Asian Journal of Business and Technology
Vol. 1, No. 1, (2018)
ISSN 2651-6613 (Print)
ISSN 2651-6721 (Online)

The Effects of Computer Aided Lessons / Computer Aided Instructions (CAL/CAI) in Science and Health 5 with Integration to Disaster Risk Reduction Management (DRRM) - Related Lessons

Paulo Martin M. Aquino, and Ricardo C. Ahillon Jr.
University of Rizal System, Morong Campus
Morong, Rizal, Philippines

Abstract *– The study validated Computer Aided Lessons / Computer Aided Instructions (CAL/CAI) in Science and Health 5 with Integration to Disaster Risk Reduction Management (DDRM) Related – Lessons for the pupils of Mariano C. San Juan Elementary School in the school year 2017 – 2018. The subjects of the study were the grade 5 pupils of Mariano C. San Juan Elementary School. A total of sixty (60) pupils were considered in the study, thirty (30) served as the experimental group and (30) thirty were in the control group. Thirty (30) public elementary school teachers who are teaching Science were also considered as respondents of the study since they validated the acceptability of the developed CAL/CAI enhancement material in Science and Health 5. The topics included were DRRM (Disaster Risk Reduction Management) Related lessons. The topics were derived on K to 12 Curriculum of the Philippines. The topics made with the CAL/CAI enhancement material are Weather Disturbances, Shows Emergency Preparedness Before, During and After a Typhoon and Storm Warning Signals The results described that the CAL/CAI enhancement material in Science and Health 5 is highly acceptable by the respondents. Furthermore, there is a significant difference between the pretest and posttest of the control and experimental group were higher than the pretest. There is a significant difference between the pretest and posttest results of the experimental and control groups with respect to all lessons in Science and Health 5. The level of performance of the experimental and control groups as revealed by their posttest mean scores with respect to Shows Emergency Preparedness Before, During and After a Typhoon and Storm Warning Signals is significantly different while there is no significant difference with respect to Weather Disturbances. The CAL/CAI enhancement material in science and health 5 were found effective in teaching Storm Warning Signals, moderately effective in the topic Shows Emergency Preparedness Before, During and After a Typhoon and not effective in the topic Weather Disturbances. The experts evaluated the CAL/CAI enhancement material in Science and Health 5 as very much accepted having obtained a total mean score of 4.88 which is verbally interpreted as very much accepted by the experts.*

Keywords – Science and Health, DRRM, EiE, CAL/CAI, CCA, researches, innovation, technology

INTRODUCTION

Ecological and environmental issues were raised as major problems globally. The countries around the world are indeed wanting to address and redress the issues for giving emphasis on the global management for disaster risk reduction management and adapt to climate changes. In line with these important issues, different agencies were in action to address the problems being raised by initiating different activities, laws, training and programs that were implemented and to conclude the unresolved problems [7].

When building the resiliency of nations and communities to disasters there is the so called Hyogo Framework for Action (HFA) 2005-2015. But it had been replaced with the

Sendai Framework in the latter year that give focus to four priorities: perceptive of disaster risk, increasing adversity threat control to manage disaster problems, investing in disaster risk reduction education to lessen the effect of disaster preparedness for successful response, and to achieve revitalization, treatment and restoration.

In the Philippine educational setting, the three years of implementation of the K TO 12 curriculum is still ongoing, the government respectively the Department of Education is trying to have a globally competitive teaching learning process in lieu with the implementation of other nations and to be successful in implementing this curriculum.

Resources such as text books form the provider of the DepEd and technological aspects that support the curriculum for the realization of the envisioned program in which the pupils cope up in a child-friendly, gender-sensitive and protected atmosphere away from harmful effects of the disasters. The Disaster Reduction Preparedness and Climate Change Adaptation has been integrated to Basic Education Curriculum. In Republic Act 101749 People's Survival Fund). An act establishing the people's survival fund to provide long-term finance streams to enable the government to effectively address the problem of climate change, amending for the purpose of RA 9729, and for other purposes. Acts as the focal point to activities related to disaster Risk Reduction Management (DRRM) Education in Emergencies (EiE), and Climate Change Adaption (CCA).

