Research Article

Effect of Multimedia in the teaching of Geotectonic and its satisfaction level on class VIII students

Sharmila Dutta[1] & Sanghamitra Ghosh (Gayan)[2]
[1]Assistant Professor, B.Ed., Jyotirmoy School of Education, Kaikapur, South 24 Parganas, Kolkata, West Bengal
Email: sharmiladutta94@gmail.com
[2]Assistant Professor& OSD, Erstwhile David Hare Training College (WBUTTEPA), Kolkata, West Bengal
Email: ahana2012ghosh@rediffmail.com

Abstract

Research in Teaching–learning process through Multimedia shows many factors affect students' performance. Therefore, the present study aimed to know the problems faced by class VIII students of Bengali Medium School of West Bengal in learning Geotectonic. The purpose of the present study was to know the effect of Multimedia in teaching Geotectonic to class VIII students and to know their satisfaction level of them in Kolkata and Purba Medinipur District.

Researchers aimed to study whether there is any significant difference between the effect of Multimedia in teaching and student's achievement with respect to teaching Geotectonic among class VIII students. All students of class VIII in Bengali Medium Schools of West Bengal Board are considered as the population of the study. The sample comprises 320 students. To assess the effect of Multimedia on teaching, researchers used self-made parallel form tests of achievement and an opinionnaire for students' satisfaction levesl. An Experimental Survey design has been chosen to conduct the present study. The findings of the study revealed that the majority of students achieved high score performance, after the treatment phase. The study also indicates that there exists a significant and positive effect of Multimedia among class VIII students of Kolkata and Purba Medinipur.

Keywords: Class VIII students, Geotectonic, Multimedia, Satisfaction level, Teaching-Learning strategy.

Introduction

Modern education belongs to science and technology; therefore, every individual comes under its impact. In this Era, Students use technology daily and this has an impact on their education. Effective use of Multimedia in the classroom enables teachers and students to be innovative while developing new skills and providing information. It is noticed that students who received instructions based on multimedia instruction carried out better learning than students who were taught in the traditional teaching method (Narzoles, 2013). Nowadays students are using video games, video cams, digital music players, cell phones, computers, and all other tools of the digital age from their birth and those are the essential parts of their life. It is clear that Multimedia-aided Teaching (MAT) is more fruitful than the traditional Chalk and Talk (CAT) and also more effective for the cognitive and attitude development of the students (Saha & Khan, 2015). Specifically, the multimedia

technique is a much better instruction way than traditional ways, which act on students' interest, attention, motivation and participation (Ilhan & Oruc, 2016). In recent times, the increase in the use of technology is shifting traditional classrooms into virtual classrooms by facilitating learning in new ways. Multimedia is used to facilitate learning anytime, anywhere.

Today, learning is not only involved to earn the degree but also involved to earn a depth of knowledge in the subject. The utilization of multimedia in classroom situations cannot be rebuffed anymore. Due to the conceptual difficulties in geotectonic, students often encounter perceptional conflicts that emerge from different interpretations of the same observation. It is also found that the school teachers are unable to solve those difficulties.

So, the main primary purpose of this study is to eradicate the fear of Geotectonic from students by utilizing new technology through multimedia. It is worth mentioning that studies on the following subject will be more effective and presentable if the researcher applied multimedia in teaching to show Geotectonic related matters through video clippings instead of traditional 2D blackboard work. That will make it possible for teachers to give more opportunities to students to be happier and more enjoyable during their studies. By using multimedia, not only different teaching and learning styles are used, but also the approach to learning is different which helps learners to construct their own knowledge. So, in this context researchers decided to study the effect of multimedia in teaching and its satisfaction level on students and also tried to find out the relation between them.

Objectives of the study

1. To find out the effectiveness of multimedia in teaching regarding achievement in respect to teaching Geotectonic.
2. To find out the level of satisfaction among students in relation to multimedia teaching methods.

