

Impact of Multimedia in Improving Quality Teaching Science for Grade-9 Students of MSU-Sulu Laboratory High School

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Abstract: The study used quasi-experimental research design to determine the effect of using multimedia on the performance of the grade-9 science students in MSU-Sulu. Two sections were utilized in the experiment. One section was treated with the teaching method using multimedia. The other section was taught without using multimedia. The teacher used the same topic to be taught in the two sections. The teacher gave pretest before teaching in both methods. After teaching the teacher gave posttest. Three research questions were formulated. The first is “What is multimedia?” This was answered by 57 students and 5 teachers using checklist questionnaire. The second research question is “What is the effect of multimedia in teaching science?” It was answered using survey questionnaire to get the opinion of teachers on the effect of multimedia in teaching science. The result of the survey was supported with the result of teaching in the quasi-experimentation. The mean grade of the students were computed and compared, the mean difference between the posttests score using multimedia and without using multimedia. T-test for independent sample was used to determine the significant difference between the posttests. The hypothesis “there is no significant difference between the posttest scores when the teacher was using multimedia and not using multimedia, was also tested. The third research question is “Is there significant difference in the effect of using multimedia when the data are grouped according to gender, socio-economic status and educational background of parents?” The question was answered using One Way ANNOVA and test the hypothesis. The study concluded that the students agree that teachers are using multimedia such as Microsoft Encarta and Microsoft excel. These multimedia were perceived by the teachers highly affect the academic performance of the students. The quasi experiment provide evidence to say that the use of multimedia highly affect the performance of the students in MSU-Sulu in grade-9 science to very satisfactory level compared to teaching without using multimedia only a satisfactory level. There is no significant difference between the perceptions on the effect of multimedia on the academic performance of the students in grade-9 science.

Keywords: Quasi-experiment design, multimedia, quality science teaching, quality science learning.

1. Introduction

Teaching is a complex craft. In some ways it is impossible to capture in a page or two the sophistication of what good teachers do. Yet nothing is more fundamental to achieving our goal of success for every student than high quality teaching

(Sharyn O’nell). Teaching science in the K-12 curriculum requires an effective teacher who use of best strategies or techniques to enhance better learning. Students may be given basic quality education to prepare them for their chosen career in the future. Since science is one of the most important subjects that every student must learn, teaching-learning processes in the classroom must be improved.

In the new curriculum, different fields of sciences are introduced in the spiral progression scheme, purposely to guide students understand the basic knowledge in the different fields such as biological and physical sciences which the teachers need to develop the 21st century skills in one hand and the use of multimedia on the other. The science teachers in MSU-Sulu Laboratory High School have applied the multimedia approach of teachings because this method needs special skills using advance technology. This high school is equipped with necessary technology equipment but the teachers were not given appropriate training to use them.

Basic to the student’s needs in MSU-Sulu Laboratory High School today is effective teaching that can improve learning abilities. However, the observation in the classroom today revealed that the teachers are still confined to use the chalk-board teaching approach because they believed, it is still the best approach in time. However, in the 21st millennium appear to be old fashion teaching strategy. But the teachers are unable to improve their teaching approaches. Hence, a search for effective teaching strategies is still progress.

Since teaching and learning can be made easier, faster and more interesting with the help of multimedia, this study can contribute tremendous counterpart in the teaching and learning process. Advanced instructional delivery using technology enhances direct impact on teaching process. Multimedia has great potential and plays vital role in improving the quality of education in the 21st century.

Comparatively, other provinces and cities were observed to have strongly promoting the use of hardware and software in the teaching learning process which eventually showed positive effect in the learning environment. In fact, multimedia brings positive effect in the learning process, hence most of the teachers were using multimedia and technology in teaching.

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The report of the UNESCO (2016) regional office has laid down the following criteria for media selection in teaching institutions: availability, accessibility, acceptability, economics and validity. Depending upon the availability and circumstances, a media mixes it. Multimedia has to be used to get maximum benefit for the students. Using a combination of media for teaching is more effective than using a single medium. After 1980's, it is observed that educational environment has also changed with the increased in computer equipment and software (Akkynunla, 1995).

Multimedia is expected to accelerate the pace of education while bringing it to a larger selections of society. In the process of imparting education, many teaching aids/tools such as Audio–video materials, computer aided learning, computer based training, interactive computer video disc, multimedia, etc., are being used to supplement the traditional teaching.

Multimedia has been one of the most well-known and effective training tools and was referred to as the technological wave of the future (Harris, 1993). Thus, the present study seeks to evaluate the effect of using multimedia in improving the quality of teaching grade-9 science at MSU-Sulu Laboratory High School. This effect will be assessed on student's level of achievements.

2. Theoretical and Conceptual Framework

This study is anchored in the following theories.

