

DEPARTMENT OF COMPUTER SCIENCE

**The Impact of Multimedia Tutorial on Students' Learning
Experience In The Public Authority For Applied Education
And Training, Kuwait**

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Abstract

This paper presents the results of an experiment carried out on a random sample of 34 students from The Public Authority For Applied Education And Training (PAAET), Kuwait Higher Education. The experiment aimed at evaluating the impact of a Multimedia Tutorial Programme on students' learning experience. Two methods of information delivery were investigated: traditional lecturing method and the multimedia method. The results, which have been analysed, show that students were motivated and satisfied with the multimedia approach comparing with the traditional way. However, it is difficult to precisely evaluate students' retention of knowledge in this experiment.

The researcher suggests the need for further studies which might present different and various results depending on type of learning materials, students' background, usability of the multimedia programme, and period of time undertaken in the experiment.

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1.0 Introduction

Multimedia technology has now become a powerful tool for our educational experience [Ambron, 1990] . It enables knowledge to be conveyed through a rich mixture of video, sound, music, graphics, still images and animation in a single electronic medium, providing the ability to link subjects in a non-linear format. Such technologies are not a threat, but rather, they present a good opportunity for education [Falk & Carlson 1992]. It is expected that this technology will not only improve educational productivity but also the way of learning itself. Implementing this technology will give the educators the chance to motivate the students, stimulate their interest, and encourage different and various ways of learning [Staley 1995].

Educators, all over the world, are challenged to re-energize the educational system to make education more exciting. Towards this goal, multimedia provides the right technology at the right time. Today, many people compare the multimedia revolution to the personal computers revolution of the 1980s. In fact, interactive multimedia is the sum of all these revolutions wrapped up into one revolution of communication that combines the audio-visual power of television, the publishing power of the press and the interactive power of the computer [Wills and Swart, 1994].

The advancement of technology energized educators to integrate technology into the curriculum development process. Educators in the Ministry Of Higher Education in Kuwait in general, and in The Public Authority for Applied Education and Training (PAAET) in particular are looking into all issues related to the development of education. As multimedia is considered to be an essential element in educational technology, the researcher aims at, in this paper, evaluating the effectiveness of the use of multimedia learning materials on students' retention of knowledge, motivation, satisfaction, and the learning experience in PAAET, Kuwait.

2.0 The Experiment

2.1 Subjects

Thirty four Kuwaiti students (first and second year female students) enrolling the College of Commercial Studies, took part in the experiment. They were specialised in banking, insurance, accounting, secretary and computer information systems. The primary objective of the study is to examine students' learning experience and retention of knowledge by using two types of learning environments: traditional presentation method and multimedia method. The students were divided into two groups as it will be explained later in the procedure section 2.5.

2.2 Learning Materials

The learning materials used for this experiment introduces a basic information of the Public Authority For Applied Education and Training (PAAET), a key figure in Higher Education in Kuwait. Actually, It covers the basic organizational structure, functions, and activities. Choosing such content, the researcher aimed at introducing general information to familiarise students with services, sectors, and facilities of their academic institutions.

The information was pulled out from PAAET annual bulletin report [PAAET, 1994/95]. It was prepared and organised to be introduced to students by two methods:

- 1- Traditional Lecture Method.
- 2- Multimedia Method.

The organization of the traditional presentation was properly set, the content was prepared and transparencies were developed. On the other hand, the multimedia tutorial programme was designed and developed (see section 2.3). Arabic language was the communication media in the two methods of delivery used in this experiment.

The multimedia tutorial programme was divided into two parts: part 1, covers the activities, functions, objectives and the training sector of PAAET. Part 2, covers both the applied education sector and the administration of the authority. The same learning materials, as described above, were also prepared to be delivered in a traditional lecturing environment. A questionnaire was developed to maintain the students feedback, attitudes and opinions at the end of the experiment.

2.3 Multimedia Design

The multimedia tutorial programme was developed using "Action 3.0" one of the multimedia authoring packages. Traditional multimedia authoring steps were followed [Vaughan 1994]. Media elements such as graphics, images and sounds were captured and edited before putting all together. The multimedia authoring process took place to create the presentation in order to communicate information as effectively as possible and to make the presentation memorable, to give the students a clear understanding of the learning materials. The script has been written down and put across.