Hypotheses of the study

1. $H_0$1: There is no significant interaction effect between locality and school type on the achievement test of students with respect to teaching in multimedia.
2. $H_0$2: There are no significant differences in mean scores of achievement tests through the traditional method between pre-test and post-test of controlled groups.
3. $H_0$3: There are no significant differences in mean scores of achievement tests between pre-test and post-test of experimental groups in rural areas after teaching through multimedia methods.
4. $H_0$4: There are no significant differences in mean scores of achievement tests between pre-test and post-test of experimental groups in urban areas after teaching through multimedia methods.
5. $H_0$5: There is no significant difference in mean scores of achievement tests through multimedia between the pre-test and post-test of the experimental group.
6. $H_0$6: There is no significant difference in mean scores of achievement tests between pre-test and post-test of experimental groups in Government aided schools.
7. $H_0$7: There is no significant difference in mean scores of achievement tests between pre-test and post-test of experimental groups in Private schools.

8. $H_0$8: There is no significant difference in mean scores of satisfaction levels among experimental groups of students with respect to teaching in multimedia.

Methodology

Sample: A random sampling technique was employed for class VIII students of North Kolkata and Purba Medinipur. The data was collected from a total of 335 students of class VIII, but the study consisted of 320 students. Among them, 160 were randomly chosen as samples of the experimental group and the rest 160 were chosen as samples of the controlled group. From each group of 160 students 40 students were selected location-wise (Rural/Urban) and School type wise (Government/ Private).

Tools: For collecting the data, a self-made close-ended opinionnaire was prepared to analyse the views of students regarding their perception of the new teaching strategies through multimedia. The opinionnaire consists of 15 items on a five-point Likert scale. The maximum possible score is 75 and the minimum possible score is 15. For testing the internal consistency or homogeneity among the items of the Opinionnaire, researchers used Cronbach's alpha (α) coefficient, which came to 0.789. On the other hand, the Criterion-referenced Test was prepared to measure the pre-test and post-test scores of the students. This CRT Test was admired by a pilot study through the test-retest method.

Research Design: The present study has used True Experimental Research Design along with pre-test and post-test of randomized experimental and controlled groups to measure the effect of multimedia in teaching regarding class VIII students' achievement in respect to teaching Geotectonic.

Variable: In this study, teaching strategies were selected as independent variables and performance on achievement tests was selected as dependent variables. On the other hand, Location and school type was selected as categorical variables.

Treatment Phase: Researchers were given treatment for the samples in three phases like Phase1-Interior of the Earth, Phase2- Plate tectonics and Phase3-Rocks with the help of multimedia and self-prepared learning design. Each phase takes one week to complete. In the fifth week, post-test was conducted for both controlled and experimental groups.

Procedure of Data Collection: Researchers administered a pre-test ($T_{1)}$ as a measure of the dependent variable for both controlled and experimental groups. As there was a randomly assigned sample as experimental and controlled group, the researcher introduced the treatment only to the Experimental group for a specific period. At the end of the experiment, the experimental and controlled group was administered the post-test ($T_{2)}$ as the measure of dependent variable.

Results and Interpretation

$H_0$1: There is no significant interaction effect between locality and school type on the achievement test of students with respect to teaching in multimedia.

Table-1: Inferential Statistics (ANOVA: Two factors with replication for an interaction effect between locality and school type)

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Sample	292.6125	1	292.6125	34.57755	1.03E-07	3.96676
Columns	762.6125	1	762.6125	90.11669	1.53E-14	3.96676
Interaction	56.1125	1	56.1125	6.630724	0.011966	3.96676
Within	643.15	76	8.4625			
Total	1754.4875	79				

Interpretation: It is found that the interaction P-value is 0.011966 ($P<0.05$) and $F = 6.630724$. So, $H_0 1$ is rejected and there is a significant effect between school type and locality on the achievement test of students with respect to teaching in multimedia.

$H_0 2$: There are no significant differences in mean scores of achievement tests through the traditional method between pre-test and post-test of controlled groups.

