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An Impact of Using Multimedia Presentations on Engineering Education

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Abstract

The work in this paper primarily focuses on how the Multimedia Presentation elements can be applied and hence, used for engineering educational purposes. Undoubtedly, the conventional approach of the teaching-learning system has proven to be helpful. However, with the introduction and usage of Multi-Media Presentations, the restructured engineering educational system has been made more interesting, creative, and impressive. The use of elements like audio, video, text, and animation provides liberty to the learner to record/ reuse the information as and when required. Thus, the paper presents Multi-Media Presentations that can be helped in the engineering education system to evolve into a better platform as compared to the traditional system. The data has been collected from the engineering institute situated in Punjab to validate the results.

Keywords: Multimedia Presentation; Audio; Video; Text; Animation.

1. Introduction

The traditional or conventional educational approach in learning has been an accepted custom by society over a long period. This type of education focused more on rote memorization and teacher centricity. The students in the traditional teaching-learning method were passive receivers of information and influence. The activity is less and lacked in problem-solving or applied logic skills. The conventional ways are linear with factual growth and mastering a skill. On the other hand, Multimedia is non-linear, which allows the learner to utilize their skill and select the path of learning independently. El-Hay [1] mentions that customarily, educators are to trust that focused instructor methodology is progressively successful in the idea of realizing. Multimedia Presentations plays a crucial role in the journey called life. The elements have been picked from the surroundings, thus making it more relatable.

Its impact and use have seen in various fields like science & technology, games, business, training, and, most importantly, teaching or education.

Teaching modules, skills, and information often imparted in a framework without keeping the learner's need in mind. The inclusiveness of Multimedia [8] as an instruction aid helps conquer this problem. The availability of high quality and relevant content on the internet is one such example. The user-friendly software and interfaces are available in the market for use. The internet has emerged as an excellent tool for Multi-Media Presentations education as it provides instant access to multiple resources. The required skills in the real world like mutual learning and existence, critical thinking, constructive discussion leading to a problem-solving approach are readily provided and practiced in such a learning environment. So Multimedia reflects many benefits over the traditional method of education.

The focus here remains on the learner's needs and skill development. The teaching-learning environment becomes interactive, which supports constructive concept development. The role of a teacher also gets enhanced as they get to become more than a facilitator extending the use of Multimedia learning. Multimedia Presentations, the word itself is self-explanatory, that it comprises multiple expression of communication. Multimedia is used in varied areas and across all fields like education [7], entrepreneurship, and mass communication. Adegok et al. [2] mentioned that technology innovation is overgrowing. Numerous scientists [11-16] and teachers [17-19] have discovered appropriate approaches to structure media applications to accomplish productive, instructive results [9]. According to David Taylor at the University of Maryland, "Students who learned from materials containing both text and graphics produced 55 percent to 121 percent more accurate solutions to problems". The purpose of helping students retain the information better managed as Multi-Media Presentations uses text and graphics. The students can relate new learning to the previously stored knowledge through quick correlation and visual similarity, which leads to better and longer time learning. The layout and graphics leave impressions on the learner's mind and enhance the understanding of a concept. Multimedia learning synthesizes 5 types of media (namely text, graphics, audio, video, and animation) to provide elasticity in the expression of the creativity of a student and in sharing the ideas.

Text [3] is the most heard and primary element in Multimedia, which makes it very easy to use. It contains a gathering of characters of single and varied sizes as well as styles. Graphics [4] stands for a two-dimensional figure or diagram. The use of the photograph, drawing, or picture makes it the most creative and original way of learning. It leaves students with a clear idea of what they are learning. There are many formats for pictures like GIF, JPEG, and PNG. Audio [10] has played an essential part in education for several decades. The advantage of using audio for education is that the course material can be recorded and used by the learner as and when required. Audio tools and platforms help conduct online discussions live. Some popular and widely used software for the same is Wechat, Whatsapp, Line, and Skype. It helps overcome the hindrance often recognized due to a lack of face-to-face conversation, particularly in long-distance learning. Time-saving is yet another advantage. Audio can be used in many exciting ways like the audio plays the content and the teacher then explains the topic using examples for learner's better understanding. For example, Videos with voiceover; mathematical theorems or proofs [5-6] on the screen explained with the speech in the background. Video is an extensively utilized multimedia element. These are found in various formats like MPEG2 for DVD or MPEG4 for home videos. The information conveyed with the help of text or other multimedia is difficult and complex to understand at times. The usage of videos and this type of Multimedia provides a visual prompt to students to have a better understanding of learning. The animation is the newest technique that uses continuously moving shapes or characters. Some animation software is Adobe Flash, Author ware, and Director, which commonly used for educational purposes. Baglama et al. [7] found that utilization of activity in a custom curriculum has increased extraordinary consideration as of late. Thus, the utilization of movement for helping people with uncommon necessities has turned into a significant research question, and this

