A Proposed model and standards for the production of 3d
animation movies in education and its impact on achievement,
learning efficiency and skill performance**

By

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1) Abstract:

The research is limited to the practical aspect of animation course for students of the Second year in Educational technology and computer teacher department, in faculty of Specific education, Port Said – Egypt, from study year 2013-2014.

The author distinguishes between two types in this study. Participants in Group 1 which used proposed model in animation creation, and Participants in Group 2 which used traditional model in animation creation.

And the Research Aims:

- Design model for the development of Animation in education.
- Examine the impact of proposed model for production animation films in achievement, learning efficiency and skill performance.

To investigate the study objectives, the author prepared some tools:

- Proposed model for animation
- Achievement test
- Using SPSS to calculate the learning efficiency from Achievement test degrees
- Skill performance checklist

The results revealed that:

- There are differences with statistical significance at level (0.05) in the experimental students score average at the achievement tests, learning efficiency and skill performance of the targeted skills, due to main effects of production models (Proposed Model - Traditional Model), in favor of the proposed model.

According to the results, the author recommends:

- Using proposed model for the production of 3D animated movies
- Using proposed standard for the production of 3D animated movies
- Mixing and using real life environment with 3D object to Approach the student to real world.
- Use better of 3D object and character to make Social learning environment, as illustrated by the theory of Social learning theory.
- Use all elements of multimedia such as; text, sound in all its forms, animation, and narration in 3D animation movies, as illustrated by the Cognitive Theory of Multimedia Learning.

2) Introduction:

Animation is a set of sequential images presented at a certain speed on the display devices to deceive the human eye that picture elements are included on the movement, relying on visual trickery. Animation is the technique for the production of animated film, filming a series of drawings or things one after the other, so that represents each frame in the Filmstrip one drawing of all drawings. Occurs a slight change in the position of the view or thing which was filmed from the frame to another. When is run in the film strip projectors things seem to be moving.

Many studies found that the majority of children / learners tend to point to accept all the information provided to him by the animation of these children and remember the information better, where the advantage of animation on the simplification and abstraction of information and transfer of interesting, as we explained previously, and animated all fees elements enable us to instill a lot of values in the minds of children, and the delivery of the required ideas seamlessly. Animated feature films have a big role in education and is one of the most important educational tools used in

multimedia software, and virtual reality. And the production of animated films, which is a series of drawings or pictures consecutive, so that every frame is drawing and one of the drawings, and any slight change in the scene or image that has been photographed makes the viewer feel that any motion pictures and drawings look like its moving.

Following, the author presents some results of studies, Confirms that effectiveness of animation in achievement, performance skills and various aspects of learning.

The study results of Maged Ibrahim (2014) discussed the effectiveness of employing animation in the lessons of physical education, and the results revealed the following:

- The proposed educational program using tuition impact on the learning skills of athletics for children under
- The use of educational fees contributed to the education of pupils of the experimental group for athletics skills for children (enemy barriers - threw the javelin for children - long jump, pole vault).
- Use the tutorial using the proposed tuition was better than the traditional method (used) to learn the skills of athletics for children under discussion which shows the effectiveness and impact
- The experimental group surpassed the control group in rates of progress for the telemetric measurement tribal skills in athletics under discussion. (Ibrahim, 2014)

The author can show another study of animation for children with mental disabilities. In study of Reda Gerges (2014) the results revealed the following:

- The effectiveness of animated films in the three-dimensional development of some computer skills in children with mental disabilities.
- The effect of film animation with human characters in the development of computer skills more than the animated movie with animal figures.
- The effectiveness of animated films in the survival of the impact of the collection of cognitive learning and performance skills of some computer skills I have children (Gerges, 2014, p. 1).

In other study of Mohamed Salem (2014) the results revealed the following:

- There is a difference between the average of student's marks in the first experimental group of Self-vision perspective, and the second experimental group of extensive-vision perspective, in applying the post-test and post-observation card of skill performance for the first experimental (Salem, M., 2014, p. 7).