Table-2: Inferential Statistics (Paired Sample t Test for pre-test and post-test of Controlled group through traditional method)

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE TEST_ TOTAL MARKS	15.33	80	3.592	0.402
	POST TEST _ TOTAL MARKS	16.58	80	3.893	0.435

Paired Samples Test

Mean		Paired Differences					T	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	PRE TEST_ TOTAL MARKS - POST TEST _ TOTAL MARKS	-1.250	1.747	0.195	-1.639	-0.861	-6.401	79	0.000

Interpretation: It is found that the mean score of pre-test is 15.33 with 3.592 S.D. and the mean score of post-test is 16.58 with 3.893 S.D. Whether the difference of mean is significant or not, the t-test is employed and after analysis it is found that the calculated $\mathbf{t_{(79)}}$ = 6.401 and P = 0.001 (P<0.05). So, 't' is significant and $H_0$2 is rejected. Hence, we can conclude that there is a significant difference in achievement test result between pre-test and post-test of controlled groups regarding traditional methods.

$H_0$3: There is no significant difference in mean scores of achievement tests through multimedia between pre-test and post-test of the experimental group.

Table-3: Inferential Statistics (Paired Sample t-Test for pre-test and post-test of experimental group through multimedia)

Paired Samples Statistics									
		Mean	N	Std. Deviation	Std. Error Mean				
Pair 1	PRE TEST_ TOTAL MARKS	16.09	80	3.953	0.442				
	POST TEST_ TOTAL MARKS	18.64	80	4.713	0.527				

Paired Samples Test									
Mean		Paired Differences					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	PRE TEST_ TOTAL MARKS - POST TEST_ TOTAL MARKS	-2.550	2.261	0.253	-3.053	-2.047	-10.088	79	0.000

Interpretation: It is found that the mean score of the pre-test is 16.09 with 3.953 S.D. and the mean score of the post-test is 18.64 with 4.713 S.D. Whether the difference in mean is significant or not, the t-test is employed and after analysis it is found that the calculated $t_{(79)}$ = 10.088 and P = 0.001 (P<0.05). So, 't' is significant and $H_0$3 is rejected. Hence, we can conclude that there is a significant difference in achievement test results between the pre-test and the post-test of experimental groups regarding multimedia.

$H_0$4 : There are no significant differences in mean scores of achievement tests between the pre-test and the post-test of the experimental groups in rural areas after teaching through multimedia.

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	RURAL_PRE TEST_ TOTAL MARKS	15.20	40	4.345	.687
	RURAL POST TEST_ TOTAL MARKS	16.73	40	4.941	.781

Table-4: Inferential Statistics (Paired Sample t-Test for the pre-test and the post-test of the experimental group in a rural area after teaching through multimedia)

Paired Samples Test									
Mean		Paired Differences					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	RURAL_PRE TEST_TOTAL MARKS- RURAL POST TEST_TOTAL MARKS	-1.525	1.754	0.277	-2.086	-0.964	-5.499	39	0.000

Interpretation: It is found that the mean score of pre-test is 15.20 with 4.345 S.D. and the mean score of post-test is 16.73 with 4.941 S.D. Whether the difference of mean is significant or not, the t-test is employed and after analysis it is found that the calculated $t_{(39)} = 5.499$ and P = 0.001 (P<0.05). So, 't' is significant and $H_0$5 is rejected. Hence, we can conclude that there is a significant difference in achievement test result between pre-test and post-test of experimental groups in rural areas regarding after teaching through multimedia.

$H_0$5: There is no significant difference in mean scores of achievement tests between the pre-test and the post-test of experimental groups in urban areas after teaching through multimedia.

Paired Samples Test									
Mean		Paired Differences					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	URBAN_PRE TEST_ TOTAL MARKS - URBAN_ POST TEST_ TOTAL MARKS	-3.575	2.263	0.358	-4.299	-2.851	-9.990	39	0.000

Table-5: Inferential Statistics (Paired Sample t-Test for the pre-test and the post-test of the experimental groups in urban areas after teaching through multimedia.

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	URBAN_PRE TEST_ TOTAL MARKS	16.98	40	3.340	.528
	URBAN_POST TEST_TOTAL MARKS	20.55	40	3.616	.572

Interpretation: It is found that the mean score of the pre-test is 16.98 with 3.340 S.D. and the mean score of the post-test is 20.55 with 3.616 S.D. Whether the difference in mean is significant or not, the t-test is employed and after analysis it is found that the calculated $t_{(39)}$ = 9.990 and P = 0.001 (P<0.05). So, 't' is significant and $H_0$6 is rejected. Hence, we can conclude that there is a significant difference in achievement test results between the pre-test and the post-test of experimental groups in urban areas regarding after teaching through multimedia.