examination means to analyze and talk about the job of utilizing activity as an apparatus to improve the learning of people with unique needs. Continuous efforts are being made to bring the funding for bringing Multi-Media Presentations to a significant part of the education system. It has resulted in a low cost per student or unit as well as giving the long-term benefit. Multi-Media Presentations enables learning through searching, invention, and skill.

2. Methodology

This paper aimed to study the impact of Multimedia Presentations on education engineering. The achievement scores of pre-test, post-test tests in selected topics of Disaster Management for first year classes of the engineering institute in Punjab play an essential role. Here, the authors assume the hypothesis that there are no significant differences between mean achievement scores (in the respective subject) of students taught through traditional lecture methods (prior knowledge) and Multi-Media Presentations. The sample of this study consisted of 120 engineering students of different streams using a randomized sampling technique. Multi-Media Presentations were prepared in selected topics of disaster management by the investigator. A test in selected topics (as pre-test) administered based on prior knowledge. The same test (as post-test) administered to students after teaching them through Multimedia Presentations. The responses of the students on all the tests scored as per the scoring procedure given under the tests. Pre and Post-test achievement scores are the set of scores comprise of raw data.

2.1. Statistical Analysis of Data

Descriptive statistics (mean maximum & minimum, mode, kurtosis, skewness, standard deviation) and frequency polygons were calculated to identify the nature of scores distribution; then t-test was processed. The correlation coefficient between Pre and Post-test achievement scores are determined.

2.2. Descriptive Statistics

Descriptive statistics and frequency polygon with respect to Pre-test and Post-test achievement scores of students taught through traditional lecture method (prior knowledge) and Multi-Media Presentations is given in Table 1.

Table 1: Smoothed Frequency Distribution and Descriptive Statistics in respect of Pre-Test Achievement Scores of Students taught through Traditional Lecture Method.

CI	MidPoint	Frequency	Smoothed Frequency
38-40	39	4	3.0
35-37	36	5	7.7
32-34	33	14	15.3
29-31	30	27	21.7
26-28	27	24	24.7
23-25	24	23	23.3
20-22	21	23	15.3

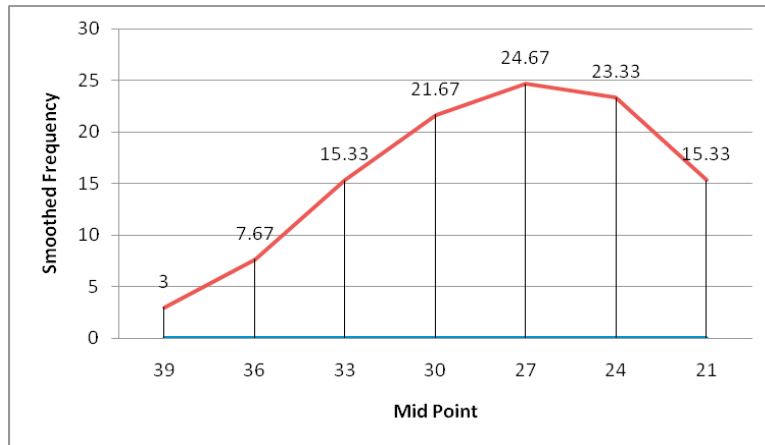| N	Mean	Median	Minimum	Maximum	S.D. Deviation	Skewness	Kurtosis
120	27.47	28.00	20	39	4.828	.268	-.562

Fig. 1: Smoothed Frequency Distribution and Descriptive Statistics in respect of Pre-Test Achievement Scores of students taught through Traditional Lecture Method.