In study of Mustafa Abdel-Majid (2013) human faces are reconstructed using structured lighting. Also, a novel projector calibration method is presented. It is based on passive stereo and triangulation.

After face reconstruction, Optitrack facial capturing system is used to record facial expression of a real actor. The captured data is used to animate the reconstructed faces (Abdel-Majid, 2013).

In study of Heba Abd El-Hak (2013) the results revealed the following:

- There are significant differences at the level of 0.01 between the mean scores of the three experimental groups in dimensional

application of the achievement test & national affiliation for the benefit of the mean scores of the first experimental group (animation according to a 3D environment), followed by the second experimental group (animation according to a 2D environment), followed by the third experimental group (animation according to the real environment) (Abd El-Hak, 2013, P. 7).

As for the animation design models, the author can show all previous Experiences in this field.

Attempt each of Heba Abd El-Hak, through the MS. Degree thesis, in the preparation of the following steps as a model. (Abd El-Hak, 2013, p.p. 79-93).

- Analysis
- Design
- Development
- Evaluation
- Publishing

In Figure (4) in figures Appendix, the author can show the basic steps in Heba Abd El-Hak model to produce animated films. But in In Figures (5, 6, 7, 8, and 9) in figures appendix, the author can show all details for any steps in this model to produce animated films.

Attempt each of Reda Gerges, through the Ph.D. thesis, in the preparation of the following steps as a model. (Gerges, 2014, p.p. 132-139).

- Analysis
- Educational design
- Technical Design
- Production

- Evaluation
- Use

In figure (10) in figures appendix, the author can show the basic steps and details in Reda Gerges model to produce animated films. While Mohammed Salem was used Reda Gerges model, although this model was dedicated to people with special needs.

In spite of the author's involvement in the preparation of these prototypes, which was the purpose of study and research. The author believes that the work is incomplete and needs to be more control. One of these models (Abd El-Hak, 2013) a lot of duplicates and overlap, and the other (Gerges, 2014) is dedicated to people with special needs also need to complete a lot of steps the applicant. This is what makes the author criticizes those models, modify, and extract the new model, which has been working in guided him a long time ago.

Many theories found the useful of animation in learning, such as Social learning theory and Cognitive Theory of Multimedia Learning.

Social learning theory integrated behavioral and cognitive theories of learning in order to provide a comprehensive model that could account for the wide range of learning experiences that occur in the real world. Key tenets of social learning theory are as follows (Grusec, 1992):

- Vicarious reinforcement: Learning can occur by observing a behavior and by observing the consequences of the behavior.
- Observational learning or modeling: Learning involves observation, extraction of information from those observations, and making decisions about the performance of the behavior, 3D Animation movies is good example for Observational learning or modeling.

In Cognitive Theory of Multimedia Learning, the cognitive science principles of effective multimedia educational technology use in e-learning. Cognitive research and theory suggest that selection of appropriate concurrent multimedia modalities may enhance learning.

All of these previous studies are consistent with the principles of the theories of teaching and learning, such as Social learning theory, Cognitive Theory of Multimedia Learning and behavioral theories.

Richard Mayer in cognitive theory of multimedia learning confirms that; the students learn better from animation. Multimedia learning theory focuses on the principles that determine the effective use of multimedia in learning, with emphasis on using both the visual and auditory channels for information processing.

Also Albert Bandura in Social learning theory confirms that; observation in in a social context like animated movies in this study.

Frederic Skinner in behavioral theories introduced learning is the acquisition of a new behavior through conditioning and social learning. Methodological behaviorism is based on the theory of treating public events, or observable behavior.

All of these previous learning theories are conceptual frameworks describing how learning happen in this study.

Definition of term

Animation

Animation is a set of sequential images presented at a certain speed on the display devices to deceive the human eye that picture elements are included on the movement, relying on visual trickery.

Educational Development Models

Model for Animation development in education, show all steps for complete the animation movies.

