

The effectiveness of multimedia learning program for medical education learners in faculty of medicine- Taif university

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Abstract

Online multimedia are increasingly used in medical education. One of the major problems facing medical students in Taif University is to imagine complex medical concepts. This project aims at developing a multimedia learning program for the students of the medical college-Taif University. The multimedia program provided the access to a variety of medical multimedia materials to aid the students in learning and understanding complex medical mechanisms. So the project covered eight medical subjects (clinical, histology, pathology, physiology, microbiology, biochemistry, anatomy, and pharmacology). A random sample of medical students from (faculty of medicine-Taif University) has been selected. The participants consist of 52 female students. They use the medical site for two medical modules, through the first and the second semester 1433-1434. After they have finished the modules they answered the three research tools (achievement electronic quiz- attitude towards e-learning in e-format, and the satisfaction of medical multimedia web site in e- format). The results showed a great response regarding the female student in the satisfaction questionnaire towards the medical-multimedia online learning. They presented about 90 % according to strongly agree. Moreover they presented a high score to the attitude towards medical multimedia learning questionnaire. Furthermore when they applied the achievement quiz .They gained score between (80%-100%). So according to this result we recommended to apply the medical multimedia to all over the medical subjects in the most of medical college in Saudi Arabia.

Key words:

Online learning, Medical multimedia, Learner satisfaction, Learner attitude, Medical education.

1. Introduction:

Computers are increasingly used in medical education. Electronic learning is moving learning face from textbooks to electronic format (that are increasingly enhanced by the use of multimedia adjuncts) to a truly interactive medium that can be delivered to meet the educational needs of students and postgraduate learners. Computer technology can present reliable, reusable content in a format that is convenient to the learner. It can be used to transcend geographical boundaries and time zones. It is a valuable tool to add to the medical teacher's toolkit, but like all tools it must be used appropriately([Chumley Jones H, 2002](#))

Medicine comprises a vast collection of knowledge, skills and attitudes. The trainee practitioner must achieve a large number of learning objectives within each of these so-called domains of learning to be considered competent to practice. Once registered, continuing professional development (CPD) is required to maintain and further develop competence. The acquisition of learning objectives in both undergraduate and postgraduate medical education can be achieved by a mixture of modalities including apprenticeship, didactic teaching (lecturing), self study and small group learning. It is clear that some of these teaching tools are better than others at helping the learner achieve his or her objectives. The recent rapid development of information technology has allowed electronic learning or “eLearning” to obtain a place in the “teaching toolbox”(Hahne A, 2005)

2. Problem statement:

One of the major problems facing medical students while learning medical sciences is to create mental images and to truly understand how some of the complex pathways work and proceed, in this project we are trying to solve this problem by providing audiovisual aids and animations that will clarify these concepts and pathways for the students.

Learning Circuits defines e-learning in the following way: “E-learning covers a wide set of applications and processes such as web-based learning, computer-based learning, virtual classrooms and digital collaboration. It includes the delivery of content via the Internet.

3. Research objectives:

- 3.1. Our proposed project is aiming at building a multimedia learning program that contains different academic materials and that concentrates on providing audiovisual aids, in the form of videos, animations and images related to the different subjects.
- 3.2. To build a multimedia learning program that will serve the students of the college of medicine and the students of other colleges in Taif University
- 3.3. To improve the clinical skills of students by providing physical examination and clinical procedure videos online.
- 3.4. To provide the students with an open access to practice materials on all subjects through the multimedia learning program.
- 3.5. To enhance self directed learning, this is one of the main characteristics of the Taif university teaching approach.
- 3.6. To allow students to study at their own pace and to have control over their learning process.
- 3.7. To improve the student/staff relationship through their communication within the multimedia learning program.

4. Justification:

- 4.1. Improving the student’s clinical skills by making clinical skills videos available for them to watch at all times.
- 4.2. Assisting students in learning complex pathways and concepts by providing relevant animations and images related to the different subjects.
- 4.3. Making the learning process more enjoyable.
- 4.4. Incorporating new technologies in the teaching and learning processes.

5. Hypothesis:

- 5.1. There is a significant difference in favor of cognitive achievement test (in e-format) to evaluate the acquisition of knowledge at the level of confidence (0.05).
- 5.2. There is a significant difference in favor of attitude towards e-learning medical site (in e-format) to evaluate medical skills performance at the level of confidence (0.05).
- 5.3. There is a significant difference in favor of Learner satisfaction towards medical -multimedia learning website at the level of confidence (0.05).
- 5.4. There is a major need of medical online multimedia learning for medical students in Taif University.

