

The Effectiveness of Using Interactive Multimedia on the Learning Process for Enhancing the Connection between Education and Practice

Qusay Abboodi Ali, Noor Mezher Sahab

Tikrit University- Iraq.

Email: dr.qusay.a.ali@tu.edu.iq, noormizher2@gmail.com

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ABSTRACT

Interactive multimedia technology enhances the educational process by increasing interaction between teachers and students at universities, especially in the practical subjects. The use of multimedia technology in the educational field has a role-play to enhance the quality of teaching and outcomes for students. In this vein, the educational institutions are using multimedia tools such as video, sound, and animated presentations and simulations to advance their teaching strategies. This benefits college students. The interactive multimedia learning has become a popular teaching strategy that uses visual and audio annotations to help students understand lessons easily and quickly. Therefore, this study aims to examine the effectiveness of using multimedia tools in teaching compared to the traditional methods of teaching practical subjects. This study is an experimental one based on questionnaires that are distributed to 238 students from various colleges at Tikrit University. Finally, the results reveal significant differences among students. Those who use multimedia tools to support their learning in the practical subjects show better results compared to those who are taught by the traditional methods. This study recommends using the multimedia instructional tool as an effective tool to enhance the outcomes of students in practicing skills in the practical subjects.

Keywords: Multimedia Tools, Traditional Learning, Practical Interaction, User Experience, Education.

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INTRODUCTION

The Tools and features of multimedia technology in the learning process not only provides a tangible experience, but also helps students to integrate that experience into the practical subjects [1]. Multimedia technology enhances the educational process through increasing the interaction between teachers and students [2]. The use of multimedia technology applications in teaching the practical subjects helps students gain a deeper understanding of what is being taught and overcomes the limitations of space, time, and equipment [2,3]. Multimedia technology can transform an initially boring lecture into a two-way interactive exchange of information using a variety of interactive means. The cognitive theory of learning by multimedia underlies the implementation of multimedia presentations of the learning content [4].

The traditional learning, on the other hand, offers limited advantages in teaching the practical subjects such as programming science, mechanics, mathematics, physiology, physics, medicine, and physical education [1]. Moreover, a major limitation of the traditional teaching methods is their inability to demonstrate the importance of the practical details in the laboratory, in addition to the limited and incomplete information [1,12].

Indeed, most of the traditional education field research focuses only on student performance in real classrooms such as labs and does not consider multimedia technologies [5]. There is no study focused on the effectiveness of using the multimedia technology on students in the practical context [5,6]. According to [7], using multimedia during teaching is a trend to teachers in the colleges of universities that includes an equipment such as computers in the labs to present and combine image, texts, animation, sound, and video to attract the interest of students in improving their interaction, outcomes, and skills [7].

Therefore, multimedia technology can be interpreted as using multiple different media to deliver information in the form of text, audio, graphics, animation, and video [8]. The intention of integrating multimedia is not to replace older teaching methods, such as 'chalk and talk', but rather the teacher's role should promote the educational community and bring about many positive influences. Multimedia is an effective and fun lesson. This is because the student remembers 30% of what s/he hears while s/he sees 20% of it [9]. Studies show that after introducing multimedia into teaching and learning, a student can recall 50% of what s/he hears and 80% of what s/he sees [10]. This phenomenon clearly shows that the use of multimedia in education is highly effective [9, 10]. In the same context, multimedia technologies are characterized by integrating, diversity, interacting, and enabling students to communicate information and ideas using digital and printed materials. Digital and printed elements in this context refer to multimedia applications or tools used to provide information for students to better understand concepts [9, 11, 12].

LITERATURE REVIEW

Multimedia is the combination and integration of text, graphics, sound, animation, and video. In education, multimedia technology can bring effective results in teaching and learning. When it is incorporated into education, there is a new approach to learning that combines educational and recreational approaches because multimedia is dynamic. Therefore, using Multimedia inside laboratory for practical materials helps understand more the practical aspects [12]. In the study of multimedia education, many researchers have studied the effects of multimedia education. In the traditional learning teachers typically stand in front of students in the classrooms, talk to them, and write on the blackboard [13]. Similarly,[14] states that the traditional classroom instruction relies on words, pictures, and numbers to present ideas. However, according to [15], in a multimedia educational environment, the instructional instructions are dynamically presented with audio and images, making them more vivid, diverse, and vibrant.

