



RESEARCH ARTICLE

UTILITY OF MULTIMEDIA ON SCIENCE LEARNING

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ABSTRACT

Multimedia is a powerful aid to learning. The use of multimedia in teaching and learning presents challenges to institutions of higher learning. The Video combined with Multimedia techniques were more effectively for teaching and learning process. The aim of this study was to find out the impact of multimedia effect on science learning by the student teachers (N=312) in three districts of Tamil Nadu State. The investigator prepared multimedia is Cell divisions content. Multimedia 5-point Likert type utility scale was used as a tool for this study and concluded that Multimedia learning is effective in science subjects. There is a significant difference occurred within the demographic variables. This paper also discusses the impact of multimedia in science teaching and learning.

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INTRODUCTION

Multimedia is a powerful aid to learning. Moving images, motion graphics and dynamic text in combination with sound effects, narration or dialogue, stimulate viewer's cognitive processing, emotional and even physical responses. The use of multimedia in teaching and learning presents challenges to institutions of higher learning. Multimedia refers to any computer-mediated software or interactive application that integrates text, colour, graphical images, animation, audio sound, and full motion video in a single application. Multimedia learning systems consists of animation and narration, which offer a potentially venue for improving student understanding (Mayer & Moreno, 2000). This paper briefly discusses the impact of multimedia in science teaching and learning.

Teaching and learning are two complementary aspects of education. Within learning, there are two key elements: content, which forms the "what" of learning; and skills, which describe the application of content to specific tasks, or the "how." These two elements are mirrored in teaching by the curriculum and syllabus (the "what") and the teaching methodology (the "how"). Multimedia technology affects both aspects of teaching and learning. It does this in three ways: in how it presents information; in how students interact both with the medium and through the medium with the teacher and other learners; and in how knowledge is structured within multimedia.

The cognitive effect of multimedia is derived from what is known as 'multi-sensory' learning. Multi-sensory learning theory looks at how the brain is stimulated via the Visual, Auditory and Kinesthetic senses (VAK). Multi-sensory learning happens when more than one sense is used to acquire and retain information. With multimedia, the visual and auditory senses are engaged simultaneously in making sense of the content. This creates a powerful emotional context for learning, and when emotions are evoked, memory and recall are enhanced.

Video and multimedia techniques

Video and multimedia techniques are different ways viz., whiteboard illustrations; papermation; interview shots; interactive video; vox pops; coaches, tutors or guides; documentary video; video drama; motion graphics-kinetic text and info-graphic animations.

METHODOLOGY

The aim of this study was to find out the impact of multimedia effect on science classrooms learning by the student teachers in three districts of Tamil Nadu State. A sample of 312 (150 male and 162 female) undergraduates (student teachers) in a College of Education (B.Ed) used the multimedia system to learn the operation of cell divisions. The multimedia system consists of a labeled diagram of Cell cycle, seven phases of Mitosis division and three phases of meiosis division, followed by a description of ten stages to successfully make the new diploid cells.

The Multimedia consists of mitosis division process, which has seven phases of the Cell cycle like inter-phase, prophase, pro-

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metaphase, metaphase, anaphase, telo-phase, and cyto-kinesis and to successfully make the new diploid cells. And the meiosis division consists of three phases of interphase, meiosis-I and meiosis-II.

The sample was randomly divided into two groups who used either an interactive (experimental) or a non-interactive (control) version involving both images and text. The interactive system differed from the non-interactive system by the incorporation of control of pace, self-assessment questions and an interactive simulation. Student teachers then undertook with an achievement test.

and the mean, standard deviation was used to determine the impact multimedia level of student teachers and also ‘t’ and F test was conducted to check the significant differences among the variables. The sample for the study is presented in Table 1.

From the table- 1, the sample for the study was 312 student teachers and that they were enrolled in three type of institutions viz., Government (48), aided (48) and self-financed student teachers (216) and most of the locality of institutions are situated in urban area (168) with the composition of 162 female student teachers and 150 males.