Having scripted the presentation, it was helpful to draw a storyboard which basically amounts to the complete presentation. Drawing the storyboard gave an idea to where to place animation, images and text. It also gave an idea about fonts, text style and size. In addition, It helped to adjust the general sequence of events in the presentation. The navigational structure of the multimedia tutorial is hierarchical. This structure allows the students to go through the presentation in a linear and a non-linear way. A guided chart was designed as shown in figure 1, and a button lied clear in each screen to assist users to access that chart. Students took some degree of control over the multimedia interactive

tutorial, they were able to actively make link decisions and control the direction of the presentation. [Boyle et al 1993].

Buttons were placed on the bottom of the screen, and students were able to navigate by clicking on backward button, forward button, main menu button, previous menu button, repeat button, exit button as well as a guided chart button. There were also some hot words and hot spots, in which if they are clicked, they give the students detailed information about the chosen topic. Different media were chosen and integrated in the multimedia tutorial, These media elements were co-ordinated and brought into the computer interface aiming at communicating with and engaging students.

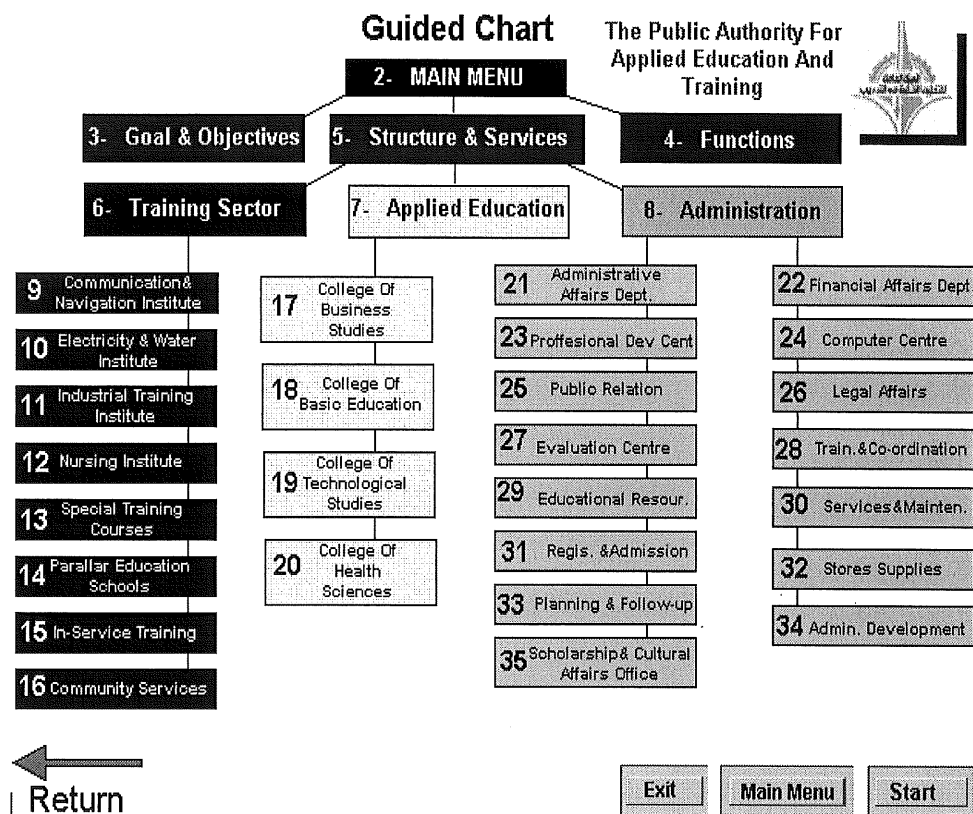


Figure (1): Guided Chart

Some of the design techniques were considered in the authoring stage of the multimedia tutoring programme such as:

- * Some welcoming text and animated pictures were integrated at the beginning and the end of the presentation to accommodate students attention and motivation.
- * Animation, pictures and graphics were used in various topics in order to illustrate and address topics.
- * Human voice, music, and sound effects were adjusted with each screen to augment and emphasise some points and to enhance learning.

2.4 Method of Evaluation

A questionnaire approach was used to evaluate students' learning experience, as well as, the usability of the multimedia tutorial. The questionnaire was designed after preparing the learning materials and developing the multimedia tutorial programme. The questionnaire is divided into four sections. The first section is concerned with collecting students' personal data. The second section consists of two parts, each part consists of 15 multiple choice questions, these questions aimed at examining students' retention of knowledge on the topics introduced in the presentation (both the traditional and the multimedia).