Table 2: Smoothed Frequency Distribution and Descriptive Statistics in respect of Post-Test Achievement scores of students taught through Multi-Media Presentations.

CI	MidPoint	Frequency	Smoothed Frequency
57-59	58	9	9
54-56	55	18	15
51-53	52	27	27
48-50	49	54	21.33
45-47	46	10	4
42-44	43	2	0.67

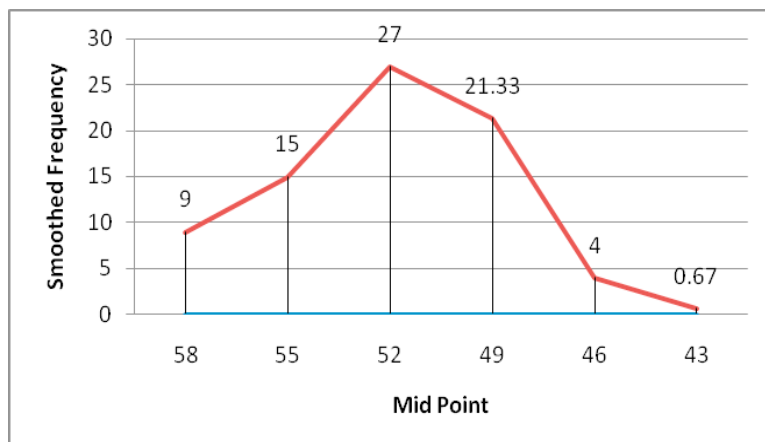| N	Mean	Median	Maximum	Minimum	S.D. Deviation	Skewness	Kurtosis
120	50.97	50	59	44	3.287	.456	-.226

Fig. 2: Smoothed Frequency Distribution and Descriptive Statistics in respect of Post-Test Achievement scores of Students taught through Multi-Media Presentations.

Table 3: To Study the Effect of Multimedia presentations (Pre-test and Post-test) on the Achievement of Students in Engineering Education.

Scores	Mean	S.D.	Standard error mean	Mean	t-ratio	95% confidence interval of the difference		Significance (two-tailed test)
						Lower	Upper	
Pre-test Scores	27.47	4.828	4.441	23.5	50.79	-24.417	-22.583	0.000

	Scores	N	Correlation	Significance				
	Pre &Post test Scores	120	0.264	0.004				

3. Results and Discussions

From the above observations (in Table 1 to Table 3), the values of mean, median and standard deviation for the pre-test and post-test achievement scores of students taught through traditional lecture method and Multimedia presentations are found to be 27.47, 50.97; 28, 50 and 4.828 and 3.287, represented the scattering of scores from the mean position. The value of skewness 0.268 and 0.456 indicating that the distribution is positively skewed shows that the scores were massed at the lower end (or left end) of the scale and spread out more gradually towards the high end (or right end) as shown in the figure. The value of kurtosis (-.562) and -0.226, which is less than 0.263, means distributions are platykurtic. The value of mean for the pre-test achievement scores of the students taught through traditional lecture method is less than the post-test accomplishment scores of the students taught Multimedia Presentations. Table 3 indicates that the t-ratio of 50.79 between pre-test and post-test achievement scores of Multimedia Presentations is significant at 0.05 level of significance. There is a significant difference between the means scores of students taught through Multi-Media Presentations. Thus, it concluded from the mean scores that in the acquisition of concepts, students taught through Multimedia Presentations achieved more as compared to the traditional lecture method.

4. Conclusion

It judiciously concluded that the utilization of Multimedia Presentations in engineering education makes the teaching-learning environment better as well as attractive. It helps in increasing the creativity in both the teacher and the student as it provides much space to exercise one's skills to be it acquired or owned. Learning becomes easy. Thus, Inclusion of Multimedia Presentations is must in the engineering education system to keep ourselves at par with the day on day basis upgrading technology.

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