Table 1 Sample for the study

Type of Institutions			Locality of Institutions		Gender		Age			Computer Knowledge		Net facility in Home	
G	SF	A	U	R	M	F	< 25 Yrs	25-30 Yrs	>30 Yrs	Yes	No	Yes	No
048	216	048	168	144	150	162	105	126	081	234	078	198	114

Sample for the study

The population in this study covers three districts viz., Coimbatore, Salem and Namakkal districts of Tamil Nadu state of India, which scattered in Government, aided and self financed college of education affiliated by Tamil Nadu Teacher Education University, Chennai. Stratified random method of sampling has been used because the population is heterogeneous form, which covers type of institution, locality of institution, gender, age, computer knowledge and presence of computer with net facilities in their home. By using stratified random sampling, the data collected is more accurate and it represents each stratum (Nachimuthu, 2010). This study has selected 312 student teachers from the selected three districts of college of education institutions in Tamil Nadu state of India during the months of January and February 2016.

Design and Tool for the study

The study was an experimental research on impact of multimedia effect on science learning by the student teacher’s teaching learning process. A Multimedia 5-point Likert type utility scale was used as a tool for this study. The tool contains 2 parts (Part A and Part B). Part A includes socio-demographic of respondents. Part B is to determine the level of multimedia utility. In the scale, positive scoring was calculated as 1=almost never, 2=never, 3= nil utility, 4 = every time and 5 = almost every time has been used. For negative scoring arranged in the same as in vice-versa. Dependent variables in this study are the multimedia utility level; while independent variables includes type of institution, locality of institution, gender, age, computer & multimedia knowledge, and presence of computer with net facilities in their home.

The validity of the MUS (Multimedia Utility Scale) was approved by multimedia experts and the Faculty of Education, Periyar University, Salem city in Indian country. The views of the experts were used to revise some of the items in the tool. The reliability was measured by Alpha Cronbach method and it shows the coefficient of reliability 0.88 for level of multimedia usage among student teachers. The coefficient of reliability shows that all items in the scale were reliable and can be accepted. An effective rapport was developed before administering the scale and then collects the data. The collected data was analyzed using R Programming (Statistical Package)

The majority of the student teachers have had the basic knowledge of computer. Around 64% of the student teachers have their own computer in their home with net facilities in their home.

Multimedia Usage based on Type of Institutions

Table-2 shows one-way variance analysis results, which were conducted to determine if there is significant difference in type of institutions regarding multimedia usage level of student teachers.

Table-2 ANOVA results of multimedia usage level (Type of Institution wise)

Type of Institutions	N	Mean	S.D	F	P value
Government	048	0.592	0.0654	19.2029	0.000
Self financed	216	2.355	0.0525		
Aided	048	0.412	0.1221		

As can be seen in Table-2, significant differences in the multimedia usage based on type of institutions were observed. When mean score were determined, student teachers in the self-financed were the highest users of multimedia (mean=2.35) compared to the Government student teachers (mean=0.59) and aided student teachers (mean=0.41). Multimedia usage among student teachers in Self-financed College of education was higher than in the Government student teachers as well as aided college of education student teachers (F= 19.20)

Multimedia Usage Based on Location of Teaching

Table-3 shows ‘t’ test results, which were conducted to determine if there is significant difference in location of institutions regarding multimedia usage level of student teachers.

Table-3 ‘t’-test results of multimedia usage level (Locality wise)

Locality	N	Mean	S.D	‘t’ value	p value
Urban	168	2.12	0.428	4.2209	0.000
Rural	144	1.86	0.624		

Table-3 shows that there was significant difference between the multimedia usage of student teachers in the urban and rural locality with the value ‘t’ = 4.22 and p = 0.000 (p < 0.05). Based on mean obtained, student teachers in the urban locality have

higher mean (mean = 2.12) compared with mean of student teachers in the rural locality (mean = 1.86). This shows that multimedia usage of student teachers in the urban locality was higher than student teachers in the rural locality.

Multimedia Usage Based on Gender

Table-4 shows ‘t’ test results, which were conducted to determine if there is significant difference in gender regarding multimedia usage level of student teachers.

Table-4 ‘t’-test results of multimedia usage level (Gender wise)

Gender	N	Mean	S.D	‘t’ value	p value
Male Student teachers	150	1.98	0.562		
Female Student teachers	162	2.14	0.214	3.2739	0.001

Table-4 shows that there was significant difference between the multimedia usage of female and male student teachers with the value ‘t’ =3.27 and p = 0.001 (p < 0.05). Based on mean obtained, female student teachers have higher mean (mean =2.14) compared with mean of the male (mean = 1.98). This shows that multimedia usage of female student teachers were higher than the male student teachers as per gender wise analysis.

Multimedia Usage Based on Age

Table-5 shows one-way variance analysis results, which were conducted to determine if there is significant difference in age regarding multimedia usage level of student teachers.