$H_0$6: There is no significant difference in mean scores of achievement tests between pre-test and post-test of the experimental groups in Government aided schools after teaching through multimedia.

Table-6: Inferential Statistics (Paired Sample t-Test for the pre-test and the post-test of the experimental group in Government aided schools after teaching through multimedia)

Paired Samples Statistics									
		Mean	N	Std. Deviation	Std. Error Mean				
Pair 1	GOVT AID_PRE TEST_ TOTAL MARKS	13.33	39	2.950	.472				
	GOVT AID_POST TEST_TOTAL MARKS	15.46	39	3.425	.548				
Paired Samples Test									
Mean		Paired Differences					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				

Pair 1	GOVT AID_PRE TEST_ TOTAL MARKS - GOVT AID_POST TEST_TOTAL MARKS	-2.128	2.226	0.357	-2.850	-1.406	-5.970	39	0.000

Interpretation: It is found that the mean score of the pre-test is 13.33 with 2.950 S.D. and the mean score of the post-test is 15.46 with 3.425 S.D. Whether the difference of mean is significant or not, the t-test is employed and after analysis, it is found that the calculated $t_{(39)}$ = 5.970 and P = 0.001 (P<0.05). So, 't' is significant and $H_0$8 is rejected. Hence, we can conclude that there is a significant difference in achievement test result between the pre-test and the post-test of experimental groups in Government aided schools regarding after teaching through multimedia.

$H_0$7: There is no significant difference in mean scores of achievement tests between the pre-test and the post-test of the experimental groups in Private schools after teaching through multimedia.

Table-7: Inferential Statistics (Paired Sample t-Test for the pre-test and the post-test of the experimental group in Private schools after teaching through multimedia)

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PVT_PRE TEST_ TOTAL MARKS	18.93	40	2.526	.399
	PVT_POST TEST_TOTAL MARKS	21.73	40	3.700	.585

Paired Samples Test									
Mean		Paired Differences					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	PVT_PRE TEST_ TOTAL MARKS - PVT_POST TEST_TOTAL MARKS	-2.800	2.053	0.325	-3.457	-2.143	-8.625	39	0.000

Interpretation: It is found that the mean score of the pre-test is 18.93 with 2.526 S.D. and the mean score of the post-test is 21.73 with 3.700 S.D. Whether the difference of mean is significant or not, the t-test is employed and after analysis it is found that the calculated $t_{(39)}$ = 8.625 and P = 0.001 (P<0.05). So,'t' is significant and $H_0$9 is rejected. Hence, we can conclude that there is a significant difference in achievement test results between the pre-test and

the post-test of experimental groups in Private School regarding after teaching through multimedia.

$H_0$8: There is no significant difference in mean scores of satisfaction level among experimental groups of students with respect to teaching in multimedia.

Table-8: Inferential Statistics (One-Sample t-Test for satisfaction level among experimental group of students with respect of teaching in multimedia)

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean		
EXPERIMENTAL GROUP_ TOTAL_MARKS	80	60.18	3.306	.370		
One-Sample Test						
	Test Value = 0					
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
EXPERIMENTAL GROUP_ TOTAL_MARKS	162.791	79	.000	60.175	59.44	60.91

Interpretation: It is found that the mean score of the experimental group satisfaction level is 60.18 with 3.306 S.D. Whether the difference in mean is significant or not, the t-test is employed and after analysis it is found that the calculated $t_{(79)}$ = 162.791 and P = 0.001(P<0.05). So, 't' is significant and $H_0$4 is rejected. Hence, we can conclude that there is a significant difference in the post-test results of the experimental group regarding student satisfaction level.