OBJECTIVES OF THE STUDY

The study is entitled "The Effects of CAL / CAI (Computer Aided Lessons / Computer Aided Instructions) in Science and Health 5 with Integration to DRRM (Disaster Risk Reduction Management) - Related Lessons". The study concentrated on the Disaster Risk Reduction Management – Related Lessons in Science and Health V. The main goal of this study is to test the effectiveness of utilizing CAL / CAI in Science and health 5 with the Integration of Disaster Risk Reduction Management – Related Lessons. The study was conducted to Grade 5 pupils of the school year 2017-2018.

The study was focused on CAL / CAI in Science and Health 5 with the topics related to Disaster Risk Reduction Management. The respondents of the study was composed of Grade 5 pupils in the Pilot section and another set of pupils in Section 1 that are under the process of toss coin to identify who among the set of pupils will be the control and experimental.

Understanding atmospheric changes and calamity menace diminution management, the country will develop resilient young learners who are able to adapt to the possible adverse effects toward sustainable development.

According to [9] the most frequent found approach is the integration of DRRM lessons and concepts within the school subjects. This commonly happens after the curriculum review where it scrutinized for its DRRM importance and prospective and to scrutinized ranges from the precise to the holistic approach. As stated in the Republic Act 9729 (Climate Change Act) Section 15a;

"The Department of Education (DepEd) shall integrate climate change into primary and secondary education curricula and/or subjects, such as, but not limited to, science, biology, sibika, history, including textbooks, primers and other educational materials, basic climate change enhance capacity for climate change adaptation and mitigation at the national and local level enhanced."

In accordance with this, the researcher tried to develop an enhancement materials specifically in the subject Science and Health 5 utilizing the CAL and CAI.

MATERIALS AND METHOD

The researcher was utilizing a teacher – made test that serves as pre – test and post – test in assessing what is known and what is learned by the pupils. Item analysis was administered to

determine the validity and reliability of the pre – test and parallel form validity test was used for the post – test.

The modified questionnaire checklist was used to determine the acceptability of the developed CAL / CAI in Science and Health 5 in terms of objectives, content, organization and presentation, language and style and usefulness.

The study used the experimental and descriptive developmental methods of research. The study involves experimental method of research to determine the level of performance of the Grade 5 pupils as revealed by their pretest and posttest results with respect to Disaster Risk Reduction – Related Topics in Science and Health 5.

RESULTS AND DISCUSSION

Table 1. Level of Performance of the Experimental and Control Groups as Revealed by the Pretest and Posttest Results with Respect to the DRRM - Related Lessons in Science and Health 5

Lessons	Experimental						Control					
	Pretest			Posttest			Pretest			Posttest		
	Mean	Sd	VI	Mean	Sd	VI	Mean	Sd	VI	Mean	Sd	VI
Weather Disturbances	7.40	1.89	S	9.27	1.64	VS	6.57	2.31	S	9.43	1.89	VS
Shows Emergency Preparedness Before, During and After a Typhoon	4.10	1.52	FS	8.93	2.03	S	4.13	1.43	FS	7.67	2.38	S
Storm Warning Signals	3.93	1.62	FS	10.10	0.80	VS	3.53	1.48	FS	5.97	1.10	FS

The table implies that the mean scores in the posttest of both control and experimental groups are higher than the pretest scores. This shows that there was an increase in the level of performance of both groups of respondents.

It implies that the experimental group showed higher motivation to understanding the DRRM – related lessons using the CAL/CAI enhancement lessons in science and health 5.

The similarity of the findings were seen to the result of the study of [2] when she developed multi – media materials in Science and Health 4. The findings revealed that the experimental group performed low in the lessons during the pretest and got a higher level of performance on the posttest than the control group.

Table 2. Significant Difference on the Level of Performance of the Experimental Group as Revealed by the Pretest and Posttest Results with Respect to the DRRM – Related Lessons in Science and Health 5

Lessons		Mean	Sd	t	df	Sig	Ho	VI
Weather Disturbances	Pretest	7.40	1.89	4.80	29	.000	R	S
	Posttest	9.27	1.64					
Shows Emergency Preparedness Before, During and After a Typhoon	Pretest	4.10	1.52	12.31	29	.000	R	S
	Posttest	8.93	2.03					
Storm Warning Signals	Pretest	3.93	1.62	18.95	29	.000	R	S
	Posttest	10.10	0.80					

It can be seen from the table that the result between the pretest and posttest scores of the experimental group with respect to DRRM – related lessons in science and health 5 found that there is no significant difference on the experimental group pretest and posttest scores. All scores were computed p – values of 0.000 that are less than the 0.05 level of significance which rejected the null hypothesis.

