

The Effect of Blended Learning Instruction using Simplified Science Module on Students' Academic Performance

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Abstract

In the new normal set-up, one of the ideal modes of teaching and learning used in the K-12 curriculum that is engaging and motivating is blended learning instruction. This study focused on the effect of blended learning instruction using simplified science module on the academic performance of Grade 11 students of Tawi-Tawi School of Arts and Trades (TTSAT) and Tawi-Tawi School of Fisheries (TTSF). This study made use of quasi-experimental design and had two sets of research instruments: the simplified science module used in blended learning instruction and the Pre-test and Post-test Questionnaire. The result revealed that there was an increase in the level of academic performance of students in both schools with blended learning instruction using simplified science module. It also revealed that blended learning instruction using simplified science module exhibits large effect in content standards such as Stellar Formation and Origin of Elements, Atomic Concept, and Chemical Reaction while medium effect on Properties of matter and Its Chemical Structure. There is a significant difference on the level of performance from pre-test to post-test of the said students in both schools. There is no significant difference on the extent of effect of blended learning instruction using simplified science module on the academic performance of the concerned students in both schools along the four content standards. Consequently, blended learning instruction using simplified science module is an effective way of engaging and motivating students to learn in both schools. Thus, schools should encourage teachers to engage students in blended learning instruction to achieve effective and meaningful learning.

Keywords— *Blended Learning Instruction, Simplified Science Module, Academic Performance, Senior High School, Tawi-Tawi.*

I. INTRODUCTION

Learning encompasses the whole life of an individual. It only differs on the process of how one attains and live with it meaningfully. Each generation has different modes of learning. With today's generation, where prevalent technological advances of gadgets influenced students' learning and the fact that everything has changed; science has played important role in life, technology has evolved, new discoveries and inventions arose.

Due to the rapid development of modern science and technology, our society is in the information technology age. Not only are students carrying their mobile phones, laptops, and iPods everywhere, but they are also familiar with different online environments (Harb, 2013).

With the changing environment, teaching and learning should also adapt without forgetting and ignoring the traditional one. It is undeniable that traditional teaching

is still adopted by some teachers due to the scantiness of the instructional resources, especially in the remote area perhaps because of the geographic location of the province.

Philippines is committed to achieving its Education for All (EFA) goals not only for the development of each Filipino, but also for the overall social and economic progress of the country. Part of the Philippine Education for All Plan of Action 2015, is Critical Task No. 5, "the expansion of basic education, targeting that by 2015, the Philippines has lengthened its cycle of basic education schooling to make it twelve years". (SEAMEO INNOTECH, 2012).

As the Philippines is embarking on the K 12 curriculum, it has been a great challenge to come up with reference materials intended for senior high school students. It is indeed challenging because the curriculum shall use spiral progression approach with emphasis on subject

integration (Cudera, et al., 2016). According to Almasaeid (2014) most of the public schools' results indicate that the achievement tests in science is declining. Thus, the integration of traditional learning and e-learning is an urgent requirement to achieve returns of the learning process, and blended learning.

Blended learning is an instructional methodology that leverages technology to provide a more personalized approach to learning, giving students control over the time, place, path, and pace of their learning (Brooke, 2017). Blended learning not only includes technology but real-life experiences too (Aslam, 2015). The uniqueness of the blended learning is represented by its ability to use the refined techniques from both, e-learning and traditional method, thus, the output will be a version of the best from each method (Almasaeid, 2014).

Philippine Education is now using ICT as part of learning. Use of ICT was supported by the DepEd Order no.78, s. 2010 – Guidelines on the implementation of the DepEd Computerization Program (DCP). Through this program and the combine efforts of other government agencies and the private sector, 5,409 public secondary schools have been provided with at least one computer laboratory each (DepEd Order 78, 2010). Unfortunately, one of the biggest problems of all teachers is the access to instructional materials and internet resources because not all may have received the supply and have equal access to internet. It hinders the teachers especially in rural areas to efficiently do their work. Thus, there is a need for an alternative or flexible resources such as modified, simplified, and suitable module for learners that even if there is lack of facilities, resourcefulness in the real world could apply.

In Bongao, Tawi-Tawi, Philippines, it has been observed that teaching science in senior high schools is quite a challenge. Problem situations or investigation approaches play a significant part in the teaching-learning process. Thus, no matter how intelligent the teacher is, if the approach is solely traditional, students may not fully engage in learning. Hence, the teacher has to generate an interactive class through blended learning instruction to create an effective and meaningful learning to students. With this notion, the researchers sought to conduct this study to determine the effect of blended learning instruction as well as to help highlight appropriate and relevant instructional approach and viable resources in teaching science class.