Findings of the study

- In this study, it is shown that there is a significant relationship between the pre-test and the post-test results of experimental groups regarding traditional methods and multimedia methods.
- It is observed that there is a significant effect in the post-test score of students with regards to their learning Geotectonic through multimedia method.
- The mean of the post-test scores is showing that there is a remarkable improvement from the pre-test scores of the students, after introducing a new teaching method.
- The Experimental treatment proved effective and the post-test results improved in this selected topic.
- The results of the mean score by which the post-teaching scores of the students have improved after the implementation of the intervention strategies also show the effectiveness of the treatment given to the students for developing their knowledge.
- It is also observed that there is a

significant improvement in the post-test scores of students in respect of locality and school type.

- The mean of the post-test scores of Private school students was much better than the Government school students. On the other hand, the mean scores of urban area's school students were much better than rural areas.
- On the other side of the research, it was also seen that the score of the experimental group's satisfaction level is high. It is indicated that they felt pleasure through innovative teaching strategies.
- From this study, the researcher finds out that many samples had no idea about the Geotectonic (class VIII geography chapter). Therefore, they got a chance to better their knowledge through multimedia methods.

Suggestion

How a presentation of a teacher in teaching affects the learning of students. This study is also helpful for Geography teachers, they can be enhanced for better development of teaching techniques through multimedia and in turn, they adopt necessary action for better scaffolding and thereby adopt new teaching strategies to present Geotectonic in a more effective and interesting way.

Conclusion

In our teaching-learning process, there is little doubt that the changing role of education is presently being refreshed with the effect of multimedia technologies. This theme has constructed a new paradigm in education and the emergence of new concepts in Geotectonic, which enhance students' learning capabilities. This new learning environment will specifically influence the way teachers teach and students learn. This study has represented and cultivated the use of multimedia in a learning environment to prepare students with critical thinking and problem-solving skills and they will be able to learn in an ICT-oriented learning situation. From the results, we are able to decide that by implementing multimedia into the teaching-learning process, the traditional method is recharged and redirected in a new path of innovation. Students act like active participants in their learning process and are able to use various elements of multimedia to achieve their goals. In this respect, there is no doubt to say that the effect of multimedia in teaching is very useful to help students' learning. (Acknowledgement: Researchers would like to acknowledge all the heads of the schools, teachers, and students of West Bengal Govt. aided and private Bengali medium schools in Purba Medinipur and North Kolkata, who participated in the present study.)

References

Akinson, O. (2018*). Effect of the Use of Multimedia on Students' performance in Sec ondary School Mathematics. Global Media Journal*. 16. Retrieved from https://www.globalmediajournal.com/open-access/effect-of-the-use-of-multimedia-on-students-performance-in-secondary-school-mathematics.pdf.

Almara'beh, H., Amer, F. E., & Sulieman, A. (2015). *The Effectiveness of Multimedia Learning Tools in Education*. *International Journal of Advanced Research in Computer Science and Software Engineering.* 5(12). 761-764. 22. Retrieved from https://www.researchgate.net/publication/290429349_The_Effective

ness_of_Multimedia_Learning_Tools_in_Education.

Aloraini, S. (2012). *The impact of using multimedia on students' academic achieve ment in the college of Education at King Saud University*. 24(2), 75-82. Retrieved from https://www.sciencedirect.com/science/article/pii/S2210831912000033.

Ayas, C. (2015). *The Role of Media in Geography Courses from the Perspectives of Pre-Service Social; Studies Teacher. Journal of Social Studies Education Re search*. 6(1). 172-189. Retrived from https://files.eric.ed.gov/fulltext/EJ1105369.pdf.

Barzegar, N., Farjad, S., & Hosseini, N. (2012). *The Effect of Teaching Model Based on Multimedia and Network on the Student Learning. Case Study: Guidance Schools in Iran*. 47. 1263-1267. Retrieved from https://doi.org/10.1016/j.sbspro.2012.06.809.

Donaldson, D. P. (2003). *Multimedia technology in the schoo geography classroom: A case study.* 45(2). 94-105. Retrived from https://www.researchgate.net/publication/283234474_Multimedia_technology_in_the_school_geography_classroom_A_case_study.