Aims of the study

- Design model for the development of Animation in education.
- Production Animation according to the proposed model.
- Examine the impact of proposed model for production of animation films.
- Examine the impact of different style of animation on development of instructional achievement, Learning efficiency and skill performance.

Problem of the study

First - formerly a researcher working experience:

Through the experiences of the author precedent of supervision of the research papers on the animation, teaching animation course for several years -from 2010 until now-, and author previous studies in MS.D. (2005) And Ph.D. (2009), which dealt with animation (Salem, 2005; Salem, 2009).

Secondly - studies and previous research:

Previous research such as; Abd El-Hak (2013), M. Salem (2014), Gerges (2014). And the need to Design a new model for the development of Animation in education to resolve the existing problems from author point of view.

Thirdly - Exploratory study done by the author in 2012-2013:

The author review many of the experimental movies to numbering 200 film in Port-said University and Suez Canal University (2012) that evaluation show in photo (13), (14), (15), (16) in photo Appendices, All of these films use the primary model.

The author concluded that the prototype need more scrutiny, and the animation course need to update.

All these reasons have made the author completes the steps in the current research

Questions of the study

- What is the form of the proposed model for the production of animation?
- What effect the use of the proposed model for animation production in achievement?
- What effect the use of the proposed model for animation production in learning efficiency?
- What effect the use of the proposed model for animation production in skill performance?

Hypotheses of the study

- There are no differences with statistical significance at level (0.05) in the experimental students score average at the *achievement tests* of the targeted skills, due to main effects of production models (Proposed Model - Traditional Model).
- There are no differences with statistical significance at level (0.05) in the experimental students score average at the *learning efficiency* of the targeted skills, due to main effects of production models (Proposed Model - Traditional Model).
- There are no differences with statistical significance at level (0.05) in the experimental students score average at the *skill performance* of the targeted skills, due to main effects of production models (Proposed Model - Traditional Model).

3) Methodology Procedures

3/1) Design and production of the experimental

Analysis

Feasibility study and the answer for its questions, considered Main inputs in author's model. Should the feasibility study author to answer the following questions:

- What is the essence of the problem, which called for this project?
- What is the general aim “goal” of project?
- Does the project meet the needs of large numbers of beneficiaries?
- Are alternatives are available for use rather than production?
- Is there an expert in the production of animated films in the geographical surroundings?
- Do you own licenses for the software used in production?
- Are places available for the meeting of the team work?
- Is the cost of production is good?
- Is enough money available for production?

In the analysis phase is written the basic components which are prerequisites for the production of animation. An animation is a narrative that is told through in all Scenes. As you brainstorm ideas for animation, Author prepared documents produced animated films, each product of the study products include the following documents:

Participants Documents

The primary purpose of this *Documents* to identify students' interest areas is to stimulate thought and discussion. Students not only come to

know themselves better, but also get a chance to share their discoveries with both teachers and peers. Examples of these documents:

- interests and inclinations document
- mental abilities and cognitive background document
- needs document

Educational Content Documents:

- The general idea
- List of goals
- List of objectives
- Educational content

Software and Production:

- List of production programs: VUE, I Clone, Poser, 3DS Max in this study.
- List of work Team: The director chooses, his assistant technical team. And have chosen them based on some points:
 - That are selected according to their expertise
 - That there should be harmony between them and the director, and preferably may be have participated with him in previous work.

The work consists of the production team:

- Director
- Script writer
- Audio performance - actors
- Audio specialist
- Modeling
- Materials

- Light
- Camera
- Movement
- The Render
- Special effects
- Montage

Alternative available

- Available Product: a choice limited to one of two or more possibilities, of animation movies and the selection of which is useful in this topic.

Design:

Production Documents:

Script:

Script can be like original idea or amendments from this idea. Script describe the movement for all objects, expression on faces, actions in story, and dialogues between all characters by writing.