6. Terminology:

6.1. Online medical multimedia for learner style:

Is the implementation of complex software applications such as movies, images, audio and video files, simulations, and so on. To allow the medical students to use the material. The instructional value of intelligent combinations of audio, video, illustrations, animation and text to better cater to learners’ different learning styles. Software designed to manage, track and deliver instruction, enabling an organization to offer courses, register learners, record student data, assemble courses into curricula or certificate programs, track student performance and produce management reports. It is necessary to know the type of student learning involved and the student’s expectations.

6.2. Definitions of Usability:

The capability of the software product to be understood, learned, used and attractive to the user, when used under specified conditions. Usability Includes factors such as efficiency of use, learn ability, memorability and satisfaction.

- It fits the user’s needs and expectations
- It is easy to understand, learn, use and is attractive
- It allows the user to work correctly, quickly and with satisfaction

6.3. Asynchronous vs. Synchronous delivery:

(Non-scheduled; accessed at any time) vs. Synchronous delivery (scheduled, interacting with an instructor, e.g., through teleconference, web conference or internet messaging).

7. Background and literature review:

7.1. Introduction to online learning:

Online learning is also denoted as Web-based learning, distributed learning via the internet, computer-assisted instruction, and Internet-based learning. Previously, there have been two common e-learning models: distance learning and computer-assisted instruction. Distance learning uses information technologies to deliver instruction to learners who are at remote locations from a central site (Ward JP, 2001). The concept also closely related to the e-learning is an online multimedia learning. Multimedia means using two or more media, such as digital text, graphics, animation, audio, or video, to produce engaging content that learners access via computer. Blended learning, a fairly new term in education. It is an approach that combines e-learning technology with traditional instructor-led training, where, for example, a lecture or demonstration is supplemented by an online tutorial (E, 2002). Faculty, administrators, and learners find that multimedia e-learning enhances both teaching and learning. These advantages can be categorized as targeting either learning delivery or learning enhancement. Learning delivery was the most often cited advantage of e-learning and includes increased accessibility to information, ease in updating content, personalized instruction, ease of distribution, standardization of content, and accountability (Wentling T, 2000).

7.2. Components of online Learning:

Creating online learning materials include several components such as developing managing, delivering, and standardizing the content. Content includes all instructional material, which can be arranged in a complex form to arrange instructional modules (Objects, 2004). Learning objects represent discrete, self-contained units of instructional material assembled and reassembled around specific learning objectives, which are used to build larger educational materials such as lessons, modules, or complete courses to meet the requirements of a specified medical curriculum. (Developments in the use of simulators and multimedia computer systems in medical education," 2002)

Content management includes all needed to make e-learning content available to learners(Phelps C, 2003).

7.3. The Acquisition of Knowledge:

Computers are good at storing information. This can be enhanced by hyper linking text so that a learner could jump to another section or call up a glossary. In an age of learner centeredness this is a step toward self direction. The busy clinician can now search a virtual database for the answer to his or her current clinical problem. With the appropriate technology this concept of just-in-time learning has been used to support battlefield surgeons and rural practitioners as well as teaching hospital consultants after the latest research information. This integration of learning with practice is often referred to as convergence (Masiello I, 2005).

7.4. Learning skills in medical education:

Psychomotor (physical) skills are best learned by doing them. Most of these cannot be learned from a computer. However, learning can be used to aid the teaching of physical skills. A video showing the technique or a package explaining the theory and putting it into context, could prime learners before they attend the teaching session (Mason, 2000).

Beyond this lies the development of virtual patients to help teach the skills of diagnostic reasoning and patient management through true interactivity. Some packages allow the student to take a virtual history using a bank of questions and examine the virtual patient. However, presentation of a clinical scenario that then allows the student to consider diagnosis, investigation and management is a better use of the resources (Huwendiek S, 2006). Good multimedia models allow a variety of choices for the medical students submit their portfolio cases via online learning. Online learning provides formative assessment of the progress of students through an eLearning model, and it can be monitored in a number of ways from time logged on to the website to accessing of modules. Summative assessment in the computer world of "right and wrong" can most easily be carried out by multiple choice questions (MCQs). More sophisticated assessments might include the use of a virtual patient either as a "multimedia enhancement" with subsequent MCQs or a genuine diagnostic reasoning problem. A similar model could be applied to the progress of a candidate through multimedia (Cook D, 2005).