Multimedia is much more effective in teaching than traditional teaching methods. Multimedia facilitates education. The contribution of multimedia to education is to improve the student's academic performance compared to the traditional teaching methods [12,13]. The use of Multimedia has a positive impact on education only if it is well designed in terms of academic performance compared to the traditional teaching methods [14]. Ponraj and his friend Sivakumar investigated the effectiveness of computer-aided teaching in zoology classes in relation to the learner personality. The main results of

the study showed that the performance values of students in the experimental group were higher than those of the control group after treatment [15]. In their study, researchers such as [16] analyzed elementary school students' opinions about multimedia tools. In their study, teaching via multimedia was applied before student input was collected. Elementary school students were happy with the multimedia lessons and wanted to take them later. In addition, researchers observed that the student's motivation had been increased after implementation [16].

Another study found that “multimedia technology is a far superior method of teaching than traditional methods. In addition, researchers, experimental groups, and teachers observed increased student interest, motivation, and participation [17]. In other researches it was concluded that improving the effectiveness of multimedia education requires increasing the need for high staff training and not only improving the quality of instruction in schools [18]. Addition to, universities need to make greater efforts to improve multimedia education and ensure the quality of modern teaching methods[18]. Based on the literature, it can be asserted that the use of multimedia facilitates and objectifies learning by presenting multiple technical factors to the learner.

METHODOLOGY

This study is conducted on different seven colleges at Tikrit University (Programming Science, Mechanical Science, Mathematics Science, Biology Science, Physics Science, Medicinal Science, Physical sport Science), which included 238 undergraduates as shown in Table 1 and Figure 1 respectively. At the end of the second semester in 2022, the students' results from each college after the final exam were analyzed by t-test based on two groups of individuals (Group A and Group B):

A. The Multimedia method group is taught via using the multimedia method for learning the practical subjects (Lab). The sample consists of 119 participants of students.

B. The traditional method group is taught via using the traditional method for learning the practical subjects (Lab). The sample consists of 119 participants of students..

Therefor, this study evaluates the extent to which there are significant differences between the students' outcomes of both A and B groups (teaching with using multimedia method in the lab or teaching with using traditional method in the lab).

Table (1) Colleges Samples

College	No. of sample
Programming Science	34
Mechanical Science	34
Mathematics Science	34
Biology Science	34
Physics Science	34
Medicinal Science	34
Physical sport Science	34
Total	238

