



Assessment of Alternative Learning System (ALS) Secondary Students' Conceptual Understanding and Science Process Skills in Strand 2

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Received: 26 Dec 2024

Revised: 28 Apr 2025

Accepted: 29 Apr 2025

Abstract. The aim of this study was to investigate the assessment of Alternative Learning System (ALS) secondary students' conceptual understanding and science process skills in strand 2. The study used one – group pretest-posttest design. The participants were 60 ALS students in the Municipality of Munai, Lanao del Norte during the school year 2023 – 2024. The findings showed that majority of respondents were in the age bracket of below 21 and 21 – 25 which gives a percentage of (36.7) while for the grade level last attended, grade 7 received the highest response rate of (43.3%). After the intervention, it shows that there is no significant relationship between the respondents' profile in terms of age and grade level last attended and the conceptual and science process skills of the students. Moreover, it was found after intervention that there was a significant difference on the students' conceptual understanding test mean score. As for the comparison of the science process skills test mean score of the students before and after intervention, it shows a significant difference. Furthermore, it shows that there is no significant relationship between the students' conceptual understanding and the science process skills of the students. As a result, it is recommended for the future researcher that the sample size and the scope of the study should be increased to determine the conceptual understanding and science process skills of the students under the program of Alternative Learning System (ALS) not only in Municipality of Munai but also in other municipalities in the Philippines.

Keywords: Alternative Learning System, Conceptual Understanding, and Science Process Skills, Assessment

1. Introduction

The Alternative Learning System (ALS) is a ladderized, modular non-formal education program in the Philippines for dropouts in elementary and secondary schools, out-of-school youths, non-readers, working Filipinos and even senior citizens. It is part of the education system of the Philippines but an alternative to the regular classroom studies where Filipino students are required to attend daily. The alternative system only requires students to choose schedules according to their choice and availability (Cayabyab, Jacoba, Nalanga, Tamayo, and sabas, 2016).

Literacy is a fundamental human right and the cornerstone for lifelong learning, according to the United Nations Educational, Scientific, and Cultural Organization (UNESCO). It is a precondition for the development of a global society and helps to national and human progress. Countries that succeed in providing literacy and lifetime skills to their populations are typically better positioned to fulfill the economic demands of functioning in a worldwide digital economy (Apao, Dayagbil & Abao, 2014). Individuals must be literate in this setting to be internationally competitive, but the means to do this is through education.

Education is more than just the transmission of information from one source to another; it is, to some extent, a critical component in the development of skills and talents in all crucial areas. Improving a country's education means developing its inhabitants' abilities so that their full potential may be realized to the nation's benefit. Nonetheless, a large number of young teenagers are unable to attend or finish basic schooling.

To address this issue, the international development community launched Education for All 2015 (EFA 2015), a large worldwide education program that seeks to satisfy the learning requirements of all children, youth, and adults by 2015. (UNESCO, 2015). The majority of nations have declared and demonstrated their commitment to the EFA goals, particularly in terms of reducing literacy rates and school dropout rates (Arzadon & Nato, 2015). The Philippines is one of these nations, and it has supported the Millennium Development Goals (MDG) since 2001, as well as the Decade for Literacy from 2003. The Philippines has achieved progress in terms of educational quality in recent decades, but the country's educational system has also faced several problems. Even though the literacy rate is between 94 and 96 percent, functional illiteracy is rather high (Pinca, 2015).

In addition, the number of students who drop out of school is alarmingly high. The most common explanation for this is that most people have been hit by an economic crisis brought on by poverty, which is blamed on illiteracy. Illiteracy continues to be a problem among the poor and marginalized, owing to a lack of education as the primary cause of poverty. As proposed in the Education for All (EFA) 2015 Philippine Plan of Action, the Philippine government implemented the Alternative Learning System (ALS) under the jurisdiction of the Department of Education as a necessary component of the Philippine education system to provide unrestricted access to basic education to all Filipinos. The Alternative Learning System is a non-formal modular education program that meets the educational needs of non-schoolers, dropouts, illiterate adults, and other marginalized learners who have never had formal education but can learn in an out-of-school setting. According to Apao's research, the execution of the alternative learning system program, which included the supply of life skills, enhanced literacy, and improved quality of life, demonstrated that the provision of life skills was achieved to a large extent.