7.5. Learning management system:

The information (text, pictures, videos, etc) is stored in a data repository. Data repositories are linked to each other and to users to form a federation. In the context of teaching the content can be managed and accessed by a learning management system. This allows the teacher to create content, the learner to access it, and the administrator to monitor the process. A variety of these are available from freeware to fully supported systems. The teacher can also monitor students' progress and provide reminders if they are not progressing as expected (Zary N, 2006).

Modules are slowly becoming more easily available. Once in the correct format, it is easy to store, access and, importantly now, convert to different platforms (laptop, mobile phone, etc.). Once in place, learners can access the medical multimedia program in a way they choose.

7.6. Online learning via traditional methods:

A number of studies comparing e-learning to more traditional methods have been carried out. Based on these it can be concluded that it is another useful tool in the teaching toolbox. It is not a Some learners find it useful, some less so, just as some learners enjoy the interactivity and some prefer a more passive approach. As with most teaching modalities, deeper rather than superficial learners appear to enjoy the greatest benefit. A number of studies show positive learner perceptions. Comparison with more “traditional” teaching is unhelpful. The future is looking at what e-learning can do and use its strengths. ELearning is good for just in time learning, assuming the learner finds it a medium from which he can learn. It crosses geographical boundaries and time zones and provides access for the learner to a wealth of resources beyond those which he or she can easily access in his or her home or institution. The challenge for teachers is to fill data repositories with useful, accessible medical multimedia and help learners access the full richness of the medium(McHarg J, 2006).

7.7. Implementing e-learning successfully:

E-learning can be a very effective tool for organizations wishing to develop staff or provide training in new products and processes. E-learning can also greatly assist in compliance training, the training required to ensure students have the knowledge and skills they need to comply with relevant laws and regulations (Emilio lastucci, 2002).

E-learning can also be a disaster if it is not managed correctly. To be successful, e-learning has to have the right fit with the organization. It should not be chosen because it is fashionable. It should be chosen because it is the most efficient and effective way to meet the identified learning need. Like most change implementations in organizations, success comes from careful planning and execution. (Blais J, 2006).

The credibility of the e-learning implementation team is critical. The introduction of new methods and technologies can create hesitation at both the students and management levels. This hesitation can be overcome if people have confidence in the people leading the change. Change management involves planning for the change itself as well as planning for the introduction of the new techniques or processes(Blais J, 2006).

If attitudinal change is required, the level of sophistication of the learning design grows dramatically. In some cases, e-learning may not be suitable(Gibbons A, 2000).

Participant background is important. Participant numbers and location also add to the situation. The larger the number, the more cost effective e-learning can be. The greater the geographic spread, the more cost effective e-learning becomes. In some cases, particularly if time pressures are also strong, it may be the only option(Chumley-Jones HS, 2002).

Many organizations find blending e-learning with face-to-face contact an effective method. As technology expands, 'face-to-face' is taking on a new meaning as a number of software products now enable classroom style training with audio, video and text communication by participants in different geographic locations. The training need should dictate the learning design. Only then should the e-learning method be considered as a possible option(Jorge G. Ruiz, 2006). Some organizations will already have an e-learning development tools. Others will have to evaluate the many options available and choose one that fits their organization, both in terms of staff skill levels as well as information technology (IT) requirements. (council9, 2010).

8. Literature review:

Ruiz, Jorge G. MD; Mintzer, Michael J. MD; Leipzig, Rosanne M. MD(Jorge G. Ruiz, 2006), discussed the Impact of E-Learning in Medical Education, By providing an introduction to e-learning and its role in medical education by outlining key terms, the components of e-learning, the evidence for its effectiveness, faculty development needs for implementation, evaluation strategies for e-learning and its technology, and how e-learning might be considered evidence of academic scholarship. E-learning technologies offer learner control over content, learning sequence, pace of learning, time, and often media, allowing them to tailor their experiences to meet their personal learning objectives. In diverse medical education contexts. e-learning appears to be at least as effective as traditional instructor-led methods such as lectures. Students do not see e-learning as replacing traditional instructor-led training but as a complement to it, forming part of a blended-learning strategy. A developing infrastructure to support e-learning within medical education includes repositories, or digital libraries, to manage access to e-learning materials, consensus on technical standards, and methods for peer review of these resources. E-learning presents numerous research opportunities for faculty, along with continuing challenges for documenting scholarship. Innovations in

e-learning technologies point toward a revolution in education, allowing learning to be individualized (adaptive learning), enhancing learners' interactions with others (collaborative learning), and transforming the role of the teacher. The integration of e-learning into medical education can catalyze the shift toward applying adult learning theory, where educators will no longer serve mainly as the distributors of content, but will become more involved as facilitators of learning and assessors of competency.