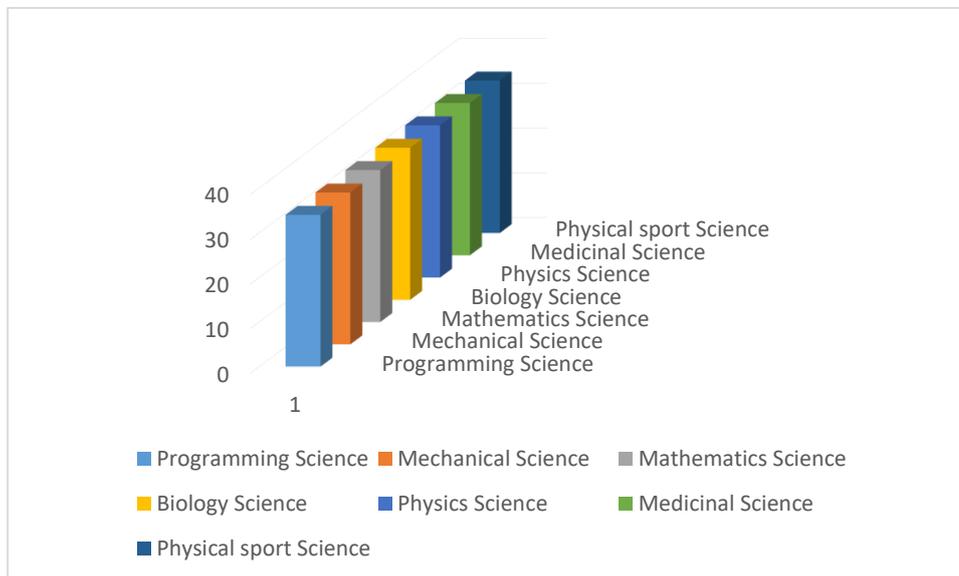


Figure (1): Colleges Samples

RESULTS AND DISCUSSION

This study includes two groups of individuals (the multimedia method group and the traditional method group). Therefore, the results of each group should be statistically tested separately. To test if there are any significant differences, that is, if the moral (T) is less than 5%, the results of the two groups cannot be combined into one group. In this context, the data collected are analyzed from each college based on the experimental two groups (the multimedia method group, and the traditional method group) and the data are organized using the statistical instruments as shown in Table 2.

Table 2: Results of test groups

College	Group	N	Mean	Std. Deviation	F	Sig.
Programming Science	Multimedia Method	34	42.4390	.79287	7.243	0.012
	Traditional method	34	22.7401	.44951	1.379	0.213
Mechanical Science	Multimedia Method	34	48.0366	.62378	5.546	0.041
	Traditional method	34	19.8223	.31758	3.511	0.215
Mathematics Science	Multimedia Method	34	51.0169	.74196	7.221	0.035
	Traditional method	34	29.9886	.28935	1.189	0.251
Biology Science	Multimedia Method	34	47.8106	.51468	4.234	0.016
	Traditional method	34	24.8794	.49831	2.564	0.214
Physics Science	Multimedia Method	34	44.9337	.66419	4.743	0.026
	Traditional method	34	29.9690	.47758	3.192	0.234
Medicinal Science	Multimedia Method	34	46.3337	.76929	6.673	0.014
	Traditional method	34	19.8790	.48598	1.239	0.063
Physical sport Science	Multimedia Method	34	39.2337	.57389	7.215	0.014
	Traditional method	34	25.8490	.41728	2.469	0.063

The mean difference is at the 0.05 level. ($\alpha < .05$)

For the programming science sample, the results of the multimedia method group are (mean: 42.4390, Std: 0.79287, and Sig : 0.012) and the results of the traditional group are (mean: 23.92, Std: 0.44951, and Sig : 0.213) at 0.05 level of significance; the null hypothesis is therefore rejected. Regarding the sample of the mechanical science, the results of the multimedia method group are (mean: 48.0366, Std: 0.62378, and Sig : 0.041) while the results of the traditional group are (mean: 19.8223, Std: 0.31758, and Sig : 0.215) at 0.05 level of significance; also the null hypothesis is rejectect. The multimedia method group of the Mathematics Science records (mean: 42.4390, Std: 0.74196, and Sig : 0.012) while the traditional group shows (mean: 29.9886, Std: 0.28935, and Sig : 0.251) at 0.05 level of significance, the null hypothesis is also rejected. The results of the multimedia method group of the Biology Science are (mean: 42.4390, Std: 0.51468, and Sig : 0.016) while the results of the traditional group are (mean: 24.8794, Std: 0.49831, and Sig : 0.214) at 0.05 level of significance; the null hypothes is rejected also. The results of the multimedia method group of the physics science reveal (mean: 44.9337, Std: 0.66419, and Sig :0.026) while the results of the traditional group display (mean: 29.9690, Std: 0.47758, and Sig : 0.234) at 0.05 level of significance, the null hypothesis is rejected. In the same context, the results of the multimedia method group of the medicinal science are (mean: 46.3337, Std: 0.76929, and Sig :0.014) while the results of the traditional group are (mean: 19.8790, Std: 0.48598, and Sig : 0.063) at 0.05 level of significance, the null hypothesis is also rejected. Finally the results of the multimedia method group of the physical sport science are (mean: 39.2337, Std: 0.57389, and Sig :0.014) while the results of the traditional group are (mean: 25.8490, Std: 0.41728, and Sig : 0.063) at 0.05 level of significance, the null hypothesis is also rejected.