This is similar to the findings of [10] that in terms of the level of the performance of the respondents in experimental and control group as revealed by pretest and posttest results with respect to the different learning competencies, after using the developed competency – based enhancement materials. The scores of the experimental group increased to a mastered level.

Table 3. Significant Difference on the Level of Performance of the Control Group as Revealed by the Pretest and Posttest Results with Respect to the DRRM – Related Lessons in Science and Health 5

Lessons		Mean	Sd	t	df	Sig	Ho	VI
Weather Disturbances	Pretest	6.57	2.31	5.71	29	.000	R	S
	Posttest	9.43	1.89					
Shows Emergency Preparedness Before, During and After a Typhoon	Pretest	4.13	1.43	6.47	29	.000	R	S
	Posttest	7.67	2.38					
Storm Warning Signals	Pretest	3.53	1.48	11.74	29	.000	R	S
	Posttest	5.97	1.10					

It can be gleaned from the table that the scores of control group obtained p – value of 0.000 is less than 0.05 level of significance which rejected the null hypothesis. The result showed that there is a significant difference on the level of performance of control group between their pretest and posttest.

This is found to be parallel to the study of [17] that revealed that both groups had shown increase in level of performance after the exposure to the different lessons of both groups.

Table 4.Significant Difference on the Level of Performance of the Experimental and Control Group as Related by Posttest Results with Respect to DRRM – Related Lessons in Science and Health 5

Lessons		Mean	Sd	t	df	Sig	Ho	VI
Weather Disturbances	Experimental	9.27	1.64	.37	58	.716	A	NS
	Control	9.43	1.89					
Shows Emergency Preparedness Before, During and After a Typhoon	Experimental	8.93	2.03	2.22	58	.031	R	S
	Control	7.67	2.38					
Storm Warning Signals	Experimental	10.10	0.80	16.64	58	.000	R	S
	Control	5.97	1.10					

It can be seen on the table that the level of performance of both groups as revealed by their posttest result with respect to Shows Emergency Preparedness Before, During and After a Typhoon and Storm Warning Signals are significantly different since the computed p – values are less than the 0.05 level of significance. However, there is no significant difference found in the lesson Weather Disturbances since the computed p – value exceeds the 0.05 level of significance.

The results are similar to the study of [13] that instructional materials improve learning if used properly and accordingly.

Table 5. Level of Effectiveness of the CAL/CAI Enhancement Material in DRRM – Related Lessons in Science and Health 5

Lessons	Experimental	Control	% Increase	VI
Weather Disturbances	9.27	9.43	- 1.70	NE
Shows Emergency Preparedness Before, During and After a Typhoon	8.93	7.76	15.08	MoE
Storm Warning Signals	10.1	5.97	69.18	VME

It can be gleaned from the table that the CAL/AI enhancement material was found very much effective in the lessons Storm Warning Signals, on the other hand it found out that the lesson in Shows Emergency Preparedness Before, During and After a Typhoon to be moderately effective. However, the lessons Weather Disturbances was found not effective.

The findings is similar to study of Sanvictores (2011) that instructional approaches may succeed or fail, they are dependent to the learning needs of the students.

Table 6. Level of Acceptability of the CAL/CAI Enhancement Material in Science and Health 5 with Respect Objectives

Objectives	Mean	VI	Very Much Accepted		Much Accepted	
			f	%	f	%
1. The objectives are presented in on point ways.	4.80	VMA	8	80.00	2	20.00
2. The CAL/CAI enhancement material in Science and Health 5 lead the pupils to think critically	4.60	VMA	6	60.00	4	40.00
3. The CAL/CAI enhancement material in Science and Health 5 enables the pupils practice their mastery of content	5.00	VMA	10	10.00	0	0.00
4. The CAL/CAI enhancement material in Science and Health 5 facilitates better understanding	4.60	VMA	6	60.00	4	40.00
1. The CAL/CAI enhancement material in Science and Health 5 stimulate problem solving skills	4.70	VMA	7	70.00	3	30.00
Average	**4.74**	**VMA**				

It can be gleaned on the table that the expert respondents responded very much accepted the CAL/CAI enhancement material in Science and Health 5 having shown a mean average 4.74.

This implies that the utilization of the CAL/CAI enhancement material in indeed effective.

This is related to the study of [4] that the objectives being utilized will lead the learners to understand and learn the lesson.