Freundschuh, S. M., & Helleviks, W. (1999*). Multimedia Technology in Cartography and Geographic Education*. *Multimedia Cartography*. (pp271-280). Springer. Berlin: Heidelberg Retrieved from https://doi.org/10.1007/978-3-662-03784-3_25.

Hintermann, C., Bergmeister, M. F., & Kessel, A. V. *Critical Geographic Media Literacy in Geography Education: Findings* from th MiDENTITY Project. *Journal of Geography*. 119(4). 115-126. Retrieved from https://doi.org/10.1080/00221341.2020.1761430.

Incedyl, N. D. (2018). *The Impact of Using Multimedia Technologies on Students Academic Achievement in the Bakirkoy Final College*. *International Journal of Humanities Social Science and Education.* 5(1), 40-47. Retrieved from https://www.arcjournals.org/pdfs/ijhsse/v5-i1/7.pdf.

Ilhan, O. G., & Oruc, S. (2016*). Effect of the use of Multimedia on students' performance: A case study of social studies class. Educational Research and Reviews*. 11(8), 877-882. Retrived from https://files.eric.ed.gov/fulltext/EJ1099996.pdf.

Kolesnikova, I.V. (2016). *Combined Teaching Method: An Experimental Study*. *World Journal of Education*. 6(6), 51-59. Retrieve from https://www.researchgate.net/publication/312441817_Combined_Teaching_Method_An_Experimental_Study.

Lee,Y. & Keckley, K. (2006). *Effects of a Teacher-Made Multimedia Program on Teaching Driver Education.* 2(5). Retrieve from https://files.eric.ed.gov/fulltext/EJ967106.pdf.

Lynch, K., Bednarz, B., Boxall, J., Chalmers,L. France, D., & Kesby, j. (2008). *E-Learning for Geography's Teacing and Learning Spaces. Journal of Geography in Higher Education*. 32(1). 135-149. Retrieved from https://doi.org/10.1080/03098260701731694.

Muryani, C., Nugraha, S., AS, L. T., & Soegiyanto, H. (2016*). Developing learning multimedia based on Geographical Information System to improve students' spatial ability in flood-disaster management*. 1910. 345-349. Retrieved from https://doi.org/10.1007/978-3-662-03784-3_25.

Narzoles, G. T. D. D. (2013). *The Effect of multi-media instruction on student learning*. *Journal of Education and Practice*. 4(5), 126-130. Retrieved from file:///C:/Users/sharmila/Downloads/4798-6871-1-PB.pdf.

Patel, C. (2013). *Use of Multimedia Technology in Teaching and Learning communication skill: An Analysis*. *International Journal of Advancements in Research & Technology*. 2(7). 2278-7763. Retrieved from http://www.ijoart.org/docs/Use-of-Multimedia-Technology-in-Teaching-and-Learning-communication-skill.pdf.

Shah, I., & Khan, M. (2015). *Impact of Multimedia-aided Teaching on Students' Academic Achievement and Attitude at Elementary Level.* 5(5), 349-360. Retrieved from http://davidpublisher.org/Public/uploads/Contribute/556fad46a6d6f.pdf.

Sousa, D. L., Richter, W. B., & Nel, C. (2017). *The effect of multimedia use on the teaching and learning of Social Sciences at tertiary level: a case study.* Yesterday & Today. 1-22. Retrieve from https://www.researchgate.net/publication/319325707_The_effect_of_multimedia_use_on_the_teaching_and_learning_of_Social_Sciences_at_tertiary_level_a_case_study.

Xu, X. (2017). *Study on Effective Using of Multimedia Teaching System and Enhancing Teaching Effect*. 12(6). 187-195. Retrieved from https://doi.org/10.3991/ijet.v12i06.7093.

Zhang, X., Zhang, X., & Yang, X. (2016*). A study of the effects of multimedia dynamic teaching on cognitive load and learning outcome. Eurasia Journal of Mathematics, Science & Technology Education*. 12(110, 2851-2860. Retrieved from https://www.ejmste.com/download/a-study-of-the-effects-of-multimedia-dynamic-teaching-on-cognitive-load-and-learning-outcome-4636.pdf.