Finally, Table 3 and Figure 2 respectively show the final summary of the results of each group. The results of the multimedia method group are (mean: 45.6863, Std: 0.6686, and Sig : 0.022) while the results of the traditional group are (mean: 24.732, Std: 0.4193, and Sig : 0.179)

Table 3: Summary of the results of each group

All Colleges	Group	N	Mean	Std. Deviation	F	Sig.
Summary of Result	Multimedia Method	119	45.6863	.6686	6.125	0.022
	Traditional method	119	24.732	.4193	2.22	0.179

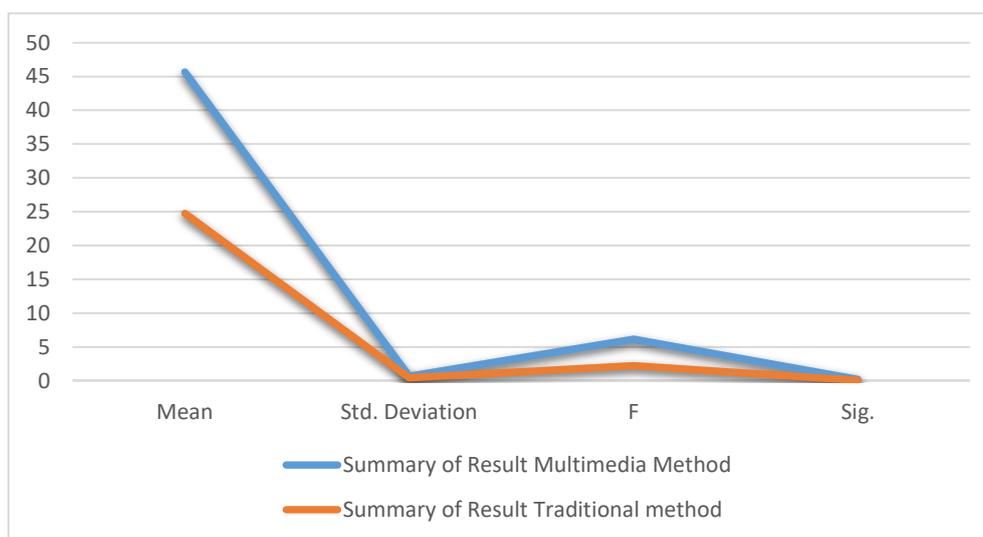


Figure 2: Summary of the Results of Each Group

Based on the above mentioned summary of results, it can be revealed that there is a significant difference in the performance of the two groups from each college. That means that the students' performance in the exam of a multimedia tool is much better than that performance of the students in the exam of the traditional group. This indicates that the students who are taught by the multimedia method have outperformed and got high outcomes in the final exam than those students who are taught by the traditional method.

CONCLUSION

In conclusion, this study aims to show the effectiveness of using multimedia interactive tools on teaching the practical subjects inside labs to increase the outcomes of the students during the learning process. The findings of this study reveal significant difference between the multimedia method group and the traditional method group. The former shows better results than the latter in teaching the practical subjects. In other words, using multimedia tools to teach the practical subjects are much better than the traditional method in the learning process. Furthermore, the use of multimedia tools during teaching increases the students' interaction, motivation, interest, and outcomes in the practical subjects while the traditional method had no effect on the students' outcomes. This means that the multimedia tools have a positive effect on the academic achievement of the students in the practical part.

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BIOGRAPHY

¹ Qusay Abboodi Ali received the B.Sc, in computer sciences in 2004 from Tikrit University- Iraq, and M.Sc, degrees in Information technology from Utara University - Malaysia, in 2012. In addition, to the Ph.D, degree in Multimedia from Utara University, Malaysia in 2018. He has more than 9 years of experience as a lecturer for undergraduate and postgraduate. He is currently a director of blended learning unit and lecturer at college of administration and economics at Tikrit University. His research interests include the intelligent applications of Multimedia, Interaction Design, Blended Learning, Online Learning and Java Programming. He can be contacted at email: Dr.qusay.a.ali@tu.edu.iq.

²Noor Mizher Sahab received the B.Sc. in computer sciences in 2004 from Tikrit University, Iraq, and M.Sc. degrees in Information technology from Utara University, Malaysia, in 2012. She is currently the lecturer in high school of Almotafukeen at Saladin's education Tikrit. She research interests include the applications of Multimedia, Database, Educational Platforms, blended learning, and online learning. She can be contacted at email: noormizher2@gmail.com.