JPAIR Institutional Research
Vol. 2 · April 2013
Print ISSN 2244-1824 Online ISSN 2244-1816
doi: http://dx.doi.org/10.7719/irj.v2i1.257

JPAIR Institutional Research is produced
by PAIR, an ISO 9001:2008 QMS certified
by AJA Registrars, Inc.

Multimedia-Aided Instruction in Teaching Grade Four Science and Health: Its Effect on Pupils' Performance and Attitude towards Multimedia Use in the Classroom

VIRLEN O. GALOPE
Orcid No. 0000-0002-0801-6037
Email: virlengalope@gmail.com
Mindanao University of Science and Technology
Cagayan de Oro City, Philippines

ABSTRACT

This study is focused on the effects of multimedia aided instructions in Grade 4 Science and health pupils' performance and attitude towards multimedia. Specifically this study sought to explore the multimedia aided instruction on the learning environment of the grade four pupils' performance in science and health. Two intact classes in grade 4 were exposed to multimedia aided instructions. The difference in gain scores produced by integrating multimedia in Science and Health 4 classes and those produced by conventional method of teaching was investigated in this quasi experimental research. Results indicated that using the multimedia in the classes produced significant improvement in the performance of the pupils in Science and Health, but not in the other, which is congruent with most other results for this strategy of teaching found in the literature. Follow-up survey of attitudes of 86 pupils towards the use of multimedia in the classroom provided additional evidence for its positive effect in the teaching learning process. The pupils' attitudes towards their class were positive about the potential for multimedia and enthusiastic about what this would mean in learning Science and Health. Utilizing multimedia seemed to affect the teachers'

personal and professional growth. Teachers expect to develop their technological skills and knowledge to use multimedia in their classrooms. Pedagogical issues challenge the teachers' approaches in the teaching and learning.

Keywords - Multimedia Integration, Effect on Pupils Performance, Attitude of Pupils towards Multimedia in the Classroom, quasi-experimental design, Philippines

INTRODUCTION

Education contributed a complete human development for survival. Thus, it alone differentiates between animal and man. Education enables a person to face reality with adequate knowledge, intellect and wisdom. If we go back even a hundred years from now and compare the development during that span, we come across amazing advancements in science and technology, commerce, health care and transport and education is the crux of all these developments (Bitner 2002).

Education for All (EFA) calls for improvement in quality education in all aspects and aims for a situation where people can achieve excellence. Coupled with this goal is the development of skills and potentials of all learners in the school system. This could be done through the provision of different activities facilitated by the teacher.

With the help of various resources that internet offers, teachers found things greatly attracted to. These resources can somehow sustain the learners own interest of learning new insights in the use of multimedia (Liu, J. 2010).

Pupils learning from multimedia activities were interactive, flexible, personalized and convenient. A multimedia aided instruction engaged their interest, and encouraged them to collaborate, to inquire and to explore effectively, far beyond the bounds of the school. Support for pupils efforts to learn both independently and collaboratively, and at their own pace, come from other pupils, faculty, and staff members (Dickie, L. 2003).

In addition, due to a rapidly changing environment, science and health education has been plagued with increasing quantities of complex information with waning numbers of faculty members. Investigating pedagogical strategies that address these issues is essential. Implementing carefully designed multimedia instruction (MMI) may be part of the solution. With development of information technology, it is much easier for people to see wide use of modern information

multimedia technology in nearly every field. As for linguistic teaching field, Multimedia aided instruction (MAI) has been applied frequently in recent years (Andrada 2001).

This study is conducted to determine the effects of using multimedia in classroom instruction. Further, the study would like to discover if with the aid of multimedia in teaching science and health in the grade four pupils can increase their performance and attitude towards multimedia use.

OBJECTIVES OF THE STUDY

The aim of this study was to explore the experience of multimedia aided instruction on the learning environment at Balulang Elementary School and the pupils' performance in science and health. This study also aimed to discover the ways pupils' make sense of their participation in an educational environment, in which multimedia aided instruction was used to measure respondents' performance and attitude towards multimedia aided instruction.

MATERIALS AND METHODS

Research Design

This study utilized the quasi-experimental design. There were four (4) intact classes used during the experiment. Two classes were randomly chosen as the experimental groups while the other two classes served as the control group. But there was no random assignment of subjects to both groups. An illustration of the non-equivalent group design is shown in the figure below:

	Pretest	Treatment	Posttest
Experimental Group	O_1	X	O_2

Control Group	O_3		O_4

Legend: O_1 and O_3 = pretest O_2 and O_4 = posttest
X – treatment (with multimedia aided instruction)

Subjects of the Study

In this study, four intact classes in science and health four were used as subjects of the study. Sections A & B were randomly selected as the experimental group while sections C & D were the control group. The members of the experimental group were exposed to the multimedia instruction while the control group was not exposed in multimedia aided instruction.

