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Development, Validation and Effectiveness of Enhancement Material in Science and Health V

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Abstract - *The objective of the study is to develop and validate the enhancement material in Science and Health 5 for the pupils of Mariano C. San Juan Elementary School in the school year 2015 – 2016. The subjects of the study were the grade 5 pupils of Mariano C. San Juan Elementary School. A total of forty - four (44) pupils were considered in the study, twenty-two (22) served as the experimental group and twenty-two (22) 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 enhancement material in Science and Health 5.The topics included were those found by the respondents difficult and based from their National Achievement Test results. The topics were derived on 2010 Philippine Elementary Learning Competencies (PELC) Basic Education Curriculum (BEC). The topics made with the developed modules are The Reproductive System, The Respiratory System and The Urinary System. The data were tallied, analyzed and subjected to appropriate statistical treatment. From the findings of the study, it is concluded that the achievement of the experimental group in Science and Health significantly changed as compared to the performance of the control groups. The results described that the developed enhancement material in Science and Health 5 is highly acceptable by the respondents. Furthermore, there is a significant difference on the level of performance of Grade 5 pupils in the control group as revealed by the pretest and posttest results in terms of the Reproductive System, Respiratory System, and The Urinary System since the computed p-value are 0.000 respectively are less than 0.05 level of significance. Also, there is significant difference on the level of performance of kindergarten pupils in the experimental group as revealed by pretest and posttest results since the computed p-value of 0.00 respectively are less than 0.05 level of significance. However, there is no significant difference on the level of performance of Grade 5 pupils in control and experimental groups as revealed by the posttest result in terms of The respiratory System since the computed p-value is 0.0354 which is greater than 0.05 level of significance.*

Keywords – development, validation, effectiveness, content, output, researches, science and health,

INTRODUCTION

Education is the delivery of knowledge, skills, and information from teachers to students. The moment a lesson is discuss in the classroom, the teacher expects that something is absorbed, and the ideas taught made a difference to the learners and how they are going to make use of the skills newly gained. However, for many people the importance of education depends in future job prospects, for others it is quality of citizenship, and yet others just want literacy, critical thinking, and/or creativity. Behind all the differences of opinion about what it means to be educated is one very basic idea: an educated person is someone who perceives accurately, thinks clearly, and acts effectively on self-selected goals. Thus, Section 5 on Curriculum Development of Republic Act 10533, otherwise known as "Basic Education Enhancement Act of 2013" states to wit:

"The DepEd shall formulate the design and details of the enhanced basic education curriculum…It shall adhere to the following standards and principles in developing the enhanced basic education curriculum:(a) The curriculum shall be learner-centered, inclusive and developmentally appropriate;(b) The curriculum shall be relevant, responsive and research-based;(c) The curriculum shall be culture-sensitive;(d) The curriculum shall be contextualized and global;(e) The curriculum shall use pedagogical approaches that are constructivist, inquiry-based, reflective, collaborative and integrative;…"

At this juncture, DepEd has introduced several strategic options and conducted various trainings for teachers on the new methods of teaching, adjustment of curriculum as well as preparation of instructional materials to effect the implementation of k to 12 in pursuant to its mandate.

Achieving a good understanding of difficulties encountered by pupils in their course of studies contributes greatly towards an effective teaching-learning process. While module curriculum is closely related with teaching, little attention has been given to the development of modules for elementary pupils due to the belief that what the pupils need is direct instruction and supervision. But recent development in the field of science proved that pupils who are exposed to modular approach in teaching showed that pupils become more active in thinking, and attempts to prove through experiments have become their popular activities according to the study of [9].

As the world is undergoing numerous transformations due to rapid development and diffusion of information and communication technologies (ICT) in all walks of life, the need to introduce pupils of concepts in Science and Health in the form of modules to make learning more effective is imperative. Hence, the researcher was motivated to develop, validate as well as attempts to verify scientifically on the effectiveness of Science and Health modules for Grade V pupils.

OBJECTIVES OF THE STUDY

The objective of the study is to develop and validate the enhancement material in Science and Health 5 for the pupils of Mariano C. San Juan Elementary School in the school year 2015 – 2016.

MATERIALS AND METHOD

This study was conducted at Mariano C. San Juan Elementary School during the school year 2014 – 2015. The subjects of the study will be two sections in Grade V consisting of 40 pupils per section.

The modules in Science and Health that will be developed is aligned to the Minimum Learning Competencies for elementary pupils and topics covered are according to the curriculum of grade V pupils.

A teacher-made questionnaire test composed of 10 items for each competency which shall be used in pretest and posttest shall be developed and will undergo validation. Validation of the material shall be through content and face validity and will be administered to determine the performance of the Grade v pupils on the developed module.