Hoffman H, Irwin A, Ligon R, Murray M, Tohsaku C. (Hoffman H, 2000) Study the Virtual reality-multimedia synthesis as next-generation learning environments for medical education. The Learning Resources Center of the University of California, San Diego School of Medicine has begun to investigate the potential of virtual reality (VR) as a tool for medical education. We are currently integrating VR with communications, animation, and visualization technologies to form a hybrid learning and training environment. Our program development reflects a curriculum-based strategy with emphasis on instructional objectives and educational outcomes. Demonstrated need, feasibility of a technology-based solution, and appropriateness of resource allocation are primary considerations. As the VR world is built, comparative analyses are being made of control strategies, display options, and interface design.

Matthies HK, von Jan U, Porth AJ, Tatagiba M, Stan AC, Walter GF. (Matthies HK, 2005) Discussed Multimedia-based coursework in the Virtual Learning Center at the Hannover Medical School. The commercial use of the World Wide Web causes an extensive change in information technology. The web browser is becoming the universal front-end for all kinds of client-server applications. The possibilities of telemetric offer a base for multimedia applications, for instance tele-learning. Learning is not limited by geography and does not cause pressure of time by the user. The development of such multimedia information and communication systems demands cooperative working teams of authors, who are able to master several areas of medical knowledge as well as the presentation of these using different multimedia facilities. A very important part of graphic design in the context of multimedia applications is the creation and interactive use of images (still, moving). The growth and the complexity of medical knowledge as well as the need for continuous, fast, and economically feasible maintenance impose requirements on the media used for medical education and training. Web-based courseware in the Virtual Learning Center at the Hannover Medical School is an innovative educational resource for medical students and professionals. Developments in the use of simulators and multimedia computer systems in medical education 1999 Medical practice changes that limit teacher time and patient availability and advances in technology are stimulating the greater use of simulators and multimedia computers in medical education. The University of Miami Center for Research in Medical Education, in collaboration with 12 other university medical schools, has developed simulation teaching and assessment systems for multi professional training. 'Harvey', the Cardiology Patient Simulator, teaches bedside skills that are transferable to live patients. The UMedic Multimedia Computer cardiology curriculum has been fully integrated into all years of medical school and postgraduate training and also assesses bedside skills. Programs are being developed in oncology, neurology and emergency medicine. Our Emergency Medical Skills programs utilize simulation technology and standardized patients to train multi-professional populations, including paramedics/ firefighters.

Roy D. Pea , Louis M. Gomez Interactive Learning Environments (23. Roy D. Pea 2007) Distributed Multimedia Learning Environments: Why and How? November 2007 We outline the societal prospects and business opportunities for much more extensive use of interactive multimedia technologies (IMT) connected through telecommunications to create distributed multimedia learning environments (DMLE). A theoretical framework is provided with a distinctive communications perspective on learning emerging from research in the cognitive and social sciences. A major consequence of this communication emphasis is the special need for rich communication technologies to support highly interactive teaching and learning activities, especially those at a distance but even within a classroom or school. Examples of existing projects using IMT for remote learning communications are among the most dramatic examples of these new possibilities. We then characterize how current educational spending trends and educational technology research and development attitudes could be transformed so that such distributed multimedia learning environments could become a reality more rapid. Short-term progress in closing the gap from current practices to this vision is possible in specific application areas described.

9. Research methodology:

9.1. Sample chosen

A random sample of medical students from (faculty of medicine Taif University) has been selected. The participants consist of 52 female students. They use the medical site for two medical modules, through the first and the second semester 1433-1434. After they have finished the modules they answer the three research tools (achievement electronic quiz- attitude towards e-learning in e-form, and the satisfaction of medical multimedia web site in e- form).

9.2. Research tools:

- Achievement tool for medical education students in Taif University.
- Learner satisfaction questionnaire for online medical multimedia web site.
- Attitude towards medical multimedia site in electronic form.

9.3. Development of medical multimedia program:

The program construction consists of seven main medical subjects which are clinical skills, anatomy, physiology, pathology, pharmacology, and histology.

Each main subject contains sub subject and each subject has seven constantly multimedia objects which are image, graphic, video, 3d animations, slides, references and quiz.