The third section consists of 14 questions and aims at evaluating students' feedback and students' opinions on the two different methods of learning environments. The questionnaire uses a set of bipolar semantically anchored items (preferring multimedia versus preferring traditional presentation) with a scale of 0 to 5.

The fourth section consists of 8 questions, and aims at evaluating the interface, media, and usability of the multimedia tutorial programme.

2.5 Procedures

All of the 34 students were gathered in the lecturing room. They were told what they were going to do during the experiment. The students were equally divided into 2 groups, group A and group B. Each group had to go through the whole presentation which was divided into two parts, traditional lecturing part and the multimedia one.

Group A attended the first part of the presentation in the lecturing room. This session covered activities, functions, objectives and the training sector of PAAET. It was delivered as traditional presentation. Group B, at the same time, attended the first part of the presentation in the multimedia lab using the multimedia tutorial programme. Students in the lab were able to navigate the programme and control the flow of the learning materials, the first part took about 30 minutes. Both groups were given the questionnaire and were told to fill in the first section and part 1 of the second section. Then, the questionnaires were collected from the students. After a short break, group A attended the second part of the presentation in the multimedia lab, they were able to navigate the programme and control the flow of the learning materials which covered the applied education sector and the administration of PAAET. Group B, at the same time, attended the second part of the presentation in the lecturing room which also covered the applied education sector and the administration. The second part took about 30 minutes.

At the end, students in both groups were given the questionnaires in order to fill in part 2 of the second section, section three which is concerned with collecting information related to the students' learning experience, and section four which is concerned with collecting information related to the usability of the multimedia tutorial programme. Then, the Questionnaires were collected from the students. Steps of the experiment are illustrated in figure 2.