Story Board

A storyboard is a graphic Style from script, which used images to display all objects in all Snapshots of scene, also we can show the expression on faces and actions, in graphical way. In next figure (1), author show proposed template for animation storyboard, it used from 2011.

Created By: Dr. Abdurrahman Ahmed Salem, FUEI SUEC, Egypt, 2014.

Number of scene: Shot Time (in seconds):	Animation Title: Number of shot: <input type="checkbox"/> Day - <input type="checkbox"/> Night / <input type="checkbox"/> Int - <input type="checkbox"/> Ext	Page number: Shot Type:
Visual	Sound details	Shot Size:
		Shot Angle:
		Camera Movement:
		Sound:
		Sound effect <input type="checkbox"/>
		Dialog <input type="checkbox"/>
		Music <input type="checkbox"/>
Beginning of scene	Ending of scene	Song <input type="checkbox"/>
		Narrator <input type="checkbox"/>
		Other <input type="checkbox"/>
Description of scene	Description of Action	Notes

Fig (1) animation Storyboard, 2014

Production

Modeling

Modeling can be performed by means of a dedicated program (e.g., Cinema 4D, VUE, I Clone, Poser, 3DS Max), the researcher used 3DS Max in this study. 3D modeling is used in various industries like films, animation and gaming, interior designing, architecture and comics. In modeling step, the model describes the process of creating the shape of an object in 3D program tool. The two most common sources of 3D models are those that specialists creates it on the computer with some of 3D modeling tool with modifiers, and models scanned into a computer from real-world objects. Models can also be produced procedurally or via physical simulation. Basically, a 3D model is formed from points called vertices that define the shape and form polygons. (Salem, 2014, p. 111)

Material & Texture:

Materials including Full Color to Plastic, Metal, and more. Texture mapping is a method for adding detail, surface texture, or color to objects (Salem, 2014, p. 121).

Light & Shadow:

Lights are created by 3D Max options to simulate real and realistic lighting, Shadows are created by visible from the light source in rendering step to simulate the realistic shadow (Salem, 2014, p.p 126-146).

There are some standards must be considered on the light and shadows creation:

- Direct Light
- Reflected Light
- Resulting Ambient Light
- Intensity
- Angle of Incidence
- Attenuation
- Light Color
- Color Temperature

Camera Position:

Create Camera from View creates a Target camera whose field of view matches an active Perspective viewport. At the same time, it changes the viewport to a Camera viewport for the new camera object, and makes the new camera the current selection. (Autodesk, 2014)

Cameras offer the scene of a particular vision determined by specialist, and willing to output the scene through. Cameras used to simulate the images or video cameras in the real world. Through watershed vision of cameras that can modulate the camera as if you look through the lens. Generally, cameras do not appear when the scene output, but it shows the scene from different angles, camera show after putting it in a viewport and can hide it from the scene Vision. (Salem, A., 2014, p.p 149-161)

There are some standards must be considered on the Camera Position creation:

- Focal length
- Field of view (FOV)

Objects Motion:

Characters and other objects need to change its locations and sizes. The animation refers to the movement changes in locations, sizes and animate parameters of any objects over time.

There are types of movements used in the animation design (Salem, A., 2014, p.p 162-164):

- Normal motion
- Slow motion
- Fast motion
- Walking
- Run fast cycles
- Entry and exit from the scene
- Re motion

Render:

Rendering converts a model into an image or video either by simulating light transport to get photo-realistic images, or by applying some kind of style as in non-photorealistic rendering. Rendering in 3D max software, is the 3D computer graphics process of automatically converting 3D wire frame models into 2D images with 3D photorealistic effects or non-photorealistic rendering on a computer, for use it in movies.

Sound Record:

Sounds plays an important role in the animated film, it interacts with the film elements to deliver a specific message. The importance of sound begins to grasp motion. In the process of compatibility and synchronization between the picture and the sound becomes the recipient of more sense to confirm his emotions and feelings and realizing the drama of the event displayed on the screen. When strengthen motion with sound, which gives effect than a movement without sound. Voice classifies to several levels: music, sound effects, and the human voice, which in turn is classified into: dialogue and narration.