9.4. The application:

After developing the medical multimedia program the researcher asked the participant to access the program through their user name and password and use all the materials are included as the pace after they have finished the answer to the three research tools (attitude towards e-learning, user satisfaction , online achievement test) then the answers have been collected and manipulated with the suitable statistical methods.

10. Findings:

10.1. User satisfaction of medical multimedia web site:

Table .1 Overall usage

Overall usage (percentage %)											
		Strongly disagree	Disagree	Moderate	Agree	Strongly agree	Score	Mean	Confidence interval 95%	Standard deviation	Standard error
1	I prefer to use the medical sit continuously (positive)	0.00	2.78	27.78	44.44	25.00	3.917	3.917	3.65-4.18	0.806	0.134
2	This site complicated (negative)	17.65	52.94	14.71	14.71	0.00	2.265	2.265	1.952-2.578	0.931	0.160
3	This site needs technology skills (negative)	28.57	34.29	20.00	17.14	0.00	2.257	2.257	1.904-2.611	1.067	0.180
4	The site content is integrated (positive)	0.00	5.56	11.11	58.33	25.00	4.028	4.028	3.775-4.281	0.774	0.129
5	There is no relation between the site content (negative)	25.00	55.56	11.11	8.33	0.00	2.028	2.028	1.752-2.304	0.845	0.141
6	I think all the students like to work with this site (positive)	0.00	0.00	27.78	52.78	19.44	3.917	3.917	3.691-4.143	0.692	0.115
7	This site needs a high cost to use	33.33	44.44	13.89	5.56	2.78	2.000	2.00	1.678-2.322	0.986	0.164

	(negative)										
8	I am not convinced into using the internet in education (negative)	52.78	38.89	5.56	0.00	2.78	1.611	1.611	1.337-1.885	0.838	0.140
9	I want to know more about this site (positive)	0.00	2.78	16.67	33.33	47.22	4.250	4.25	3.975-4.525	0.841	0.140

Results of user satisfaction of medical multimedia web site overall usage . (Table 1) showed that the majority of the users (agree+strongly agree) 69% prefers to use the medical site continuously. While only about 2.78% refuse using this web site. According to the second question that asked about the complication of the site , Only 14.71% of users find this site complicated while more that 70% did not find it complicated. On the same line majority of users (70%) believe that the site does not need technology skills, while about (17.14) found it complicated. Also about (83.33) found Its contents are integrated and there is a relation between its contents. Also about (72.22%) think that all students like to work with the site, without needing the high cost and (80.55) want to know more about this site. Moreover (91.67) gave a high score to I m convinced by learning medical through this multimedia program.

Table .2 overall impression about the medical site

Overall impression about the medical site (percentage %)											
		So wonderful	Wonderful	Moderate	Acceptable	Need to modify	Score	Mean	Confidence interval 95%	Standard deviation	Standard error
1	General impression	30.56	41.67	27.78	0.00	0.00		1.972	1.719-2.225	0.774	0.129

Regarding the overall impression about the medical site (table 2), Results showed that (72%) of the users have a wonderful impression about the site while no one at all believe that the site need modification.

Table .3 Overall impression about the medical site web pages

Overall impression about the medical site web pages (percentage %)										
		Difficult	Moderate	Easy	Score	Mean	Confidence interval 95%	Standard deviation	Standard error	
1	The clearness of reading letters	0.00	22.22	77.78	2.778	2.778	2.640-2.916	0.422	0.070	
2	The information arrangements in the site pages	0.00	42.86	57.14	2.571	2.571	2.405-2.0738	0.502	0.085	
3	The easiness of navigation	0.00	20.00	80.00	2.800	2.800	2.666-2.934	0.406	0.069	
4	Vision satisfaction (contrast)	0.00	11.43	88.57	2.886	2.886	2.779-2.993	0.323	0.055	

The overall impression about the medical site web pages (Table 3) showed that (78%) of users found the reader letters are easy with no one at all found it difficult. Approximately (57%) found the information arrangements in the site pages easy meanwhile (43%) found It moderate. Meanwhile (80%) of the students believe that the navigation is easy and also the vision satisfaction were easy among 89% of users.