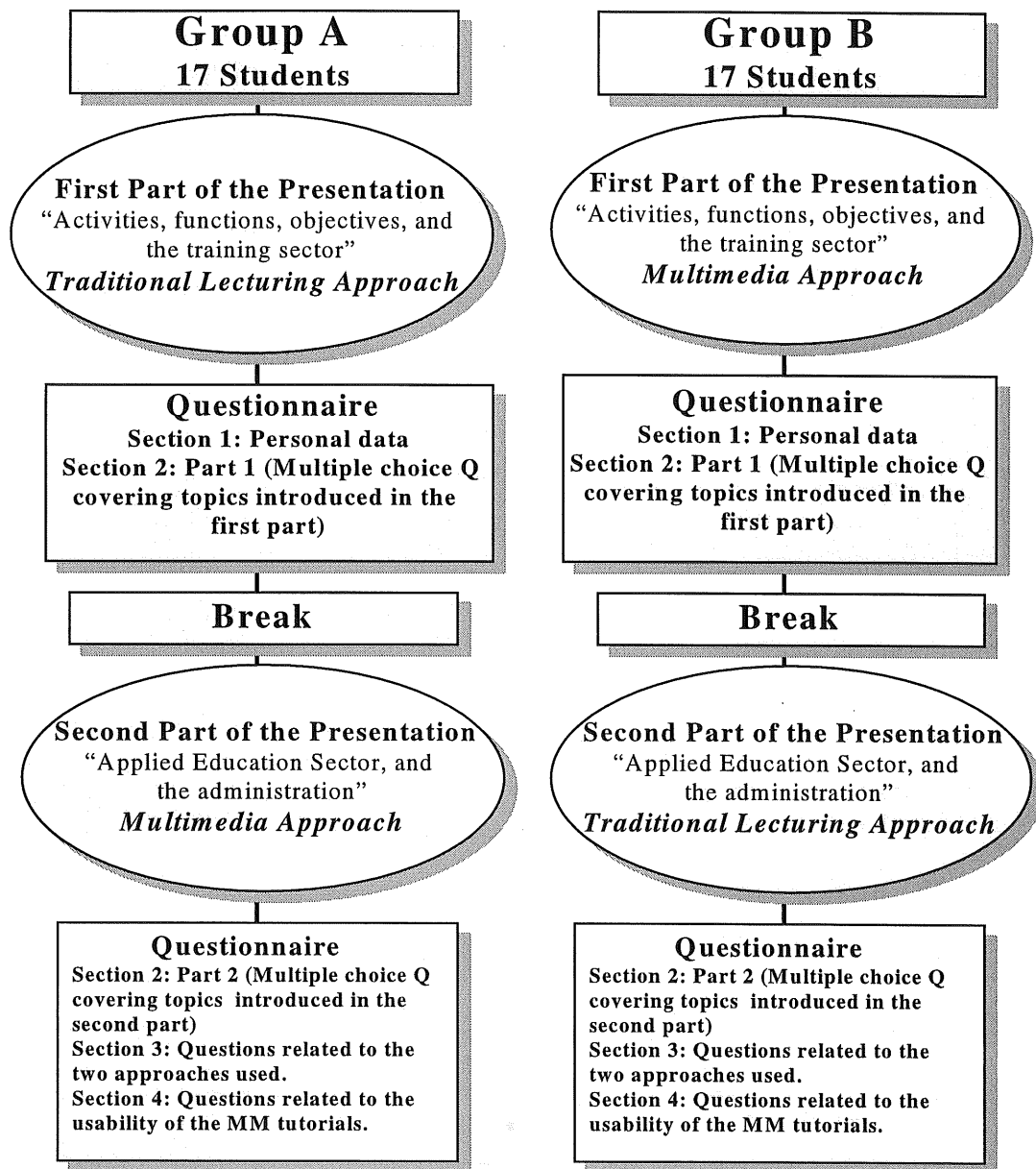


Figure (2): Experiment steps

3.0 Results

Based on the analysis of the collected data, the results are as follows:

1- The first section of the questionnaire, which is concerned with students' personal data, revealed that students were first and second year, business college, female students averaging a 2.5 grade point average (scale out of 4).

2- The second section examines students' retention of knowledge. Students answering the multiple choice questions related to the multimedia part of the presentation scored a total of 391 correct answers from 480 (81.5%), which is 2 points higher than the correct answers related to the traditional presentation in which students scored a total of 389 from 480 (81%). See table 1.

| | No. of Questions | Eliminated Questions | After Elimination | Correct Answers | Percentage % |
|---|------------------|----------------------|-------------------|-----------------|--------------|
| Questions related to the Multimedia Part | 510 | 30 | 480 | 391 | 81.5% |
| Questions related to the Traditional Part | 510 | 30 | 480 | 389 | 81% |

Table (1): *Students' retention of knowledge- Multimedia method VS Traditional method*

3- The third section, examines students' learning experience, and evaluates the multimedia tutorial programme as an open learning environment versus the traditional way of learning. The results of the analysis are illustrated in table 2 and described as follows:

A- 57.6 % of the students totally agree, and 33.3% agree with the fact that the multimedia tutorial was more beneficial in comparison with 15.2% of the students who totally agree, and 30.3% who agree that they have benefited more from the traditional learning method comparing with the multimedia one.

B- 70.6% of the students totally agree, and 23.5% agree that they were more motivated by the multimedia tutorial compared with 15.6% of the students who totally agree, and 12.5% who agree of being more motivated by the traditional way of learning.

C- 73.5% of the students totally agree, and 17.7% agree of being more excited by using the multimedia tutorial compared with 2.9% of the students who totally agree, and 8.8% who agree that the traditional learning was more exciting.