Table 7. Level of Acceptability of the CAL/CAI Enhancement Material in Science and Health 5 with Respect to Contents

Objectives	Mean	VI	Very Much Accepted		Much Accepted	
			f	%	f	%
1. Lessons are relevant, interesting, self – motivating and at the level of the pupils understanding.	5.00	VMA	7	70.00	3	30.00
2. The contents are simple yet comprehensive	5.00	VMA	10	0.00	0	0.00
3. Explanation and discussion of the topics are clear and easy to understand.	4.80	VMA	8	80.00	2	20.00
4. Important concepts and ideas are generated from the pupils' point of view.	4.70	VMA	7	70.00	3	30.00
5. Prior knowledge is evidently shown in every lessons.	4.70	VMA	10	100	0	0.00
Average	**4.84**	**VMA**				

It can be seen from the table that the CAL/CAI enchantment material in science and health 5 had been evaluated by the experts as very much accepted gaining a mean average of 4.84 and verbally interpreted as very much accepted. This is aligned to the study of [8] in which he stated the set of subject matter increased the students' achievement particularly when the matching is conducted on the basis of a students' way of learning.

Table 8. Level of Acceptability of the CAL/CAI Enhancement Material in Science and Health 5 with Respect to Organization and Presentation

Objectives	Mean	VI	Very Much Accepted		Much Accepted	
			f	%	f	%
1. The lessons headings and introduction provide the learners background of information about the topics to be studied.	5.00	VMA	10	10.00	0	0.00
2. The discussion materials accompanying pupils' CAL/CAI activities are practically suited to the learners level of understanding	5.00	VMA	10	10.00	0	0.00
3. The lessons are presented clearly and captivating.	5.00	VMA	10	10.00	0	0.00
4. The CAL/CAI enhancement material helps pupils understand better and recall more easily the concepts discussed.	4.90	VMA	9	90.00	1	10.00
5. The CAL/CAI enhancement material activities are properly sequenced; the content of each CAL/CAI enhancement material activity is carefully organized and aligned in the continuum K – 12 competencies	4.70	VMA	7	70.00	3	30.00
Average	**4.92**	**VMA**				

The table shows the experts evaluated the CAL/CAI enhancement material in science and health 5 as very much accepted for having obtained a mean score of 4.92. It can relate to the study of [5] that when introduction and presentation unites together, it may lead to the right presentation and understanding of the lesson.

Table 9. Level of Acceptability of the CAL/CAI Enhancement Material in Science and Health 5 with Respect to Language and Style

Objectives	**Mean**	**VI**	**Very Much Accepted**		**Much Accepted**	
			f	**%**	**f**	**%**
1. The direction gives clear information about the lesson.	4.80	VMA	8	80.00	2	20.00
2. The language used is basic, simple and easy to comprehend by the learners.	4.80	VMA	8	80.00	2	20.00
3. The language structure used avoids misinterpretation.	4.90	VMA	9	90.00	1	10.00
4. The words used are simple and familiar to ensure easy learning.	5.00	VMA	10	10.00	0	0.00
5. The language and style are appropriate to the ability of the learners.	5.00	VMA	10	10.00	0	0.00
Average	**4.90**	**VMA**				

The table revealed that the experts evaluated the CAL/CAI enhancement material as very much acceptable for having gain a mean score of 4.90. The result implied that the CAL/CAI enhancement material with respect to language and style is effective.

This is similar to the findings of [6] in her study that proved that computer assisted enhancement material is very effective in teaching since the clarity of the language and style of the enhancement material avoid errors.

Table 10. Level of Acceptability of the CAL/CAI Enhancement Material in Science and Health 5 with Respect to Usefulness

Objectives	**Mean**	**VI**	**Very Much Accepted**		**Much Accepted**	
			f	**%**	**f**	**%**
1. The CAL/CAI enhancement material makes the learners interested in the applications based on the lessons gained.	5.00	VMA	10	20.41	0	0.00
2. The CAL/CAI enhancement material is useful in developing the useful skills of the learners.	5.00	VMA	10	20.41	0	0.00
3. Pupils can learn, understand and answer the CAL/CAI enhancement material thoroughly by reviewing the enhancement material.	5.00	VMA	10	20.41	0	0.00

4. The CAL/CAI enhancement material makes the pupils learn and understand the subject matter.	4.90	VMA	9	18.37	1	100
5. The CAL/CAI enhancement material magnifies the learning interests of the pupils.	5.00	VMA	10	20.41	0	0.00
Average	**4.98**	**VMA**				

The table shows the evaluated acceptability of the experts in CAL/CAI enhancement material with respect to usefulness. It implies the experts evaluated a verbal interpretation of very much acceptable having gained a total mean score of 4.98. This is related to the study of [13] that instructional materials improved learning, if utilize properly and appropriately.