Table .4 Terminology and information on the medical site

Terminology and information on the medical site (percentage %)									
		Easy	Moderate	Difficult	Score	Mean	Confidence interval 95%	Standard deviation	Standard error
1	Using terminology through the site	69.44	30.56	0.00	1.306	1.306	1.153-1.458	0.467	0.078
2	The strangeness of the terminology	65.71	31.43	2.86	1.371	1.371	1.190-1.553	0.547	0.092
3	The placement of medical multimedia through the site	68.57	28.57	2.86	1.343	1.343	1.164-1.522	0.539	0.091
4	The speed to reach the information	50.00	47.06	2.94	1.529	1.529	1.340-1.719	0.563	0.97
		63.43	34.4	2.16					

Regarding terminology and information on the medical site (table 4) showed that the majority of users (69%) reported that using terminology through the site was easy. Also the same percentage of users (69%) mentioned that the placement of medical multimedia through the site was easy while (50%) of users find the speed to reach the information on the site was easy.

Table .5 The easiness of using the site

The easiness of using the site (percentage %)											
		Excellent	Good	Moderate	Poor	Not decided	Score	Mean	Confidence interval 95%	Standard deviation	Standard error
1	Learn how to use the site	55.56	27.78	11.11	0.00	5.56	1.722	1.722	1.376-2.068	1.059	0.176
2	Discovering the ambiguous information on the site	34.29	34.29	22.86	0.00	8.57	2.143	2.143	1.756-2.529	1.167	0.197
3	The level of medical multimedia and references	42.86	25.79	22.86	2.86	5.71	2.029	2.029	1.648-2.410	1.150	0.194
4	The speed of downloading	40.00	22.86	25.71	2.86	8.57	2.171	2.171	1.758-2.585	1.248	0.211
5	The level of depending on the medical site	35.29	23.53	29.41	2.94	8.82	2.265	2.265	1.848-2.681	1.238	0.212
6	The level of information compatible with all student levels	51.43	25.71	11.43	5.71	5.71	1.886	1.886	1.494-2.277	1.183	0.200
	Mean	43.23	22.36	26.98	2.39	12.81					

The results of the easiness of using the site (table 5) showed that (56%) of users answered that learn how to use the site were excellent while 28% answered good for the same question. While (69%) of users discovered the ambiguous information on the site to be excellent or at least good. Regarding the level of medical multimedia and references. Around (68%) of users found it at least good. While only (3%) found it poor. The speed of downloading was reported to be good at least among (63%) of the users with only (3%) report it as poor. Moreover around (77%) of users found

the level of information on the site was at least good while only 6% found it poor. Most medical students (60%) can depend on this medical multimedia program.

Table .6 The level of your satisfaction

The level of your satisfaction (percentage %)											
		Strongly unsatisfied	Unsatisfied	Undecided	Satisfied	Strongly satisfied	Score	Mean	Confidence interval 95%	Standard deviation	Standard error
1	In general am satisfied	0.00	0.00	11.11	58.33	30.56	4.194	4.194	3.991-4.398	0.624	0.104
2	The site is simple	0.00	2.78	11.11	52.78	33.33	4.167	4.167	3.926-4.407	0.737	0.123
3	The site helps me in my studying	0.00	2.86	14.29	51.43	31.43	4.114	4.114	3.863-4.365	0.758	0.128
4	The site helps me in my courses	0.00	5.56	30.56	36.11	27.78	3.861	3.861	3.567-4.155	0.899	0.150
5	The site suitable for all grades	0.00	2.78	22.22	41.67	33.33	4.056	4.056	3.786-4.325	0.826	0.138
6	There are some messages I can not understand	0.00	2.78	38.89	50.00	8.33	3.639	3.639	3.416-3.862	0.683	0.114
7	All information in the site is clear	0.00	0.00	11.11	58.33	30.56	4.194	4.194	3.991-4.398	0.624	0.104
8	The navigation is logical	2.78	5.56	22.22	50.00	19.44	3.778	3.778	3.474-4.081	0.929	0.155
9	The home page is attractive	2.78	2.78	25.00	58.33	11.11	3.722	3.722	3.456-3.988	0.815	0.136
10	This site achieves my expectation	0.00	0.00	19.44	55.56	25.00	4.056	4.056	3.835-4.276	0.674	0.112
		.55	5.02	20.595	51.254	25.087	3.978				

The level of satisfaction was also investigated in this study. The results in (table 6) showed that in general 89% of users were satisfied with the site. While (11%) did not decide yet while no one was unsatisfied at all. Also, nearly (80%) of users mentioned that the site is simple. Help them in studying, all information on the site was clear and the site achieves their expectations. Meanwhile, more than (60%) of users believe that site helped them in courses and suitable for all grades. Navigation was logical (69%) and it gave (69%) to the home page attraction . Moreover (81%) through the site achieve their expectations.