| Questions | Totally Agree | Agree | Agree to a certain limit | Disagree | Totally disagree |
|---|---------------|--------|--------------------------|----------|------------------|
| Multimedia is more useful compared with traditional Presentation | 57.58% | 33.33% | 9.09% | 0.00% | 0.00% |
| The Traditional presentation is more useful than multimedia | 15.15% | 30.30% | 45.45% | 9.09% | 0.00% |
| I find myself enthusiastic using multimedia program than Traditional presentation | 70.59% | 23.53% | 5.88% | 0.00% | 0.00% |
| I find myself enthusiastic in listening to the traditional presentation than multimedia | 15.63% | 12.50% | 34.38% | 31.25% | 6.25% |
| The flow of learning materials was more exiting in multimedia than traditional presentation | 73.53% | 17.65% | 8.82% | 0.00% | 0.00% |
| The flow of learning materials was more exiting in traditional presentation than multimedia | 2.94% | 8.82% | 32.35% | 52.94% | 2.94% |
| Multimedia encourages me to explore finding information by my own | 64.71% | 23.53% | 11.76% | 0.00% | 0.00% |
| control over the flow of content makes multimedia more useful than traditional presentation | 70.59% | 20.59% | 8.82% | 0.00% | 0.00% |
| I am not intimidated to using multimedia in learning | 65.63% | 18.75% | 12.50% | 0.00% | 3.13% |
| I paid more attention to multimedia than the traditional presentation | 56.25% | 34.38% | 9.38% | 0.00% | 0.00% |
| I paid more attention to the traditional presentation than multimedia | 3.03% | 15.15% | 33.33% | 45.45% | 3.03% |
| I would rather learn by using multimedia programs than by traditional way of learning | 65.63% | 21.88% | 6.25% | 3.13% | 3.13% |
| I would rather learn by traditional presentation than by using multimedia programs | 2.94% | 2.94% | 29.41% | 55.88% | 8.82% |
| I would like to integrate multimedia technology into some or all our college courses | 55.88% | 20.59% | 17.65% | 5.88% | 0.00% |

Table (2): Students' Learning Experience - The Multimedia Approach Vs Traditional Approach

D- 64.7 % of the students totally agree, and 23.5% agree that learning by multimedia encourages searching through the programme as well as exploring and getting more information.

E- 70.6% of the students totally agree, and 20.6% agree with the fact that multimedia tutorial was helpful in terms of controlling the flow of the presentation.

F- 65.6% of the students totally agree, and 18.8% agree that they were not frightened using the multimedia tutorial in comparison with 3.1% of the students who were frightened using the multimedia programme.

G- 56.3% of the students totally agree, and 34.4% agree that the multimedia tutorial aroused their attention to the content and the learning materials in comparison with the 3% of the students, who totally agree, and 15.2% who agree that the traditional learning aroused their attention more.

H- 65.6% of the students totally agree, and 21.9% agree that they would prefer to learn by using the multimedia tutorial than by the traditional method. However, 2.9% of the students totally agree, and 2.9% agree that they would prefer to learn by the traditional method.

I- 55.9% of the students totally agree, and 20.6% agree that they would like to see multimedia programmes integrated in all or some of the existing courses in their college compared with 5.9% of the students who disagree with that.

4- The fourth section examines the design and the usability of the multimedia tutorial. The results of the analysis are illustrated in table 3, and described as follows:

A- 65.6% of the students totally agree, and 34.4% agree that illustrations, graphics, and images were completely related to the learning materials.

B- 48.5% of the students totally agree, and 45.5% agree, while 6.1% agree to a certain limit that the text was clear, readable and colours were convenient.

C- 75.8% of the students totally agree, and 15.2% agree that buttons and links of the multimedia programme were recognizable and clear. They were easy to control the flow of the presentation.

D- 66.7% of the students totally agree, and 27.3% agree that it was easy to understand the structure and the elements of the multimedia programme.

E- 40.6% of the students totally agree, and 59.4% agree that the content of the learning materials of the multimedia programme were integrated and related.

F- 69.7% of the students totally agree, and 24.2% agree that sound was clear.

| Questions | Totally Agree | Agree | Agree to a certain limit | Disagree | Totally disagree |
|---|---------------|--------|--------------------------|----------|------------------|
| Graphs and images were perfectly related to the learning materials | 65.63% | 34.38% | 0.00% | 0.00% | 0.00% |
| Colors and text were convenient | 48.48% | 45.45% | 6.06% | 0.00% | 0.00% |
| Controlling the presentation through buttons and hot words was feasible | 75.76% | 15.15% | 9.09% | 0.00% | 0.00% |
| It was easy recognizing the structure and elements of the program | 66.67% | 27.27% | 6.06% | 0.00% | 0.00% |
| The content was fully related and integrated while using the program | 40.63% | 59.38% | 0.00% | 0.00% | 0.00% |
| sound was clear | 69.70% | 24.24% | 6.06% | 0.00% | 0.00% |
| The use of sounds in the program has enhanced my attention to the content | 42.42% | 24.24% | 24.24% | 0.00% | 9.09% |
| The multimedia tutorial was easy to use | 72.73% | 12.12% | 6.06% | 6.06% | 3.03% |

Table (3): Usability of The Multimedia Tutorial Programme

G- 42.4% of the students totally agree, and 24.2% agree, while only 9% disagree that sound aroused their attention to the learning materials in the multimedia programme.