Research Instrument

In this study two sets of instruments were used. The researcher made a test as the grade four science and health achievement test. Items from this test were based from the Philippine Elementary Learning Competencies. This measured the performance of the pupils in science and health. The second instrument was a likert scale instrument that measures the pupils' attitudes towards multimedia as an aid to instruction.

The tests were validated using another group of elementary school pupils of the same District which was suggested by our District Supervisor. The test items were then subjected to item analysis. Out of the 50 item teacher-made test, 10 items were discarded. The reliability index is 0.76 using the Richardson formula 21.

Statistical Treatment

The mean and standard deviation were used to describe the science and health performance and pupils' attitude to the two groups when they were grouped according to the given treatment.

ANCOVA was used to determine the significant difference on the grade four pupils' science and health performance. The hypothesis was set at 0.05 level of significance.

Scoring Procedure

The following is guide in interpreting the scores of the pupils in the test performance. This was based on the following:

Percentage			Descriptive Equivalent
75	–	100	mastered
51	–	74	nearly mastered
25	–	50	not mastered
1	–	24	Poor

The scoring procedure used in analyzing the data about the pupils' attitude towards the use of multimedia in the classroom is given below:

For Positive Indicators For Negative Indicators

Scales		**Responses**	**Scales**		**Responses**
5	-	strongly agree	1	-	strongly disagree
4	-	agree	2	-	disagree
3	-	undecided	3	-	undecided
2	-	disagree	4	-	agree
1	-	strongly disagree	5	-	strongly agree

A group of teachers and the school head were invited to observe the class on how multimedia was used /presented by the teacher. The observation was both on the experimental and control group. They used the following criteria in rating the teachers. This criteria was based on the Competency Based-Performance Appraisal System for Teachers:

Legend:

1 – Below Basic. Teacher performance on the job and outputs frequently fall below standard in teaching science and health.
2 – Basic. Teacher performance meets basic expectations based on standards in teaching science and health.
3 – Proficient. Teacher Performance often exceeds expectations in teaching science and health.
4 – Highly Proficient. Teacher performance consistently exceeds expectations in teaching science and health.

After previewing the multimedia, the teachers with the school head concluded that with multimedia-aided instruction students expressed confidently their

knowledge in multiple ways. However some constraints in using multimedia-aided instructions were identified such as: technological resources both hardware and software, technological skills for both students and teachers and time required to plan, design, develop and evaluate.

The Experiment
Pre-experiment Activity

Most of the videos used in the instruction were downloaded from the internet. One of the website visited for references was makemegenius.com. The downloaded videos were previewed by a group of teachers including the school head. It was then evaluated as to the appropriateness of the videos using the following criteria: topics within the Philippine Elementary Learning Competencies; suits the pupils' age, needs and level of understanding; accuracy of the information being presented; language used; and graphics understandable by the pupils'. Out of the four videos downloaded only one for each topic was used for the experiment.

The table below shows the corresponding multimedia-aided instruction employed in the experimental and control group.

Table 1. Topics and corresponding multimedia-aided instruction employed in the first and second grading

Topics	Mutimedia Use Control Group	Experimental Group
First Grading		
I. People		
Skeletal System	charts, pictures, real objects	video, ppt, real objects
Muscular system	charts, pictures, real objects	video, ppt, real objects
Digestive system	charts, pictures, real objects	video, ppt, real objects
Second Grading Topics		
II. Animals	charts, pictures	video, ppt
III. Plants	charts, pictures, real objects	video, ppt, real objects

Topics on the first grading include skeletal system, muscular system and the digestive system. The multimedia used in the conduct of the experiment was

videos, power point presentation and real objects. Likewise, topics on animals and plants in the second grading utilized the same multimedia in the first grading lessons. While the control group, with the same lessons in the experimental group utilized still pictures, charts and real objects in the lesson.

The Experiment

Pre-experiment Activity

Most of the videos used in the instruction were downloaded from the internet. One of the website visited for references was makemegenius.com. The downloaded videos were previewed by a group of teachers including the school head. It was then evaluated as to the appropriateness of the videos using the following criteria: topics within the Philippine Elementary Learning Competencies; suits the pupils' age, needs and level of understanding; accuracy of the information being presented; language used; and graphics understandable by the pupils'. Out of the four videos downloaded only one for each topic was used for the experiment.