10.2. User attitude towards medical online learning:

Table .7 the results of attitude towards e-learning

		Disagree	Undecided	Agree	No answer
1	I hope to provide courses in pictures through online sites	6.25	18.75	66.67	8.33
2	Websites needs special skills available to the majority of college students	16.67	18.75	56.25	8.33
3	e-learning improve learning effectiveness	2.08	14.58	75	8.33
4	I think that college students need for the application of e-learning and provide them with websites o	5	16.67	75	8.33
5	I think the use of websites reliance will increase the effectiveness and efficiency of the university.	4.17	14.58	72.92	8.33
6	I see that the use of sites will increase in the teaching of medical scientific disciplines in college	18.75	41.67	31.25	8.33
7	Always trying to acquire new books and magazines associated with e-learning and E-courses.	2.08	18.75	70.83	8.33
8	The best e-learning opportunities to raise the level of the students academically.	8.33	14.58	68.75	8.33
9	Can offer e-courses university opportunities for the development of innovative thinking among college students.	25	45.83	20.83	8.33
10	I think that the traditional lecture is appropriate for university education more than the use of websites.(negative)	41.67	41.57	8.33	8.33
11	My credit a lot to learn by using websites certainly will reduce the level of science	2.08	16.67	70.83	10.42
12	I make sure to communicate via the Internet with a lot of my colleagues and some of my students and to participate in materials and medical information.	2.08	14.58	75	8.33
13	E-learning is one of the features of the modern technological age that cannot be dispensed with and should be circulated to all university courses (negative).	56.25	22.92	12.5	8.33
14	Rarely be sure to use the Internet to develop a level of education	4.17	22.92	64.58	8.33
15	I feel happy when dealing with online learning medical decisions.	2.08	14.58	75	8.32

The results of attitude towards medical online learning (table 7) showed more than (70%) of users agree that e-learning improve learning effectiveness, college students in dire need foe the applications of e learning and provide them with websites online. The use of websites reliance will increase the effectiveness and efficiency of university education, and they feel happy when dealing with online learning medical decisions. More than (60%) of users hope to provide courses in pictures through online auction sites. They also agree that the best e-learning opportunities to raise the level of the students academically and they rarely are sure to use the internet to develop a level of education. Only (31%) see that the use of sites will increase the teaching of medical scientific disciplines in college. While (21%) of users agree that e courses can offer university opportunities for the development of innovative thinking among college students. Lastly, only (12.5%) of users agrees that learning is one of the features of the modern technological age that cannot be dispensed with and should ne circulated to all university courses.

10.3. The achievement through medical multimedia program:

Table .8 results of achievement through online medical multimedia web site

Score	No of students (52)	Percentage
50-60	5	9.5%
61-70	6	11.5%
71-80	1	2%
81-90	11	21.5%
91-100	29	55.5%
	52	100%

Table .8 shows the score for the achievement test which the participant answered it after they learned from the medical multimedia online learning. Most of the participants get scores more than 90% about 55.5% of the participants. Moreover around 21.5% of the participants have got score between 81 to 90. While the remains of participant about 22% have got score less than 70 to 50 may be this due to the care less about the answers.

11. Results and discussion:

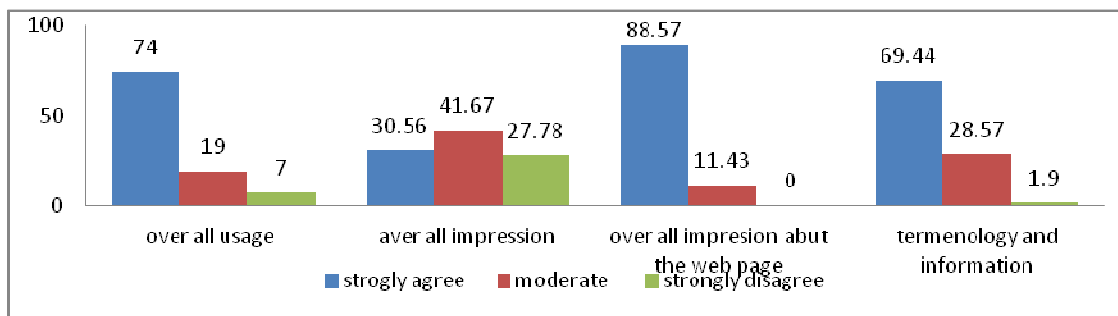


Figure.1 User satisfaction of medical multimedia web site

We can see a notice from the figure .1 of user satisfaction for the medical site that more than 70% strongly agree to the easiness of using the site. Also overall impression gave a moderate score around 50 % , further more the responses to the overall impression about the web page navigation. And they also gave a high score to the understanding of terminology in the medical program.