Research Problem

This study determined the effect of blended learning instruction using simplified science module on the academic performance in Physical Science subject of Grade 11 students of Tawi-Tawi School of Arts and Trades

(TTSAT) and Tawi-Tawi School of Fisheries (TTSF) in Bongao, Tawi-Tawi. Specifically, it sought to answer the following questions:

1. What is the level of academic performance (pre-test and post-test) of the concerned senior high school students in Physical Science subject when taught using a blended learning instruction and simplified science module in terms of the following content standards:
 - 1.1. Stellar Formation and the Origin of Elements;
 - 1.2. Atomic Concept;
 - 1.3. Properties of Matter and its Chemical Structure; and
 - 1.4. Chemical Reaction?
2. To what extent is the effect of blended learning instruction using simplified science module on the academic performance of the concerned students in Physical Science in terms of the aforementioned content standards?
3. Is there a significant difference on the level of academic performance (pre-test and post-test) of the concerned students in Physical Science pre-test and post-test on the tested content standards by school?
4. Is there a significant difference on the extent of effect of blended learning instruction using simplified science module on the academic performance of the concerned students in Physical Science in terms of the aforementioned content standards by school?

II. METHODOLOGY

This study used a quasi-experimental approach to determine the effect of blended learning instruction using simplified science module on students' academic performance. It was conducted in two public secondary schools in Bongao namely: Tawi-Tawi School of Arts and Trades (TTSAT) and Tawi-Tawi School of Fisheries (TTSF). TTSAT is a demand-driven institution committed to produce graduates with competencies, technical-vocational, and values for higher learning, entrepreneurship and life-long gainful employment fit for the global workplace. TTSF is an institution of learning which aims to provide accessible, efficient, and effective education to all individuals especially the underserved and underprivileged but deserving students of Tawi-Tawi and is globally competitive and equally parallel to the education with seal of international standard. Both schools are under the direct

supervision of the Ministry of Basic, Higher and Technical Education (MBHTE), Tawi-Tawi Division.

The respondents of this study were the Grade 11 students taking General Academic Strand (GAS). A Simplified Science Module developed by the researchers and patterned from the K-12 Science Module was utilized. Also, a researcher-made-test was developed and used to assess the performance of students in the pre-test and post-test. Said instruments were subjected to validity and reliability tests. Pilot test was initially done in one of the schools in Bongao, Tawi-Tawi. To gather the needed data, one of the researchers personally taught the simplified

science module to the respondents in the class using the blended learning instruction. The respondents' performance was evaluated through pre-test and post-test. Data were treated using mean, paired t-test, Cohen's *d*, and ANOVA.

III. RESULTS AND DISCUSSION

Table 1 presents the level of academic performance (pre-test and post-test) of the Grade 11 students of Tawi-Tawi School of Arts and Trade (TTSAT) and Tawi-Tawi School of Fisheries (TTSF) in Physical Science subject when taught using a blended learning instruction and simplified science module.

Table 1. Level of Academic Performance of TTSAT and TTSF Students Using Blended Learning Instruction and Simplified Science Module

Content Standard	TTSAT				TTSF				
	Pre-test		Post-test		Pre-test		Post-test		
	Mean	Int.	Mean	Int.	Mean	Int.	Mean	Int.	
Stellar Formation and the Origin of Elements	3.75	L	5.09	A	4.26	L	6.13	H	
Atomic Concept	2.52	VL	3.96	L	2.46	VL	4.39	L	
Properties of Matter and Its Chemical Structure	4.29	L	5.25	L	4.76	L	5.85	L	
Chemical Reaction		2.66	VL	4.30	L	4.13	L	5.54	L

Legend: VH- Very High; H – High; A – Average; L – Low; VL- Very Low

As shown in Table 1, there was an increase in the level of academic performance of Tawi-Tawi School of Arts and Trade (TTSAT) students in the Stellar Formation and the Origin of Elements from **low** (3.75) in the pre-test to **average** (5.09) in the post test. Further, an increase in the level of performance in the Atomic Concept and Chemical Reaction in pre-test from **very low** (2.52 and 2.66) to **low** (3.96 and 4.30) performance. However, in terms of Properties of Matter and Its Chemical Structure, students obtained **low** level of performance in both pre-test (4.29) and post-test (5.25).

In like manner, a large increase in the level of academic performance of Tawi-Tawi School of Fisheries (TTSF) students in terms of Stellar Formation and the Origin of Elements was gained from **low** (4.26) to **high** (6.13); while they obtained **very low** (2.46) to **low** (4.39)

performance in the Atomic Concept. Meanwhile, although mean score increased in terms of Properties of Matter and Its Chemical Structure and Chemical Reaction, students got **low** level of performance in both pre-test (4.76 and 4.13) and post-test (5.85 and 5.54).

The result implied that there was an increase in the level of performance in almost all content standards in the post-test. This further implied that blended learning instruction using Simplified Science Module had increased/improved the level of academic performance of both TTSAT and TTSF students.