Developmental research cum experimental and descriptive research shall be employed in this study since the very purpose of the investigation is to construct a module on Science and Health for Grade V to be validated and test its effectiveness with the use of questionnaire-checklist.

RESULTS AND DISCUSSION

Table 1. Level of Performance of the Experimental Group and Control Group on the Developed Enhancement Material in Science and health 5 as Revealed by the Pretest and Posttest Results

Lessons	Experimental		Control	
	Pretest	Posttest	Pretest	Posttest

	Mean	Sd	VI	Mean	Sd	VI	Mean	Sd	VI	Mean	Sd	VI
The Reproductive System	3.71	1.15	L	9.76	0.54	VH	3.36	1.73	L	8.95	1.36	VH
The Respiratory System	2.67	0.97	L	8.86	1.88	VH	3.18	1.14	L	8.27	2.19	VH
The Urinary System	3.71	0.96	L	9.57	0.93	VH	4.05	1.40	A	8.59	1.71	VH

The table depicts that the different lessons in Science and Health for grade five pupils considered in this study resulted to a low mastery level in the pretest in both experimental and control group under the two lessons which are the Male and Female Reproductive System and Urinary System and turned out to be average in the pretest of the control group. Both groups have mean value ranging from 2.67-4.05 with low standard deviation reflecting more consistent scores among pupils in the pretest. The study is said to be the same with the finding of [11]. On his study entitled "Module on Percent and Ratio for Mathematics I" He found out that there is a highly significant improvement in the performance of the students in the experimental group as reflected in their pretest and posttest results.

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 Different Lessons

Lessons		Mean	Sd	t	df	Sig	Ho	VI
The Reproductive System	Pretest	3.71	1.15	20.964	20	.000	R	S
	Posttest	9.76	0.54					
The Respiratory System	Pretest	2.67	0.97	15.031	20	.000	R	S
	Posttest	8.86	1.88					
The Urinary System	Pretest	3.71	0.96	19.849	20	.000	R	S
	Posttest	9.57	0.93					

The table depicts that prior to the use of the developed module in Science and Health, no significant difference in the pretest scores of the experimental group is seen particularly in the lessons Parts of the Male and Female Reproductive System, The Respiratory System and The Urinary System with significant value of .000 are all less than the alpha value of .05. Same with the study of [2]. In which he aimed to evaluate the effectiveness of modular instruction given to the experimental group and control group. He found out that the use of module has a significant effect on the performance of the student respondents as revealed in the results of pretest and posttest.

Table 3. Significant Difference on the Level of Performance of the Experimental and Control Groups as Revealed by the Posttest Results

Lessons		Mean	Sd	t	df	Sig	Ho	VI
The Reproductive System	Experimental	9.76	0.54	2.577	27.673	.016	R	S
	Control	8.95	1.36					
The Respiratory System	Experimental	8.86	1.88	.938	41	.354	FR	NS
	Control	8.27	2.19					
The Urinary System	Experimental	9.57	0.93	2.354	32.659	.025	R	S
	Control	8.59	1.71					

Table 3 presents the statistical difference of the performance of grade five pupils who used and did not use the developed module in Science and Health for grade five pupils are significantly different before and after the experiment in the lessons The Reproductive System and the Urinary System considered in the study with their respective significant values of .016 and .025 are less than the alpha value of .05. In the lesson The Respiratory System reflected a score of .354 that is more that the significant value of .05 that there is no significant difference with the scores of the The Respiratory System. The mean 8.86 from the experimental group is pretty acceptable for it gained way far against 8.27 mean score of the control. The improved level of performance of pupils is seen with the use of the developed enhancement material in Science and Health 5 parallel to the findings of [12]. In which the developed module enhances the performance of the students as showed in the results of the pretest and posttest scores.

Table 4. Level of Effectiveness of the Developed Module in Science and Health for grade five pupils

Lessons	Experimental	Control	% Increase	VI
The Reproductive	9.76	8.95	9.05	Less Effective
System	8.86	8.27	7.13	Less Effective
The Respiratory System	9.57	8.59	11.41	Less Effective
The Urinary System				

The Table presents the effectiveness of the developed module in Science and Health for grade five pupils. It shows that the use of the developed module has a little effect for it gained a less effective remark. It only proves that it has a positive effect for not gaining a not effective result. In addition to this, 1% still seen as an increased and with regards to the level of effectiveness result of the developed module which are 9.05, 7.13 and 11.41. This only proves that the study of [5]. In which he proved that the results indicated in his study is effective in facilitating the performance of the respondents.