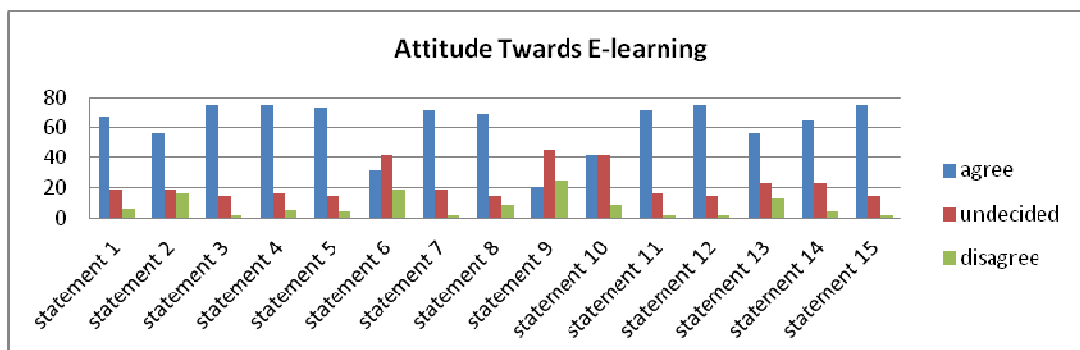


Figure.2 The results of attitude towards e-learning

Figure (2) presents the attitude towards using e-learning according to the attitude questionnaire. We can notice that all of the statements gave more than 70 percent to the agree option to the most of the attitude statements. That means the medical student agrees with using e-learning in medical education , and they have a positive impression towards it.

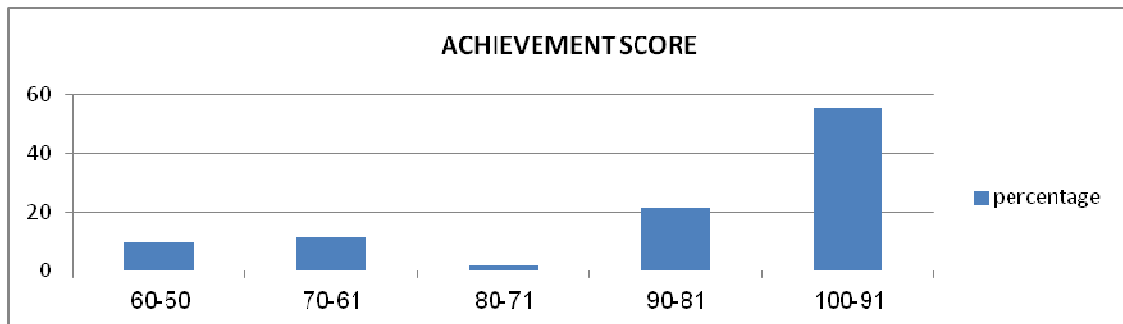


Figure.3 the achievement through a medical multimedia program

According to figures .3 which evaluates the student achievement in the specific medical subject by applying a medical on line MCQ quiz. The result presents a high score of 90 to 100 that means most of participant students achieved more than 90. Further about more than 20 percent achieve less score (81-90). The least medical participants got less than 71.

12. Recommendation:

The purpose of this project is building a multimedia learning program that contains different academic materials and that concentrates on providing audiovisual aids, in the form of videos, animations and images related to the different subjects. That will serve the students of the college of medicine and the students of other colleges in Taif University. And also to improve the clinical skills by providing physical examination and clinical procedure videos online.

By providing the students with an open access to practice materials on all subjects through the multimedia learning program. Enhance self directed learning this is one of the main characteristics of the Taif University teaching approach. And To allow students to study at their own pace and to have control over their learning process. Else this project improves the student/staff relationship through their communication within the multimedia learning program.

According to the results above and what we mention we can conclude that the medical multimedia program through online learning has been succeeded. And gave a high impression of the medical students in faculty of medicine– Taif university . The medical multimedia contribute in making the learning more interesting and more attractive . Also it increases the motivation towards medical education.

The farther it helps to create mental images and to truly understand how some of the complex pathways work and proceed. So this medical multimedia are trying to solve this problem by providing audiovisual aids and animations that will clarify these concepts and pathways for the students. And we recommend to apply the project in all over the faculty of medicine in Saudi Arabia.

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