Celikoz (1998) using multimedia students can gain the knowledge and information that would be impossible to get in traditional ways; besides students could find the opportunity to prepare their own products with multimedia technique. Semerci (1999) the message via multimedia reaches the receivers in various ways and thus, it provides a richer learning environment. The subjects being taught could be transmitted to the students with web-based audio, visuals, video and animations in a way that could not be taught in classrooms authentically with other techniques. Uşun (2000) multimedia creates a familiar, various, economic and practical environment in education. Akkoyunlu and Yılmaz (2005) multimedia increase academic achievement of the students. The use of multimedia affects education positively when designed properly compared to traditional instruction, in terms of academic achievement. Cubrilo, et. al., (2014) multimedia application in teaching physics had resulted in a significant increase of the quantum and quality of students' knowledge in all categories, as well as the retention of knowledge quality in the category of applying compared to the traditional method of teaching. The validity of multimedia application in teaching practice enhancing understanding of fundamental physical concepts and laws, and therefore increasing the efficiency of teaching physics.

Nusir, et. al. (2012) found that in such math skills at this age, using programs or multimedia enhanced methods of teaching can be effective in getting students attention especially when cartoon characters are used. Results also showed that there is no significant difference in learning and knowledge skills and information absorption based on gender distribution where results comparison between little boys and girls showed no

significant difference in their learning skills. Aloraini (2005) states that multimedia is one of the best educational techniques because it addresses more than one sense simultaneously, as it addresses the senses of sight & hearing. Multimedia programs provide different stimuli in their presentations which include a number of elements some of which are: Texts, spoken words, sound & music, graphics, animations and still pictures.

Theoretical evidence showed the positive effect of using multimedia in teaching. The impact of using multimedia on the quality of teaching science as evidence from the quality of science learning. Use of Multimedia is the independent variables. The Quality of Teaching Science is the dependent variables and the quality of science learning is the output of the quality teaching.

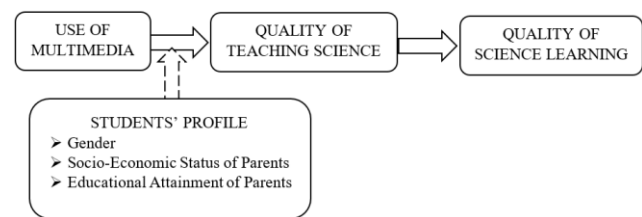


Fig. 1. Theoretical and conceptual framework

3. Statement of the Problem

The study focused on the effect of using multimedia for improving the quality of teaching grade 9 science at MSU- Sulu Laboratory High School. Specifically, it seek answers of the following research questions: What is multimedia? What is the effect of multimedia in teaching science? Is there significant difference in the effect of using multimedia when the data are grouped according to gender, socio-economic status and educational background of parents? The researcher hypothesize that there is no significant difference in the effect of using multimedia when the data are grouped according to gender, socio-economic status and educational background of parents.

4. Literature Review

This literature emphasized that science subjects are taught deductively starting from theories, concepts, as well as models are presented by the teacher, then move on to the exercises in the textbook. Usually the only motivation students have to learn the matters, beyond grade, is the vague promise that it will be useful or important in real life or in their careers (Prince and Felder, 2007). Science is perceived to be difficult by most of the students. It is a-priori viewed when dealing with concepts which are difficult to be explained and understood. Students feel that they have to learn a lot of theory without even considering how this theory might apply to the real world they are living (Dalcosta, et. al., (2009). Multimedia provides easiness and facilities in education. Thanks to multimedia practices, students can learn variety and brand new of information. Students can gain the knowledge and information that would be impossible to get in traditional ways; besides students could find the opportunity to prepare their own products with multimedia technique (Dwyer, 1993).

It can be observed that multimedia gains authenticity and

variety in learning and instruction. Semerci (1999) expresses the fact that the message via multimedia reaches the receivers in various ways and thus, it provides a richer learning environment. The subjects being taught could be transmitted to the students with web-based audio, visuals, video and animations in a way that could not be taught in classrooms authentically with other techniques. This way, closeness to reality could be provided and complete learning could be achieved (Semerci, 1999). Another contribution multimedia makes into education is the increase in academic achievement of the students. When compared to traditional instruction. The use of multimedia affects education positively when designed properly compared to traditional instruction, in terms of academic achievement (Akkoyunlu and Yilmaz, 2005).

Learning, teaching and communicating science implies very often the use of technology. Multimedia has its own place in the science teaching legal documentation, being mainly used to promote learning and the development of transversal competences associated with scientific and digital literacy (Paiva *et al.*). The results of the pedagogical research conducted by Cubrilo, *et al.* (2014) to examine the effects of multimedia application on teaching physics compared to the traditional method of teaching. The influence of multimedia application in teaching physics on the quantum, quality and retention of students' knowledge was examined by the experimental method. Knowledge tests were used as research instrument. Tests questions were divided based on Bloom's taxonomy into three basic categories: remembering, understanding and applying. It was determined that multimedia application in teaching physics had resulted in a significant increase of the quantum and quality of students' knowledge in all categories, as well as the retention of knowledge quality in the category of applying compared to the traditional method of teaching. Research results have shown the validity of multimedia application in teaching practice with the aim of enhancing understanding of fundamental physical concepts and laws, and therefore increasing the efficiency of teaching physics.