Table 5. Level of Acceptability of the Developed Module in Science and Health for grade five pupils as evaluated by experts with respect to Instructions

Instructions	Mean	VI	VMA		MA	
			f	%	f	%
1. Contains clear and specific directions	4.93	VMA	28	93.3	2	6.7
2. Presents attainable tasks	4.93	VMA	28	93.3	2	6.7
3. Furnishes comprehensive sets of procedures	4.97	VMA	29	96.7	1	3.3
4. Enables pupils to deal with the lessons squarely	5.00	VMA	30	100.0	-	-
	5.00	VMA	30	100.0	-	-
5. Enhances interest of pupils	4.97	VMA	29	96.7	1	3.3
6. Suits to the learning abilities of pupils	4.93	VMA	29	96.7	1	3.3
7. Encourages the pupils to follow the given procedures	4.93	VMA	29	96.7	1	3.3
8. Motivates pupils to continue reading the lessons because of clear specifications	4.93	VMA	29	96.7	1	3.3
9. Reflects definite purpose throughout the activities	4.87	VMA	28	93.3	2	6.7
	4.95	VMA				
10. Drives students to learn						
Average						

The table shows that the teachers find the developed module in science and health for grade five pupils to be very much acceptable in terms of its instructions with an average mean value of 4.95, all are verbally interpreted as very much acceptable.

According to [3]. This was attained since the developed enhancement material contains clear instructions that are historically proven to be promoting interest among learners in the experimental group that is proven after they got higher achievement than the control group.

Table 6. Level of Acceptability of the Developed Module in Science and Health for grade five pupils as evaluated by experts with respect to Discussions

Discussions	Mean	VI	VMA		MA		MOA	
			f	%	f	%	f	%
1. Presents lessons which are arrange in logical order	4.97	VMA	29	96.7	1	3.3	-	-
2. Motivates the learning interest of the pupils	4.87	VMA	27	90.0	2	6.7	1	3.3
3. Have forms that are congruent to the aims and objectives of the subject	4.90	VMA	27	90.0	3	10.0	-	-
4. Explains and discusses topics which are easy to understand	4.90	VMA	27	90.0	3	10.0	-	-
5. provides clear explanations that module users can understand	4.93	VMA	28	93.3	2	6.7	-	-
6. Supports explanations with realistic examples	4.83	VMA	27	90.0	1	3.3	2	6.7
7. Helps connect new and old learning to knowledge	4.93	VMA	28	93.3	2	6.7	-	-
8. Establishes connection between what the pupils are learning and what they will learn	4.93	VMA	28	93.3	2	6.7	-	-
9. Contains objectives that sustain pupils interest to the topic continuously	4.93	VMA	28	93.3	2	6.7	-	-
10. Provides pupils with competitive learning task	4.83	VMA	26	89.7	1	3.4	2	6.9
Average	4.90	VMA						

As depicted in the table, experts are one in saying that the discussion of the developed module in science and health for grade five pupils are very much acceptable having a total mean

value of 4.90. It denotes that the discussions of the developed material suites the taste and are easily understood by the pupil respondents. This is parallel with the study of [7]. That defined engagement as student-faculty interaction, peer to peer collaboration and active learning. It has been positively related to the quality of the learning experience.

Table 7. Level of Acceptability of the Developed Module in Science and Health for Grade Five Pupils as Evaluated by experts with respect to Pictures used

Pictures used	Mean	VI	VMA		MA		MOA	
			f	%	f	%	f	%
1. Illustrations used which downloaded are properly documented and/or cited	4.90	VMA	28	93.3	1	3.3	1	3.3
2. Provides clear and descriptive illustrations	4.97	VMA	29	96.7	1	3.3	-	-
3.Gives clear picture on the topic introduced	4.90	VMA	28	93.3	1	3.3	1	3.3
4. Clears information through the illustration presented	4.90	VMA	28	93.3	1	3.3	1	3.3
5. Shows consistent in picture presentation that adds color to the discussion	4.93	VMA	29	96.7	1	3.3	-	-
6. Presents hierarchy illustration provides a big picture, but one that is conveniently broken into categories	5.00	VMA	30	100.0	-	-	-	-
7. presents simultaneously all the information needed to explain a topic or perform a task	4.97	VMA	29	96.7	1	3.3	-	-
8. Uses lines, boxes, arrows, space, color, typefaces, and the relative distance between elements to communicate information about the relationships of those elements	4.97	VMA	29	96.7	1	3.3	-	-
9. Provides graphic organizers with enough spaces and margins	5.00	VMA	30	100.0	-	-	-	-
10. Generates associated mental images for abstract information	4.93	VMA	29	96.7	1	3.3	-	-
Average	4.95	VMA						

The findings depict that the developed module in science and health for grade five pupils in terms of pictured used are very much acceptable. The pictured use revealed an average mean of 4.95 that denoted to be very much acceptable. Particularly, it outstands on the presents hierarchy illustration provides a big picture, but one that is conveniently broken into categories and provides graphic organizers with enough spaces and margins with an average mean of both 5.00 in the overall mean score value. In terms of illustrations used which downloaded are properly documented and/or cited, gives clear picture on the topic introduced and clears information through the illustration presented are moderately acceptable. This is evidently parallel to the study of [6]. In which he stated that the illustrations can attract attention, aid retention, enhance understanding, or create context.