Montage “Film editing”:

Film editing is a technique in film editing in which a series of short shots are edited into a sequence. So that the film editor works with the render output files, selecting shots, combining them into sequences, and add effects, to create a finished motion picture.

Publishing and Distribution:

Publish Documents:

- Product Registration: Taking necessary authorizations for the Showing of the competent authorities
- Storage media: Video files are a huge group of file formats, which contain processing, storing, transmitting, and show. This means movie, film, video and other multimedia files are basically data container formats that are used for audio-with-video playback. Even if there is a large number of video existing, only some formats made breakthrough and are used a standard for computers, multimedia equipment, cinemas, home theaters, portable players or other devices (File-Extensions.org, 2014). The most used video file formats today

are: AVI, MPG (MPEG), MPEG-2, MP4 (MPEG-4), MOV, 3GP, and other.

- Final Product: a final film, made at the end of a production process and ready to use.

Continuous Review and feedback

Lists of Production standards:

We can show Table (1) Continuous Review and feedback card, this 24 point Considered model's Lists of Production standards. And it write by Expert opinion.

The Proposed Model Description

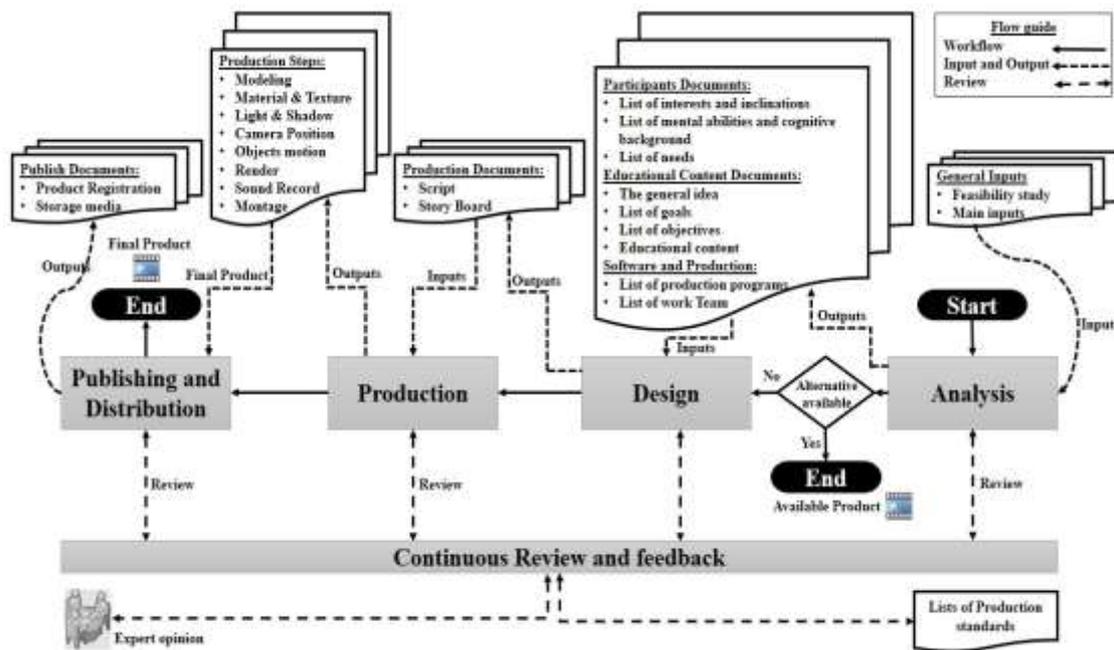


Fig (2) author's proposed model for develop animation in education

3/2) Building research tools and measurement and validation.

- *Proposed model and all its attachments documents*

We can show figures of *proposed model* in our study, in previous figure (2), and the standards in tables (4) in appendices.