H-72.7% of the students totally agree, and 12.1% agree that the multimedia tutorial was in general easy to use compared with 6.1% of the students who disagree and 3% who totally disagree with that.

4.0 Discussions

There is a number of interesting results in tables (1,2, and 3). In table 1 it is obvious that there is a slight difference among students who answered correct questions related to the multimedia presentation which is 391 compared with those correct answers related to the traditional presentation part which is 389, this may give an indication that multimedia tutorial programme is more effective in terms of students' retention of knowledge than the traditional presentation. For a very short experiment, however, it is difficult to measure students' retention of knowledge which could be affected by other factors such as type of information being presented, usability of the multimedia tutorial programme as well as the presentation skills of the lecturer.

In presenting learning strategies, Lorna Uden [Uden 1993] discussed the goals of any particular learning strategy such as multimedia learning environment, that may affect the learner's motivational or effective state, or the way in which the learner selects, acquires, organizes or integrate new knowledge. The intention of such learning strategy is to increase the number of links between presented information and existing knowledge in order to enhance retention.

Students were interested, motivated, excited by learning through multimedia. The results presented in table 2 support those propositions. The physical act of clicking a mouse to control the flow of the presentation seem to have a strong attractiveness to students. Their ability to explore and to find information by their own pace seems to give them the chance to put them in the driver's seat. It seemed that multimedia session had transformed students from passive recipients of information to active participants in their own learning. It was notable that the advantages of multimedia are its ability to re-energize students and stimulate new excitement which led to a general agreement among students that multimedia will be beneficial if integrated into their college curriculum.

In this experiment, the researcher is not examining the usability of this particular multimedia tutorial programme, as much as, focusing on the impact of a good interface on the usability of the system. It is rather looking at the relationship between usability and student exploration of knowledge, satisfaction, and motivation. Students were just being asked some major questions related to the interface of the multimedia tutorial programme such as, the degree of interactivity, ease of use, integration of media, integration of content and colours. The results as shown in table 3, indicate that the tutorial was easy to

use and control. Moreover, the integration of media and content was effective. In addition, text and colours were convenient. Although 9% of the students were not totally happy with the multimedia sound, 72.7% agree that sound had aroused their attention to the learning materials.

It is very important to consider designing a good interface for any multimedia educational programme in order to get the best of it. Mckerlie and Preece have supported that and indicated that good integration of media in an effective and creative way, taking users' constraints, excitement and support into account will give the best result. They advised designers to exploit creative talent and experiment with new ideas and ways of thinking [Mckerlie & Preece 1993].

5.0 Recommendations

The researcher In this study, is not focusing on reporting the benefits and advantages of the implementation of a multimedia learning environment in PAAET as much as examining the impact of the use of multimedia in higher education in general and PAAET in particular. He recommends the followings to PAAET decision-makers with respect to this study:

- 1- Integrate technology into its curriculum development process and establish a curriculum development centre.
- 2- Encourage teaching staff to gain basic understanding of the use of computers and multimedia applications.
- 3- Establish a Multimedia Unit in each college, institute and training centre.
- 4- Integrate the Multimedia Unit with the Curriculum Development Centre.
- 5- Provide an Internet access to students as international networks are being opened up and contain information and media that can be selected and navigated from large numbers of computer systems.
- 6- Encourage researchers and staff members to contribute to the development of this technology to maximise the use of this type of teaching tool.

6.0 Conclusion

Multimedia is considered as an essential element in educational technology. The researcher, in this study, aimed at evaluating the impact of the use of Multimedia Tutorial Programme on students' learning experience. An experiment were carried out on Kuwaiti students representing the Public Authority for Applied Education and Training (PAAET), Higher Education. Issues such as students' retention of knowledge, motivation, and satisfaction have been investigated, as well as some interface design issues. The results of the experiment have been analysed, presented, and summarised in this paper. In addition, some recommendations were introduced in regard to this study.

7.0 Acknowledgments

The researcher would like to thank all the personnel who helped him through this experiment. Their comments and discussions are appreciated. He would also like to thank Blue Marble Computers Company for assisting him in the experiment, and for facilitating the use of their lecturing room and multimedia computer lab.

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