Table 8. Level of Acceptability of the Developed Module in Science and Health for Grade Five Pupils as Evaluated by Experts with Respect to Activities

Activities	Mean	VI	VMA		MA	
			f	%	f	%
1. Responds to the needs for new learning experiences	4.93	VMA	28	93.3	2	6.7
2. Utilizes real-life situations which are applicable to different situations	4.87	VMA	26	86.7	4	13.3
3. Acquaints pupils with new terminologies useful in varied settings	4.93	VMA	28	93.3	2	6.7
4. Contributes to pupils' ability to work efficiently	4.93	VMA	28	93.3	2	6.7
5. Guides pupils to the principles and concepts of the subject	5.00	VMA	30	100.0	-	-
6. Adapts to any size of learning groups and learning time	5.00	VMA	30	100.0	-	-
7. Applies to varying attitudes and abilities of pupils	5.00	VMA	30	100.0	-	-
8. Leads pupils' further interest in the field of sciences	5.00	VMA	30	100.0	-	-
9. teaches and guides pupils during the actual use of the material	4.97	VMA	29	96.7	1	3.3
10. Relates activities to other subjects	5.00	VMA	30	100.0	-	-
Average	4.96	VMA				

The table depicts the mean value of the acceptability of the developed module in science and health for grade five pupils with respect to its assessment are all rated as very much acceptable with a mean value of 4.96 as rated by the teacher respondents.

It is the same with the findings of [8]. That all of the factors being meant that the teacher should possess in order to plan a range of activities around any text that a teacher should choose for the class is incorporated in the enhancement material.

Table 9. Level of Acceptability of the Developed Enhancement Material in Science and Health 5 as Evaluated by Science Teachers with Respect to Assessment

Assessment The developed enhancement material…	Mean	VI	VMA		MA	
			f	%	f	%
1. presents aligned exercises and evaluation tool for module users.	4.93	VME	28	93.3	2	6.7
2. makes appropriate use of authentic assessment tools.	4.97	VMA	29	96.7	1	3.3
3. involves the use of techniques for a valid, reliable, and realistic assessment of learning.	4.93	VMA	29	96.7	1	3.3
4. utilizes self-assessment to develop the learners' personal responsibility for learning.	5.00	VMA	30	100.0	-	-
5. uses multiple choice and short-answer-test to gauge understanding of pupils.	5.00	VMA	30	100.0	-	-
6. collects evidence showing the attainment of the objectives.	4.87	VMA	28	93.3	2	6.7

7.	applies to varying attitudes and abilities of pupils.	4.97	VMA	29	96.7	1	3.3
8.	measures simple recall.	4.97	VMA	29	96.7	1	3.3
9.	monitors learning progress during the actual use of the module.	5.00	VMA	30	100.0	-	-
10.	gives appropriate diagnosis as indicated in the objective.	4.93	VMA	28	93.3	2	6.7
Average		4.96	VMA				

The findings imply that the used of the developed enhancement material in Science and Health 5 is highly acceptable with respect to assessment as evaluated by the Science teachers. The assessment is fully gained parallel to the writings of [10]. That the assessment must play a significant role in the whole teaching and learning process. It is seen in the science teachers' evaluation with respect to assessment.

Table 10. Composite Table of the Level of Acceptability of the Developed Module in Science and Health for Grade Five Pupils as Evaluated by Experts

Criteria	Mean	VI
Instructions	4.95	VMA
Discussions	4.90	VMA
Pictures used	4.95	VMA
Activities	4.96	VMA
Assessment	4.96	VMA
Overall	4.94	VMA

The table depicts the mean value of the acceptability of the developed module in science and health for grade five pupils are all evaluated as very much acceptable. The developed module in science and health for grade five pupils have the highest rating on its activities and assessment with the highest mean value of both 4.96. This implies that a module which activities and assessment are suitable to the purpose.

CONCLUSION AND RECOMMENDATION

Based on the findings, the achievement of homogeneous group of pupils in Science and Health significantly changed when exposed to the developed module in science and health and found to be having a higher performance compared to the pupils who were not exposed to the developed module in science and health. This only proves the study of [4]. In which he proved that his developed enhancement material contributed significantly in the performance of the pupils who utilized it.

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