

Modular Approach in Teaching Chemical Elements and Compounds among Senior High School Students

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ABSTRACT

The key purpose of this research was to find out the effectiveness of a modular approach in teaching Chemical Elements and Compounds in order to assess the students learning, and performance. The population was Senior High School Students of Tuyom National High School for the academic year 2018-2019. Sample size has consisted of 48 students. This study has been utilized pre-post research design following experimental in nature. The findings of the study revealed that the majority of the respondents were male, ages range from 16 to 17 taking the course Housekeeping under technical vocational strand which most of them were least learners. The findings further surfaced that the scores of the respondents prior to the implementation of the intervention do not significantly differ, however, there was a significant difference after the intervention of the user of the module. Thus, the modular approach is an effective tool for intervention and could help improve the performance of the learners. It is a way of extending help to learners who need immediate intervention.

KEYWORDS: *Modular Approach, Chemical Elements and Compounds, Experimental Design*

INTRODUCTION

Education plays a vital role in promoting students both macro and micro skills and even their multiple intelligences. Education plays a vital role in promoting students both macro and micro-skills and even their multiple intelligences. As front liners in the educational system, teachers should find ways to help the learners through intervention in such a way that these learners would become productive in society. It is, therefore, the Department of Education crafted the new curriculum which is known as the K-12 curriculum to address the issues regarding students/ performance in the school as part of societal growth and development. Strengthening of the K-12 curriculum could address the prevalent issues of the educational system in the country and upgrading school learning competencies. One of the problems in our educational system would be the classroom participation of the students become declining. The poor 21st skills students would be prevalent and existing problems and issues in education. This can be manifested in the achievement test conducted all over the regions. The results of the assessment test surfaced that students have low performance in the Science area. In the last 3 years results from 2016 to 2018 National Achievement Test revealed the MPS 45- 50% which was lower compared to other subjects. This revealed that most of the students got a low score in scientific ability. The 2018 National Exit Exam for the senior high students, showed the MPS of 50% which far from the expected result. This was shown that students have difficulty in science learning and acquiring basic knowledge of science. In the context of learning process,

both teaching and learning play a vital aspects as what Hammond & Snowden (2005) wanted to emphasize that the teachers need to know on how to scaffold learning to provide the students enough assistance as part of his/her being loco parent is in which the performance of the students will be improved.

Moreover, at this level of learning, the school should require excellent facilities and equipment to combat students' needs. In this way, the school will help to cultivate capabilities for exercising self-directed of the students across all learning areas. These include the development of competencies, learning instructions and self- regulatory capabilities for influencing one's own motivation and action towards the science subject. This is where the modular teaching approach intervene in which the goal is to help the learners to become a productive individual by providing quality education.

BACKGROUND OF THE STUDY

Modules are progressively being utilized in numerous nations as a method for organizing an educational program. Modular teaching is one of the most recognizes teaching-learning methods in numerous nations including other Western and Asian nations. According to Manlove and David (1985) modular approach is used almost in all subjects like natural science, specifically in biology and medical education and even in social sciences as well as in computer education. Further, a module is a logical presentation of the topics using

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effective teaching techniques complete with clearly stated instructions that could be easily followed by the students in solving their own problem with no assistance from the teacher. Since it is a self-study, the module must be able to communicate ideas to the students clearly and effectively. Moreover, it should learn a simple language within the learning ability of the learner (Suan, 2006). He added that the modular approach would be made to solve the problem encountered in the learning process since it is a mastery program through sharply focused, self-paced and individualized learning instruction.

Furthermore, the Ministry of Education in Guyana, (2016) mentioned that teaching material used as an alternative tool for instruction in the classroom. This will serve as a support material that could help students learned at their own paced. This teaching material is craft based on the least learned competencies that the teachers wanted to address. Abu (2009) pointed out the modular approach can be an intervention and of great help in increasing the performance of the students especially the least learners in the classroom.

According to Vistal & Lopina (2006), the module encourages mastery of the topics, all information is intact and the teacher is no longer the source of information, thus developing a learner-centered approach. They added that in modular instruction, the teacher only acts as a facilitator in the students' learning process at their particular pace. The teachers then must only assist if the students have improved and progressed based on the identified topics and competencies.

Matanlukab, et al. (2013) proved that teaching modules contributed to high-level thinking skills among students. The module also enabled students to achieve better performance in examinations, particularly on the essay form. In addition, the module was also able to overcome learning problems such as lack of interest, concentration, skills in critical and creative thinking.

A similar study by Jamin (2015), on Remedial, Reinforcement, and Enhancement Modular Learning Activities in Science and Health in Elementary Schools: An Action Research. The findings revealed that the developed instructional materials like modules were more effective in attainment and remediation purpose. Likewise, he recommended that modules should be developed and enhance further based on the level of difficulties and deficiencies of the learners in the classroom. It is parallel to the present study since both focused on the development of the instructional materials and which to address the problems of the skills gap among the learners.