The Experiment Proper

When all the multimedia materials were ready the pretest was given to both experimental and control groups last June 30, 2013. The duration of the experiment was for two grading periods or from July to September. The class lasted approximately twenty (20) weeks, five (5) days a week, one hour daily. The coverage of the topics for the two classes was the same for the two grading periods based on the learning competencies provided. The two classes were conducted in the school ICT Room.

Four intact heterogeneous classes were utilized in the conduct of the study. The researcher was the one who handled the four classes starting at 8:30 to 9:30 and 10:30 to 11:30 in the morning for the experimental group and 1:05 to 2:05 and 2:05 to 3:05 in the afternoon for the control group.

The experimental group was exposed to multimedia-aided instructions. They were exposed to pictures, video, graphics, animations, live objects, power point presentations and hands-on manipulation of the computer, while the control group was taught in a lecture-discussion method. The class used visual aids such as still pictures, charts and sometimes pupils were asked to bring real objects as an instructional aid.

RESULTS AND DISCUSSION

Table 2.Descriptive statistics on the performance of the grade four pupils in science and health classes with and without multimedia aided instruction

Group/Test	N	Mean	Standard Deviation
		Pretest	
Experimental	84	14.31	2.20
Control	86	12.08	2.45
Both	170	13.18	2.58
		Posttest	
Experimental	84	29.99	5.48
Control	86	22.74	2.71
Both	170	26.32	5.62

TPS = 40

The table shows that the means in the pretest in the experimental and the control group has a minimal difference. While the experimental and the control group in the posttest showed an increase in their means.

The ANCOVA was used to test the significance of the difference of the two groups. The summary of the test is shown in table 10.

Table 3.ANCOVA results on the performance of the grade four pupils in science and health classes with and without multimedia aided instruction

Source of Variation	Sum of Squares	Mean		F	p-value
		df	Squares		
Pretest	62.797	1	62.797	3.433	.066
Group	1529.658	1	1529.658	63.63*	<.0001
Error	3054.564	167	18.291		
Total	4647.019	169			

*p<.05 R squared = .429 (adjusted R squared = .422)

Table 2 shows the summary table of one-way ANCOVA on the performance of the grade 4 pupils in Science and Health as influenced by the use of multimedia

in the classroom. The ANCOVA yielded an F-ratio of 53.63 value with probability value of <0.0001 which is significant at 0.05 level of significance. The results revealed that there is sufficient evidence not to accept the null hypothesis. This implies that there is a significant difference in the performance of the group exposed to multimedia with a posttest mean of 29.99 compared to the group not exposed to multimedia with a posttest mean of 22.74. This further implies that the experimental group performed better than the control group.

Using multimedia in Science and Health class has significant effect on the performance of the pupils in the achievement test. Likewise 42.2% (r^2 =0.422) of the variance in the observed academic performance could be explained by the use of the multimedia.

However, pupils' gender has no impact or significant difference on attitude towards multimedia-aided instruction. Thus, attitude towards multimedia-aided instruction between male and female pupils are the same. It means that both boys and girls feel the same towards the use of multimedia aided instruction in their science and health class.

According to the theory of Constructivism, knowledge is not taught but is learned by the learner himself through constructing new knowledge on the bases of old knowledge, under a certain setting, with the help of others, such as teachers or study partners, utilizing certain study resources. So the student should be the center of teaching and "student-centered methodology" should be used. That is to say, the student is the center of teaching and the teacher works as organizer, facilitator and motivator, utilizing setting, cooperation and dialogue to motivate the student's interests, activity and creativity. Teachers should meet the needs of students. From this point of view, multimedia assisted approach can help students learn in this way.

It cannot be denied that multimedia assisted approach can make learning more interesting, and to some extent, change the situation of having to learn into willing to learn. Multimedia courseware combines sound, pictures, texts together and it offers a vivid, direct study environment. It has different kinds of forms, exercises, and activities. It can arouse pupils' interest.

Meanwhile, the new method cannot meet all the expectations. With the help of various resources that internet offers, teachers find things greatly attract them and in turn unavoidably organize teaching materials according to their own interest, while think a little less of making study an evolutionary and systematic process for students. Students are still relatively passive in the seemingly new learning environment. Teachers are the lords of all the sources. Students do what

they are told to. They take down notes from the screen, try hard to memorize them and follow through to do simulated practice. Frustrations thus appear in the classroom. Students become stenographers. Teachers can hardly make students listen to their explanations or appreciate insights into matters, not to mention discussions between them. When lights are turned off the dark classroom might become the best napping place. It seems that the so-called exciting advanced technology - multi-media assisted teaching method is to some extent only a practical electronic blackboard.

The attitude of the subjects in the experimental group was surveyed. Results of the survey is shown in table 4.