Table 2 presents the extent of effect of blended learning instruction using simplified science module on the academic performance of the concerned students in terms of the aforementioned content standards.

Table 2. Extent of Effect of Blended Learning Instruction on Students' Academic Performance

Content Standard	TTSAT			TTSF			
	Mean	Cohen's Diff.	Level of <i>d</i> Effect	Mean	Cohen's Diff.	Level of <i>d</i> Effect	
Stellar Formation and the Origin of Elements	-1.339	0.712	Large	-1.870	1.048	Large	
Atomic Concept	-1.446	0.804	Large	-1.935	0.930	Large	
Properties of Matter and Its Chemical Structure	-0.964	0.432	Medium	-1.087	0.577	Medium	
Chemical Reaction		-1.643	0.693	Large	-1.413	0.693	Large

As shown in Table 2, blended learning instruction using simplified science module among TTSAT students revealed a **large effect** on Stellar Formation and the Origin of Elements; Atomic Concept; and Chemical Reaction with Cohen's *d* of 0.712, 0.804 and 0.693, respectively, while Properties of Matter and Its Chemical Structure had a **medium effect** (0.432) on the academic performance of the concerned students.

Comparably, TTSF students got the same effect with TTSAT students. There was a **large effect** on Stellar Formation and the Origin of Elements, Atomic Concept, and Chemical Reaction with Cohen's *d* of 1.048, 0.930, and 0.693, respectively, while Properties of Matter and Its Chemical Structure had a **medium effect** with a Cohen's *d* of 0.577.

The result implied that blended learning instruction using simplified science module manifested the same effect

on the students' learning gains in both schools in terms of the above-mentioned content standards. Further, it implied that students from both schools found blended learning instruction using simplified science module effective to learning. Meanwhile, the **medium effect** of blended learning instruction on both schools might be the result of the unavailability of the laboratory room since activities were done only inside the classroom of a large class size which might affect students' organization of ideas and the implementation of lab-rotation model of the blended learning instruction.

Table 3 presents the significant difference on the levels of academic performance (pre-test and post-test) of the concerned students in Physical Science pre-test and post-test on the tested content standards by school.

Table 3. Result of Significant Difference on the Levels of Academic Performance in Pre-test and Post-test by School

Content Standard	TTSAT			TTSF			
	Mean	p-value Diff.	Remarks	Mean	p-value Diff.	Remarks	
Stellar Formation and the Origin of Elements	-1.339	.000	Sig.	-1.870	.000	Sig.	
Atomic Concept	-1.446	.000	Sig.	-1.935	.000	Sig.	
Properties of Matter and Its Chemical Structure	-.964	.002	Sig.	-1.087	.000	Sig.	
Chemical Reaction		-1.643	.000	Sig.	-1.413	.000	Sig.

As shown in Table 2, there is a **significant difference** on the level of performance of the Grade 11 students of TTSAT in the aforementioned content standards between pretest and post-test with the p-values of 0.000,

0.000, 0.002, and 0.000, respectively, which are all lower than alpha 0.005.

In like manner, there was a **significant difference** on the level of performance of the Grade 11 students of TTSF in the aforementioned content standards between pre-

test and post-test with the p-values of 0.000, 0.000, 0.000, and 0.000, respectively, which are all lower than alpha 0.005.

This implied that the result of their performance in the post-test increased from that of their pre-test. There was a rise in the scores of the learners in both school from the pre-test to post-test though it was not sufficient to elevate their performance to the next higher level of interpretation.

Table 4. Result of Significant Difference on the Effect of Blended Learning Instruction on Students' Academic Performance by School

	p-value	Remarks
TTSAT Content Standards	0.372	Not Sig.
TTSF Content Standards	0.125	Not Sig.

As shown in Table 4, there is **no significant difference** on the extent of effect of blended learning instruction using simplified science module on the academic performance of the concerned students in both TTSAT and TTSF along the four (4) content standards with p-values of 0.372 and 0.123, respectively, which are greater than alpha 0.005. This indicates that the variation of effect along content standards within each school is not significant. Further, it implies that blended learning instruction using simplified science module showed similar effect along the four content standards.

IV. CONCLUSION

Based on the findings of the study, it is concluded that blended learning instruction using simplified science module increased the level of academic performance of the students in both schools. Further, it manifests that blended learning instruction had similar positive effect on the students' learning in both schools. Consequently, blended learning instruction using simplified science module is an effective way of engaging and motivating the said students in both schools to learn. Thus, schools should encourage teachers to engage students in blended learning instruction to achieve effective and meaningful learning.

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Thus, blended learning instruction using simplified science module is effective for students' learning in both schools.

Table 4 presents the significant difference on the extent of effect of blended learning instruction using simplified science module on the academic performance of the concerned students in Physical Science in terms of the aforementioned content standards by school.

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