Furthermore, the K to 12 science curriculum's conceptual framework, science education aims to develop scientific literacy among students that will prepare them to be informed and participative citizens who are able to make judgments and decisions regarding applications of scientific knowledge that may have social, health or environmental impacts. It integrates science and technology in the civic, personal, social, economic and the values and ethical aspects of life. It is designed around the three domains of learning science: understanding and applying scientific knowledge, performing scientific process and skills, and developing and demonstrating scientific attitudes and values (Maranan, 2017).

Students are natural conceptualizer. Students, as humans who always conceptualize, comparing natural tendencies and distinguishing objects, events, all things. To take advantage of this natural tendency, effective learning environments must be put in place. That should give students assignments to increase their effectiveness in shaping and using concepts. Moreover, helping them become aware of developing skills for completing a task. Guidelines for establishing an effective learning environment that is by helping

students concentrate on something they understand and produce ideas. Effective learning environment help students to develop conceptual understanding of certain knowledge that force students converting conceptual understanding into the skills of developing categories, making algorithmic formulations, generating and testing hypotheses. In addition, directing students to the acquisition of knowledge and understanding of concepts, and practice science process skills (Nufida, Khery, Suryati and Budiasih, 2020).

Student's investigation is an integral part of learning science. And there are science process skills that are important in scientific investigation. Observing, classifying, communicating, measuring, inferring and predicting are among the science process skills used by scientists, teachers and students when doing science. Much of the pleasure of both learning and teaching science is experiencing science. Mastering these process skills will help use develop the kind of science program that mirrors real science (Rezba, Sprague, Fiel, and Funk, 1995).

Development of process skills is important as well as development of proper scientific attitude and values. Science Education aims to train students to think like scientists and emphasis would be expected on the development of attitude that good scientists are able to display (Opulencia, 2011).

Conceptual understanding and process skills toward science are important elements that may influence students' performance. According to Johnston (2009), science process skills are significant in improving students' cognitive development and facilitating students' active participation during the teaching and learning process (Papanastasiou and Zembylas, 2004).

Since it was found out that the reasons why there are many students who did not finish schooling because of early marriage, child labor, financial problem etc. the Department of Education establish the Alternative Learning System Program to give them chance to improve their quality of life and increase literacy. The researcher conducted this study to determine the effectiveness of Alternative Learning System (ALS) on secondary students' conceptual understanding and science process skills in the municipality of Munai, Lanao del Norte. Furthermore, this study to determine whether the program's objectives have been achieved.

2. Methodology

This part presents the research methodology used in the study. Specifically, it presents research design, subject participants of the study, data gathering procedure, research instruments, and statistical tools.

2.1 Research Design

This study employed quantitative approach to investigate the assessment of Alternative Learning System (ALS) secondary students' conceptual understanding and science process skills in strand 2. The quantitative aspect utilized the one-group pretest -posttest design. The design is shown below.

O	X	O
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The symbol O represents observation. The first symbol O refers to the first administration of the research instruments or pretest to the students. The symbol X refers to instructional intervention, which is learned under the ALS curriculum. The second O refers to the second administration of the research instruments or posttest. Quantitatively, data in the form of test-scores and survey questionnaire scores were used.

The intervention specifically includes lesson on Scientific Method, and Organ Systems with subtopics of; nervous system, skeletal system, respiratory system, digestive system, excretory system circulatory system, reproductive system (male and female reproductive

system) which includes ailments and their preventive measures, Earth and Space, Earthquake and Seismology, understanding typhoon and Matter.

The pretest and posttest scores of the Science Conceptual Understanding Test and Science Process Skills were quantitative aspect of the research and utilized to determine if there is significant difference in the students' conceptual understanding and science process skills before and after intervention respectively.