Table-5 ANOVA results of multimedia usage level (Age wise)

Age	N	Mean	S.D	F	p value
Less than 25 years	105	0.991	0.2825		
25 to 30 years	126	1.098	0.1785	9.9591	0.000
More than 30 years	081	1.261	0.2517		

As can be seen in Table-5, significant differences in the multimedia usage based on age were observed (F=9.96). When means score were determined, student teachers age is more than 30 years were the highest users of multimedia (mean=1.26). While aged 25 to 30 years (mean=1.09) were higher than aged less than 25 years (mean=0.099) of student teachers.

Multimedia Usage based on their Computer knowledge

Table-6 shows ‘t’ test results, which were conducted to determine if there is significant difference in their computer knowledge regarding multimedia usage level of student teachers.

Table-6 ‘t’-test results of multimedia usage level (Knowledge wise)

Computer Knowledge	N	Mean	S.D	‘t’ value	p value
Yes	234	2.24	0.584		
No	078	1.98	0.482	3.9037	0.001

Table-6 shows that there was significant difference between the multimedia usage of student teachers having computer knowledge and not having computer knowledge with the value ‘t’ = 3.90 and p = 0.001 (p < 0.05). Based on mean obtained, student teachers’ knowing computer knowledge have higher mean (mean = 2.24) compared with mean of student teachers

were not having computer knowledge (mean = 1.98). This shows that multimedia usage of student teachers having the computer knowledge were higher than student teachers not having computer knowledge.

Multimedia Usage Based on their availability of home computer with net facilities Table-7 shows ‘t’ test results, which were conducted to determine if there is significant difference based on the home computer with net facilities regarding multimedia usage level of student teachers.

Table-7 ‘t’-test results of multimedia usage level (Home Computer facility wise)

Net Facility in Home	N	Mean	S.D	‘t’	p
Yes	198	2.04	0.448		
No	114	1.86	0.486	3.2405	0.001

Table-7 shows that there was significant difference of multimedia usage of student teachers based on having Home computer (PC) with internet facility with the value ‘t’ = 3.24 and p = 0.001 (p < 0.05). Based on mean obtained, student teachers having home computer with internet facility have higher mean (mean = 2.04) compared with mean of student teachers those who are not having computer in their home (mean = 1.86). This shows that multimedia usage of student teachers having home computer with internet facility were higher than student teachers not having computers in their home.

DISCUSSION

Findings showed that the use of multimedia among student teachers in teacher education institutions in the selected three districts of Tamil Nadu State was at the effective level. This research is also supported to Konan (2010) found that the academic qualification was affected the use of multimedia. This research calculations are not taken their academic qualifications because of all are entry level of first year B.Ed student teachers. The results also showed significant differences in the use of multimedia teaching on gender. The use of multimedia among female student teachers mean score is higher than male mean scores. This finding is supported by Abdul (2005) and Larry *et al.* (2001) which showed the significant in different levels of multimedia usage on gender.

The findings of multimedia usage of student teachers in the urban locality was higher than student teachers in the rural locality in this study was not supported to Senthilkumar *et al.*, (2012), who found out that there is no significant difference between the use of multimedia in rural and urban areas. They noted that the use of multimedia is not dependent on location such as rural or urban, but it is related to the knowledge and attitudes towards multimedia.

The multimedia utility was depending on the facilities in which they work (Jamian *et al.*, 2011). These same findings also supported to this research findings such as multimedia usage among student teachers as per their age wise. From the analysis, there is a significant difference occurred in the multimedia usage based on the age. When means score were determined, student teachers within age more than 30 years were the highest users of multimedia compared to less than 30 years of age. As usual depending on their computer knowledge the student

teachers working ability in multimedia was vice-versa. Also they have better effect to the use of multimedia on the basis of their knowledge of computer and having computer with net facility in home.

CONCLUSION

Multimedia is generally designed to guide students through lot of information in a specific task. A multimedia package can be used as a teacher in the virtual classroom situations. The quality of learning depends not only on the form of how the process is carried out but also on what content is taught and how the content is presented. Student and teachers both need to accept and face the challenges for the coming future and adapt the new ways of multimedia learning to improve their methods of learning and to elevate better educational outcome of the whole society. The e-learning is a process and multimedia and e-content packages are products. This approach of teaching has become an answer to the complicated problems and unidentified areas.

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