Salita (2006) mentioned that the modules are widely used worldwide integrating into the school curriculum; as a result, teachers should be innovative in developing a tool as an aid in extending help to the learners for better learning and teaching process.

The book of Brown & Vanlehn (2002), affirmed the students would require knowledge on how previous learning

experiences be integrated into the present, and on how to apply to the real world. The modular approach would become an instrument that encouraged learners to extend their learning and to have a concrete learning process. They added that through a modular approach, students would become independent to learn at their own pace. They need to adapt to combining existing of the users of learning instructional material like a module to increase their cognitive ability. The module serves as a catalyst of learning because it contains different activities for the learners to learn.

Nicholes (2002) cited that through a module, students would easily learn because activities in the module were suited to capabilities. Through the given information and activities in the module, students must become more participative in the learning process. And in addition, by means of other instructional materials like a module, students may be able to directly understand their lessons. He added that best-crafted module with the integration of lectures could be essential for effective and efficient students learning about the topic.

Salandanan (2001), stated that modular instruction is the most common printed teaching module which follows the correct format intended for the learners. The modular approach could help to improve remedial instruction for the slow learners and enrichment for fast learners. One way of helping slow learners and remediate them is through the help of modules. Thus he added that a module could serve as an effective tool in the teaching and learning process.

OBJECTIVE OF THE STUDY

The purpose of this study was to examine the effectiveness of modular approach in teaching Chemical Compounds and Elements among Senior High School Students of Tuyom National High School. More specifically, the study sought to answer the following sub-problems: demographic profile of the respondents, pre-test and post-test results, and performance of the students using the modular approach in teaching.

RESEARCH METHODOLOGY

This study utilizes pre- post- test research design following experimental design in nature which a test was given to the experimental group. It was true experimental in which the respondents was chosen in random to avoid bias and to ensure the objectives of results of the study. The study was conducted in Tuyom National High School, Carcar City Cebu otherwise known as Don Juana Macalalang Memorial National High School because. The school offers four courses intended for the senior high students namely, Accountancy, Business and Management (ABM), Humanities and Social Sciences (HUMSS), Housekeeping (HK), and Food and Beverages (F&B). The respondents of this study were the senior high school students who were identified at risk of failing in Physical Science subject in Tuyom National High School for the academic year 2018- 2019. There were only five in the ABM department, 7 in the HUMSS department, 13 in the F & B department and 23 in the Housekeeping department with a total of 48 respondents.

Figure1 presents the summary of the respondents.

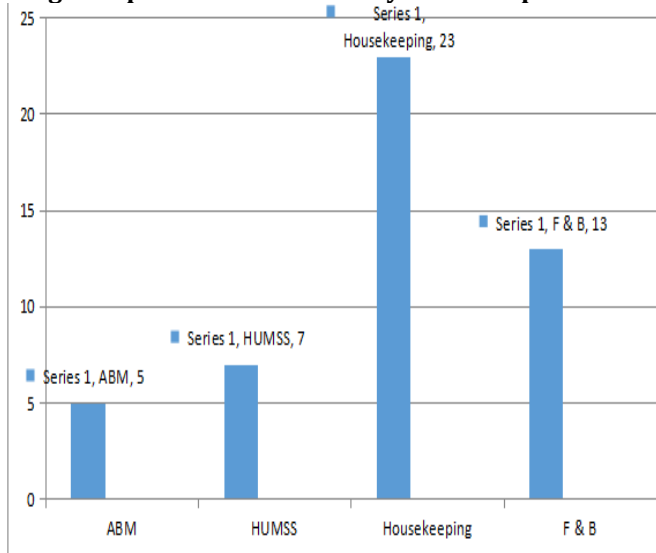


Figure1.

Data Collection

The study utilized two sets of questionnaire. The first set of the questionnaire contained of the profile of the respondents seeking information such as age, sex, and course strands. The second set of questionnaire is a multiple choice question on the topic of the module on the elements and compounds. There are ten items in which the students have to answer of their choice. Part I focused on the development of the periodic table, part II was on the chemical bonding, part III pointed on the naming of compounds and part IV was on the topic chemical reactions.

To ensure the validity and reliability of the questionnaire, this was validated; pilot tested to the senior high school students in other school in Carcar City Division. The result has shown a Cronbac's alpha of 0.85 which mean that the instrument used is reliable and valid. After the validation of the questionnaire, the researcher himself with the assistance of the subject teacher distributed the questionnaire to the respondents during class hour. A face to face interview and

Pre-test Performance of the Respondents

Table 2 presents the pre-test performance of the students before introducing the module.