- *Achievement test*

An e-test on the Web, aims to measure the cognitive part of the targeted skills in the research. In general, the achievement test contains 4 questions with a total score of 50 points.

We can show figures of *Achievement test* in our study, in figure (11) in appendices.

- *Skill performance checklist*

A skill performance checklist test is a Card on paper, aims to measure the skill performance part of the targeted skills in the study for the sample by observation. In general, a skill performance checklist contains 24 skills with a total score of 50 points by average, this skills is:

- Analysis

1. Feasibility study
2. List of interests and inclinations
3. List of mental abilities and cognitive background
4. List of needs
5. The general idea
6. List of goals
7. List of objectives
8. Educational content
9. production programs
10. work Team
11. Alternative available

- Design

12. Script
13. Story Board

- Production
 - 14. Modeling
 - 15. Material & Texture
 - 16. Light & Shadow
 - 17. Camera Position
 - 18. Objects Animation
 - 19. Render:
 - 20. Sound Record:
 - 21. Montage “Film editing”
- Publishing and Distribution
 - 22. Product Registration
 - 23. Storage media
 - 24. Final Product

We can show figures of *Skill performance checklist* in our study, in tables (4) in appendices, it is the same document to review and feedback in this study.

This *Skill performance checklist* ensure consistency and completeness in carrying out a task for learners. It was designed according to a Likert scale, the format of a typical five-level Likert item, for example, could be:

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree

Study Limits

The research is confined to the following limits:

Scientific subject and Sample limit (Place and Human): The research is limited to the practical aspect of animation course for 40 students of the Second year in Educational technology and computer teacher department, in faculty of Specific education, Port Said – Egypt, from study year 2013-2014.

Experimental Design

Table (1) the experimental design

	Model Style	
	Proposed Model	Traditional Model
Achievement	G1	G2
Learning Efficiency		
Skill Performance		

We can show the relation between Independent variables and Dependent variables in this study in previous table.

- Usage model (Independent variables)
 - Proposed model for animation
 - Traditional model for animation (Abd El-Hak, 2013)
- Participants Skills (Dependent variables)
 - Achievement
 - Learning efficiency
 - Skill Performance

3/3) procedure the research experiment

The experiment was performed according to the following steps :

- Production of primary production model (Salem, 2008; Salem, 2009).

- Applying primary production model.
- Move towards modifying and adapting the production model to second edition (Abd El-Hak, 2013; Salem, 2014; Gerges, 2014)
- Apply a second version of the production model (Abd El-Hak, 2013; Salem, 2014; Gerges, 2014)
- The revision of the previous models and movies; Computer Maintenance (2008) show in photo (7) in photo and screen shots appendices, Hunter Monsters (2009) show in photo (3) in Appendices, Winner Cat (2009) show in photo (4) in Appendices, Galaxies (2010) show in photo (2) in Appendices, The Wise Minister (2010) show in photo (6) in Appendices, Zahra with the tree (2010) show in photo (5) in Appendices, The Volcano (2011) show in photo (8) in Appendices, many of the experimental movies to numbering 200 film in Port-said University and Suez Canal University (2012) that evaluation show in photo (13), (14), (15), (16) in figures Appendices, the series of math (2013) show in figure (1) in Appendices, the series of National Education (Abd El-Hak, H., 2013) show in photo (11) and (12) in Appendices, cinematography (Salem, M., 2014) show in photo (17) and (18) in Appendices, an educational film for people with Special Needs (Gerges, R., 2014) show in photo (9) and (10) in Appendices. All of these films under the supervision of the author and published and documented on the author Facebook page <https://www.facebook.com/Salem.Studio>, and Facebook group <https://www.facebook.com/groups/Salem.Studio/>.
- The development of the proposed production model, show in figure (9) in figures Appendices.

- Experts used the standard list to evaluate the films, which used production model in this study.
- Choose a sample of the study population
- Making sure that the final scheduled is ready for Applying.
- Apply the pre-test monitoring their grades.
- Apply experience on the experimental groups simultaneously.
 - Display and explain the proposed curriculum of the "animation" (Salem, A., 2014)
 - Display and explain the proposed model in this study
- Apply post-testing and monitor their grades.