Table 11. Composite Table on the Level of Acceptability of the CAL/CAI Enhancement Material in Science and Health 5

Criteria	Mean	VI
Objective	4.74	VMA
Contents	4.84	VMA
Organization and Presentation	4.92	VMA
Language and Style	4.90	VMA
Usefulness	4.98	VMA
Overall	**4.88**	**VMA**

The composite table implies that the majority of mean scores are verbally interpreted as very much accepted. It also shows that the overall total mean score of 4.88 is verbally interpreted as very much accepted.

This implies that the use of CAL/CAI enhancement material in science and health 5 characterize a criterion of a good enhancement material as evaluated by the experts.

This is related to the findings of [12] on their developed scientific games in teaching chemistry is useful and relevant that can promote and develop achievements academically.

CONCLUSION AND RECOMMENDATION

Based on the findings, the achievement of experimental group of pupils in Science and Health 5 significantly changed when being exposed to the CAL/CAI enhancement material in science and health 5 with integration of DRRM – related lessons was found to be having a higher performance compared to the pupils who were not exposed to the CAL/CAI enhancement material in science and health 5. This only proves the study of [1]. In which he proved that his developed enhancement material contributed significantly in the performance of the pupils who utilized it.

REFERENCES

[1] Calindog, JL. SL. (2013). *Development and Validation of Reinforcement Materials in Computer Hardware Servicing in Technology and Livelihood Education* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[2] Castro, R. C. (2011). *Development and Effectiveness of Multi – Media Materials in Science and Health for Grade Four Pupils* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[3] Davis, I. (2005). *Disaster Risk Management in Asia and the Pacific*. Abingdon, Oxon: Routledge.

[4] Doblada, V. M. (2007). *The Effects of Enrichment Activities on the Performance of Fourth Year High School in Trigonometry* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[5] Ferrer, L. S. (2012). *Development and Acceptability of Enhancement Activities in Science for Grade 6 Students* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[6] Julian, J.H. (2010). *Effectiveness of Enhancement Activities in Selected Topics in High School Chemistry* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[7] Margareta, J. et. al, (2011) *Studies in Human Ecology: Energy, Policy, and the Environment* Springer Publishing

[8] Menciano, F. L. (2007). *The Effect of Cooperative Learning Approach in the Pupils Performance in Science* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[9] Madu, C. N. et. al. (2018). *Handbook of Disaster Risk Reduction and Management* World Scientific Publishing Co.

[10] Miranda, R. R. (2011). *Development and Validation of Competency Based Enhancement Activities in Integrated Science* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[11] Muldong, C. C. (2013). *Development and Validation of Worktext in Applied Mathematics* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[12] Perlota, G. et. al. (2008). *The Effectiveness of Scientific Games in Teaching Chemistry Concept* (Unpublished Master's Thesis) University of Rizal System, Rizal, Philippines.

[13] Orleans, A. (2007, July 13). The Condition of Secondary Physics in the Philippines: *Recent Development and Remaining Challenges for Substantive Improvements.* Retrieved from http://files.eric.ed.gov/fulltextEJ766603.pdf

[14] Republic Act 10174 (People's Survival Fund)

[15] Republic Act 9729 (Climate Change Act) Section 15a;
Deped Order No. 52, S. 2011 "Strengthening Environmental Education in Public and Private Schools in pursuant to Republic Act (R.A.) No. 9512, entitled "An Act to Promote Environmental Education and for Other Purposes."

[16] Sanvictores, K. C. (2011). *Development and Acceptability of Improvised Science Apparatuses in Teaching selected Topics in Physics* (Unpublished Master's Thesis). University of Rizal System, Rizal, Philippines.

[17] Soberano, A. (2009, July). Strategic Intervention Materials in Chemistry: *Development and Effectiveness* Retrieved from http://www.rescam.edu.my/cosmed/cosmed09/AbstractFullPapers2009/Abstract/Science%20parallel%20PDF/Full%20Paper/04.pdf