Table2 Pre-test Performance of the Respondents

Pre-test Scores	Control Group		Description
Score Ranges	F	%	
31- 40	0	0.00	Very Satisfactory
21- 30	8	16.67	Satisfactory
11-20	36	75.00	Less Satisfactory
1-10	4	8.33	Unsatisfactory
Total	48	100	
Mean	15.27		
Standard Deviation	3.417		

Table 2 showed the pre-test scores of the respondents. There were 8 (16.67%) who garnered a score 21- 30 which interpreted *Satisfactory*. However, there were 36 (75%) students who garnered a score of 11- 20 which interpreted *Less Satisfactory*, and the remaining 4 (8.33%) got a score of 1 to 10 indicated as *Unsatisfactory* performance. The data revealed that most of the students showed poor performance in the pre-test maybe because there was no intervention of the module took place before the test. This implies that students need immediate help for them to pass the subject. As shown in the table, students have less satisfactory performance, thus these students really need aid from the teacher like modular intervention.

This was supported by Jamin (2015) that the developed instructional materials like modules were more effective in attainment and remediation purposes to the least learners in the class.

discussion was done to the respondents as to scaffold the learning of the students on the topic. This was done with the presence of the teacher, learners and other concerns characterized the quantitative results.

RESULTS AND DISCUSSION

Table1 Profile of the Respondents

Age	Frequency	Percentage
16-17	23	47.92
18-19	19	39.58
20-21	6	12.50
Total	48	100
Sex	Frequency	Percentage
Male	29	60.42
Female	19	39.58
Total	48	100
Course Strands	Frequency	Percentage
ABM	5	10.42
HUMSS	7	14.58
F&BS	13	20.08
HOUSEKEEPING	23	47.92
Total	48	100

Table 1 presents the demographic profile of the respondents as to their age, sex, and the course strands. It was shown that the majority of the respondents were age ranges 16- 17 years old or 47.92%. 19 out of 48 or 39.58% were age ranges 18-19 while 6 out of 48 or 12.50% were ages 20- 21 years old.

As to their sex, 29 out of 48 or 60.42% were males while 19 out of 48 or 39.58% were females. This implies that most of them were males.

As to their course strands, 23 out of 48 or 47.92% were Housekeeping, 13 out of 48 or 20.08% were Food and Beverages Services, 7 out of 48 or 14.58% were Humanities and Social Sciences and 5 out of 48 or 10.42% were Accountancy, Business, and Management. This implies that most of the respondents were males ages 17 to 19 in the Housekeeping department.

Post-test Performance of the Respondents

Table 3 presents the post-test performance of the students after introducing the module.

Table3 Post-test Performance of the Respondents

Post-test Score	Control Group		Description
Score Ranges	F	%	
31- 40	10	20.83	Very Satisfactory
21- 30	34	70.84	Satisfactory
11-20	4	8.33	Less Satisfactory
1-10	0	0.00	Unsatisfactory
Total	48	100	
Mean	25.79		
Standard Deviation	3.52		

Table 3 showed noteworthy results in the post-test of the students. It showed an increase in the performance of the students based on the score earned in the post-test. There were 34 or 70.84% who earned the score of 21-30 which showed *Satisfactory* performance. On the other hand, there were 10 or 20.83% garnered the score of 31-40 in which interpreted to Very Satisfactory and only 4 or 8.33% of the students got scores of 11- 20 indicated as Less Satisfactory. It further revealed that in the post-test result, there were no *Unsatisfactory* students. This further revealed that with the help of the developed instructional material which is the module really is of great help for the least learners.

This was proved by Matanlukab, et. al. (2013) that teaching module contributed high level thinking skills among students. The module also enabled students to achieve better performance in examinations. In addition, module was also able to overcome learning problems such as lack of interest, concentration, skills in critical and creative thinking.

Significance of the Improvement between the Pre-test and Post-test Performances of the Students

Table 4 presents the significant improvement between the pre-test and post-test performance of the students.

Table4 Significance of the Improvement between the Pre-test and Post-test Performances of the Students

Variables	Mean	P- Value	Decision on Ho	Interpretation
After The intervention	3.52	0.02	Reject the Ho	Significantly Different

Level of significance= alpha 0.05

The table above presented that the p- value is less than the level of significance. There is no significant difference on the performance of the students before intervention of the module, however, a significant different on the students' performance after the intervention of the module.

Summary of Findings, Conclusion and Recommendations FINDINGS

- The ages of the respondents were from 16 to 21 years old. Majority were Male, aged 16 to 17 taking the course Housekeeping under tech- voch strand.
- The level of the students' performance on the topics was interpreted Less Satisfactory before the conduct of modular approach and Satisfactory after the intervention of the module.
- There is a significant difference after the intervention of the used of the module.

CONCLUSION

The use of Modular Approach is an effective tool for intervention and a great help to improve the performance of the learners. It is a way of helping the least learners who need immediate intervention.

RECOMMENDATIOIS

In the light of the findings, the following recommendations are proposed:

- The teachers as front liners in all levels will do the same to help improved the performance of the identified PARDO's and LARDO's in the classroom.
- The school will make an assessment as to what level of help needed for the learners specially the identified least learners in the classroom.

- The school will initiate in developing self- instructional material to meet students with deficiencies in their academic learning.
- The school will integrate varied activities and assessment to the least learners.
- The Division office and the teachers in the classroom help in the wide implementation of the module for the intervention program.

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