4) Results

The author calculate the degree from standard list. In table (1) in tables Appendix, we can find the evaluation standard list, which used in production model in this study, to evaluate the suggested animation films.

Author use the tables (4), (5) in tables Appendix, to show results, that the evaluation degrees of skill performance in production of animation and show this table as the skill performance Observation Card. And figure (11) in figures Appendix show the achievement tests.

The author input the student's degrees of experimental groups in SPSS program to calculate the statistical result. In next table (2), we can find the statistical results to T – TEST - group statistics.

Table (2) Statistical results to T – TEST - Group Statistics

	Animation_Model	N	Mean	Std. Deviation	Std. Error Mean
Achievement	Proposed model	20	47.2550	1.21963	.27272
	Traditional model	20	42.2085	6.62033	1.48035

	Animation_Model	N	Mean	Std. Deviation	Std. Error Mean
Efficiency	Proposed model	20	.00101155	.000035080	.000007844
	Traditional model	20	.00091765	.000125464	.000028055
Skills	Proposed model	20	48.2745	2.18275	.48808
	Traditional model	20	38.1395	8.34376	1.86572

And we can find independent samples test in next table (6).

Table (3) Statistical results to T – TEST - Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
								95% Confidence Interval of the Difference		
		Equal variances assumed	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower
Achievement	assumed	29.314	.000	3.353	38	.002	5.04650	1.50526	1.99926	8.09374
	not assumed			3.353	20.288	.003	5.04650	1.50526	1.90944	8.18356
Efficiency	assumed	22.352	.000	3.223	38	.003	.000093900	.000029131	.000034928	.000152872
	not assumed			3.223	21.953	.004	.000093900	.000029131	.000033479	.000154321
Skills	assumed	27.997	.000	5.255	38	.000	10.13500	1.92851	6.23094	14.03906
	not assumed			5.255	21.588	.000	10.13500	1.92851	6.13110	14.13890

On the statistical results tables shows us that the Mean scores of participants who learned using proposed model were greater than the Mean scores of participants who learned using the traditional model. It shows in

the same tables that significance (.002) for achievement, (.003) for learning efficiency and collectible (.000) for the skill performance, which is less than the specified values (0.05), which means that the proposed model has achieved positive results, as shown in the interpretation of the results in the following pages.

Extrapolating the results in statistical analysis tables, table (5) and (6), it is clear that it amounted to a Mean value of the groups, who used proposed model (47.2550), and groups who used Traditional model (42.2085) in achievement tests.

- Accordingly, *first* hypothesis was rejected, and reformulated as follows: “There are differences with statistical significance at level (0.05) in the experimental students Mean score at the *achievement tests* of the targeted skills, due to main effects of production models (proposed model - Traditional model), in favor of the proposed model.”

This accords with Heba Abd El-Hak (2013) study, which show this result; There are significant differences at the level of 0.01 between the mean scores of the three experimental groups in dimensional application of the *achievement test* for the benefit of the mean scores of the first experimental group (animation according to a 3D environment).

Extrapolating the results in statistical analysis tables, table (5) and (6), it is clear that it amounted to a Mean value of the groups, who used proposed model (.00101155), and groups who used Traditional model (.00091765) in learning efficiency.

- Accordingly, *second* hypothesis was rejected, and reformulated as follows: “There are differences with statistical significance at level (0.05) in the experimental students Mean score at the *learning efficiency* of the targeted skills, due to main effects of production models (proposed model - Traditional model), in favor of the proposed model.”

Extrapolating the results in statistical analysis tables, table (5) and (6), it is clear that it amounted to a Mean value of the groups, who used proposed model (48.2745), and groups who used Traditional model (38.1395) in skill performance.