Table 4.Pupils' attitude towards use of multimedia in teaching science and health

Statements About Multimedia	Mean	Description
1. I enjoy when my teacher use multimedia in our class.	4.7	SA
2. Multimedia is fascinating and fun.	4.89	SA
3. I am motivated to learn more when my teacher use multimedia-aided instruction.	4.62	SA
4. My mind goes blank, and I am unable to think clearly when working multimedia teaching/learning.	0.54	SD
5. I feel a sense of insecurity with my teacher integrate multimedia in our class.	0.61	SD
6. Multimedia makes me feel uncomfortable, restless, irritable and impatient.	1.28	D
7. I feel good when we have film showing or video presentation.	4.83	SA
8. I enjoy the class with multimedia presentation.	4.93	SA
9. I really like using the computer during our class.	4.84	SA
10. I enjoy studying my science and health class during video presentation.	4.96	SA

The survey suggested that the use multimedia in the class has a positive impact on the pupils' attitudes. Researcher asserts that multimedia is making a significant, positive impact on education that includes:

- Educational multimedia has found to have positive effects on pupil attitudes toward learning and on pupil self-concept.

- Pupils' felt more successful in school, were more motivated to learn and had increased self-confidence and self-esteem when using multimedia aided instructions.

More involvement and increased effectiveness of learning are also the key impact of multimedia. Multimedia also helps pupils to reflect on how they have learned making it a catalyst for reflection. Multimedia-aided instruction provides teachers with the opportunity to provide various learning tasks within the same classroom for the benefit of the individual students (Lynch, 2010).

CONCLUSIONS

Multimedia materials tremendous potential have guided the researcher to achieve professional growth. Teachers should continue to use multimedia aided instruction in their class despite many factors affecting integration Teachers are expected to develop their technological skills and knowledge. Pedagogical issues challenge teachers' approaches to teaching and learning and the impact of traditional classroom practices.

The potential impact of multimedia aided instruction in teaching and learning is beyond measure. Findings indicate that multimedia aided instruction applications have an important role to play in the future education. This role should continue to be exploring to the maximum. In general, implementation succeeds or fails on the level of the individual teacher.

Teachers demonstrate their acceptance and adoption of instructional technology as a "good teaching" practice while students agree that it significantly enhances their learning. As one teacher summarizes:

"Classroom teachers can only realize the potential of computer technology if educators at all levels understand the issues facing them, define the role of computer technology in education, and plan for its appropriate use."

The potential impact of multimedia aided instruction in teaching and learning is beyond measure. Findings indicate that multimedia applications have an important role to play in the future of education. This role should continue to be exploring to the maximum. A constructivist approach towards learning should emphasize and this will tap into the computers greatest strength. In general, implementation succeeds or fails on the level of the individual teacher.

RECOMMENDATIONS

Based on the findings of the study the researcher would like to recommend the following:

1. It is recommended that multimedia be used in other subjects. Teachers may use multimedia-aided instruction in their class regardless of subjects taught. These teachers must be trained how to use them.
2. Further studies are recommended comparing the effect of different multimedia to academic performance.
4. Planners and curriculum makers may take a brief look at the current trends in multimedia use to begin to fulfill the potential of the multimedia aided instruction may provide a direction for further study in this area.

LITERATURE CITED

Andrada L.M &Abcede V.
2001 "The Use of ICT in Basic Education in the Philippines and Efforts to Measure Its Impact" http:/gauge.u-gakugei.ac/Philippines.

Bitner, N. &Bitner J.
2002 What research says: Training teachers for using Technology. Journal of Staff Development

Dickie, L.
2003 Approach to Learning, the Cognitive Demands of Assessment, and Achievement in Physics. The Canadian Journal of Higher Education 33.1. Retrieved From (June 6, 2013) <http://search.proquest.com/pqcentral/docview/221210412/13F9853690A5C1068DC/1?accountid=141440>

Liu, Jing
2010 An Experimental Study on the Effectiveness of Multimedia in College English Teaching July 21, 2013

Lynch, D.
(2010) Motivational Beliefs and Learning Strategies as Predictors of

Academic Performance in College Physics.*College Student Journal,*44.4: 920-927. Retrieved from July 15, 2013. 13F9877C9A74BB7E036/38?accountid=141440>

Smart Schools Program website (www.smartschools.phWiburg, J.)
1995 In Canada how computers live in schools. Retrieved from (June 14, 2013) http://www.ascd.org/pubs/e1/miller.html

"Pinoy Internet: Philippines Case Study" (International Telecommunication Union (ITU),
2002 www.itu.int/asean2001/PHL.

"Internet Usage in Asia (Internet Users and Population Statistics for Asia)" (Internet World Stats) 2003 www.internetworldstats.com