Nusir, *et al.* (2012) wrote that the continuous inventions and evolutions in all information technology fields open new channels and opportunities to enhance teaching and educational methods. In one side, those may improve the abilities of educators to present information in an interactive and media enhanced formats relative to traditional methods. This may help students or learners through offering them the information in channels and methods that can be easier to understand, deal with, and retrieve. On the other hand, offering those alternative methods of teaching can be helpful particularly for children, people with special needs, or students in rural areas where they can have virtual or remote instructors especially for majors that have shortages.

Tinker (2014) wrote that to a surprising extent, what we teach is dictated by what we have been teaching, even when far better strategies and resources are available than are currently used. There are many reasons for this innate conservatism. Texts, tests, standards, unions, and poor teacher preparation all resist change while there are few incentives for change.

Aloraini (2012) found that there are statistically-significant differences between the experimental group and the control group at a significance level of 0.05 for the interest of the experimental group. Both groups were subjected to pre & posttests in the subject tackled by the lecture. The analysis result of the pretest showed no statistically-significant differences, which in turn proves the equivalence of the two groups. Meanwhile, the analysis result of the post test showed the following: There are statistically-significant differences between the experimental group and the control group at a significance level of 0.05 for the interest of the experimental group.

Guzey and Roehrig (2009) found to have positive impacts to varying degrees on teachers' development of TPACK. Contextual factors and teachers' pedagogical reasoning affected teachers' ability to enact in their classrooms what they learned in the program. Suggestions for designing effective professional development programs to improve science teachers' TPACK are discussed. Science teaching is such a complex, dynamic profession that it is difficult for a teacher to stay up-to-date. For a teacher to grow professionally and become better as a teacher of science, a special, continuous effort is required (Showalter, 1984, p. 21).

From the literature, it could be asserted that application of multimedia hastens learnings as it helps and presents more than one technological factor to the learner and it addresses more than one emotion of the receiver, thereby enhancing their abilities and will produce an excellent outcome in their achievements.

Teaching science becomes easier and exciting with the presence of multimedia as stated by Dansalan. Multimedia provides educator with a unique opportunity to control instruction by way of planning and selecting the audio and visuals that the learners receive. Additionally, Pun (2014) points out that the computers have appeared as powerful tools to facilitate science and help students and teachers understand the subject a vividly as it should be. The multimedia teaching is a design that select and applies teaching media reasonably, according to the characteristics of learning target and aim, organically combining with traditional teaching method to complete the whole learning process and structure to achieve the optimized teaching. Multimedia to improve class efficiency, increase the active involvement of the students and cultivate their ability of using technology through exploring interaction, collaboration and cooperation.

To sum up multimedia, hasten the learning process as it is the best teaching aids or tool where student can easily grasp the subject to be learned in a period of time. The use of multimedia will improve students' understanding scientific concepts.

5. Method

Quasi experimental design was used to determine the effect of multimedia on the performance of grade-9 students in science. 57 students and 5 teachers were utilized to participate in the study. The teaching process involved multimedia using power point presentation, Microsoft excel and Microsoft Encarta. The data were analyzed using mean, t-test and One

Analysis of Variance. The students were given pretest before teaching and posttest after teaching. The average grades were computed to determine the level of learning competency.

6. Result

The students agree ($\mu=4.15$) that all of the listed multimedia in the table from Microsoft Encarta down to the Microsoft Excel are multimedia used by the teachers and students in the teaching learning process. The uses of these multimedia follows the lessons presented as to be used as visual – film showing, you tube, video clips, power point presentation like still pictures, and others. The auditory – involved listening to the passage and expression, You Tube, song lyrics, and others. Kinesthetic – movements, learning dances, emulation and others. The teachers perceived that multimedia can highly improve ($\mu=4.7$) the academic performance of the students in grade-9 science. The posttest scores in the group where the teacher used multimedia in teaching is 44.66 and standard deviation 6.195 given the verbal description very satisfactory. The posttest score of the students where the teacher is not using multimedia is 42.67 given the verbal description satisfactory. The academic performance when using multimedia is very satisfactory compared to a satisfactory level when not using multimedia. The hypothesis is accepted there is no significant difference between the perceptions in the effect of multimedia when the respondents are grouped according to gender ($t=1.702$; $p=.103$; $\alpha=.05$) no significant differences are also observed when the data are grouped according to socio-economic status ($F=.396$; $p=.756$; $\alpha=.05$), and educational attainment ($F=2.074$; $p=.117$; $\alpha=.05$).

7. Conclusion

In the light of the findings, the study concluded that the students agree that teachers are using multimedia such as

Microsoft Encarta, Microsoft excel, projector and other media. These multimedia was perceived by the teachers highly affect the academic performance of the students. The quasi experiment provide evidence to say that the use of multimedia highly affect the performance of the students in MSU-Sulu in grade-9 science to very satisfactory level compared to teaching without using multimedia only in satisfactory level. There is no significant difference between the perceptions on the effect of multimedia on the academic performance of the students in grade-9 science when the data are grouped according to gender, socio-economic status and educational attainment of parents.

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