- Accordingly, *third* hypothesis was rejected, and reformulated as follows: “There are differences with statistical significance at level (0.05) in the experimental students Mean score at the *skill performance* of the targeted skills, due to main effects of production models (proposed model - Traditional model), in favor of the proposed model.”

This accords with Maged Ibrahim (2014), and Mohamed Salem (2014) studies, which show this result; there are significant differences at the level between the mean scores of the experimental groups of the skill performance for the benefit of the mean scores of the experimental group of 3D animation.

Also this accords with Social learning theory and Cognitive Theory of Multimedia Principles, that show in research Conclusion.

5) Discussion / Conclusion

The author explains this result, as follows:

In cognitive theory of multimedia learning, Richard E. Mayer's "modality principle" states that if materials contain both verbal and graphical information, the verbal information should be given in auditory format only, and not as written text as well. "Mayer" found that "Students learn better from animation and narration than from animation, narration, and on-screen text". (Mayer, & Moreno, 1999, p.p. 358–368; Mayer, 2001; Ginns, 2005).

Albert Bandura in social learning theory posits that learning is a cognitive process that takes place in a social context and can occur purely through observation as in current research, or direct instruction (Bandura, 1963). The theory expands on traditional behavioral theories, in which behavior is governed solely by reinforcements by observation in 3D animated movies, by placing emphasis on the important roles of various internal processes in the learning individual (Bandura, 1971).

For that the animation in this study using animation, sound effects and narration, accomplishes the best educational results and encourages students to learn.

Featuring animated films produced according to this model, including the following :

- No film production, only in the case of non-availability of alternative and this feature in this model, not found in other models.
- Films produced committed to by standard guidance viewers and identify target audience. The author has used these symbol levels in all its projects for the production of animated films. In next figure

(3), the author can show “PG – Parental Guidance Suggested” in author’s animation films (FilmRatings.com, 2014).

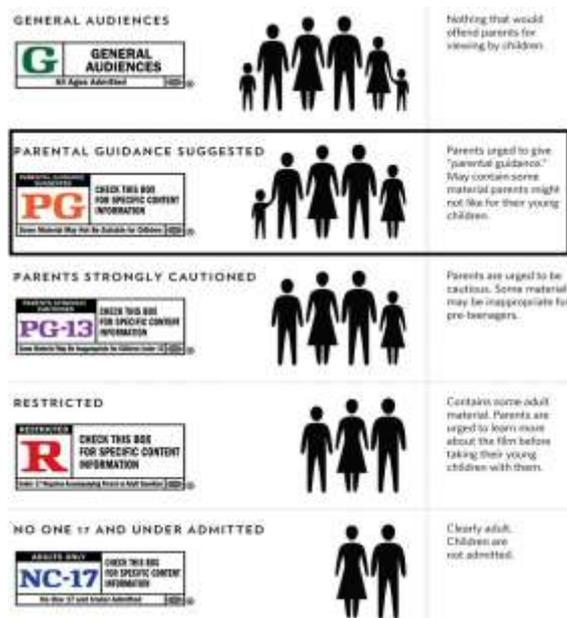


Fig (3) FilmRatings.com, the Film Ratings

- Comes out of proposed model, a large number of documents of production, the four main stages of production, and the output of each stage is the input of the next stage.
- differentiate between the script and story board, and the development of templates for them
- Completion of the evaluation and review at each step, the existence of the evaluation finally is not good in other models, which are difficult to re-produce movies again when there is any error.

According to the results, the author recommends:

- Use proposed model for the production of 3D animated movies, which show in figure (2) in figures Appendix.
- Use proposed standard for the production of 3D animated movies, which show in table (4) in tables’ appendix.

- Mixing and using real life environment with 3D object to Approach the student to real world.
- Use better of 3D object and character to make Social learning environment, as illustrated by the theory of Social learning theory.
- Use all elements of multimedia such as; text, sound in all its forms, animation, and narration in 3D animation movies, as illustrated by the Cognitive Theory of Multimedia Learning.

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