2.2 Subject Participant of the study

The subject participants of this study were sixty (60) secondary students of Alternative Learning System (ALS) in the Municipality of Munai who were enrolled for the school year 2023 – 2024. The students of ALS are those who did not finish schooling because of reasons such as early marriage, child labor, financial problems, secondary/elementary dropouts, or leavers to name the few but there are many other reasons for them to leave the school. Thus, the age of the participants varies from below 21 to above 25. The Department of Education established the Alternative Learning System Program to give them a chance to improve their quality of life and increase literacy.

2.3 Research Instruments

In gathering data, the following instruments were used:

2.3.1 Conceptual Understanding Test (SCUT). The conceptual understanding of the students before and after intervention were measured using 61 item multiple choice conceptual understanding questionnaire prepared by the researcher. A table of specification was constructed to ensure proportionate distribution of the questions on the different topics covered in the study. Initially, the teacher constructed 100 multiple choice questions that was validated by experts and pilot tested. After the pilot test, forty-two (42) questions were retained, nineteen (19) questions were revised. Thirty-nine (39) questions were eliminated after the pilot testing and reliability test. The results of the pilot testing and reliability was 0.8900 which is reliable. For example, questions on scientific method were being asked to the participants to determine the step in the scientific method that being described in the situation (see Figure 1).

1. Ahmad grew mongo seeds in ten (10) pots. He divided the pots into two (2) groups, the five (5) pots exposed to sunlight and the rest five (5) pots inside their house. The situation describes what step of the scientific method?
 - A. draw conclusions
 - B. recognize a problem
 - C. form a hypothesis
 - D. test the hypothesis/experiment
2. What step of scientific method is described in the situation when Maria's experiment proved that earthworms move away from light?
 - A. draw conclusions
 - B. recognize a problem
 - C. form a hypothesis
 - D. test the hypothesis/experiment

Figure 1: Question 1 and 2, which asked participants to determine the step in scientific method that being described.

The level of conceptual understanding was measured using raw scores of Conceptual Understanding Test (CUT). The level of categorization was based on the Department of Education (DepEd). The categorization with corresponding raw score is shown below:

Raw Score	Level of Performance
59 – 61	Mastered
52 – 58	Closely Approximating Mastery
40 – 51	Moving Towards Mastery
21 – 39	Average
9 – 20	Low
3 – 8	Very Low
0 – 2	Absolutely No Mastery

2.3.2. Science Process Skills Test (SPST). The science process skills of the students were determined using the questionnaire adopted from the study done by Feyzioğlu, Demirdag, Akyildiz, & Altun, (2012) entitled Developing a Science Process Skills Test for Secondary Students: Validity and Reliability. They did a confirmatory factor analysis in determining the better fit factor structure, the goodness of fit indices were examined with Structural Equation Modeling (SEM). In order to determine this, the fitness rate obtained from the dividing of the χ^2 to its own degrees of freedom. The significance test between values of χ^2 and GFI, AGFI, RMSEA and CFI values were taken into account (Byrne, 1998; Kelloway, 1998). The rate of χ^2 value to its own degree of freedom is an important statistic. Having a rate of 3 or more than 3 shows that the fitness is very good (Loehlin, 2004).

In addition, the fitness indices in factor structures were put to examination, it was seen that the 11-factor model had perfect goodness of fit. While the RMSEA value was 0.024, CFI value was 0.97. Also, the χ^2 /sd rate was 1.04. This rate is another evidence that indicates good fit. It was seen that the 5-factor model also had very good fit. The RMSEA value was 0.034 and the CFI value was 0.94. While the low values of RMSEA show that this model also has good fit, GFI and AGFI values point out that this model has a similar goodness of fit to the 11-factor model. Also, the χ^2 /sd rate was 1.24.

Moreover, the significance test of the difference between this model's χ^2 value and the 11-factor model's χ^2 value shows that the χ^2 difference between two models was not statistically significant. However, since the chi-square values were affected by sample size this was not interpreted in this study. In order to determine the better fitting model, the differences of RMSEA and CFI values (Cheung & Rensvold, 2002) were examined. While the difference of RMSEA values was 0.01, the difference of CFI values was 0.03. According to this, the fitness of the 11-factor model is better than the 5-factor model. Yet, one must take note that both of the models have good degrees of fitness. One may state that both of the models have goodness of fit indices, yet the 11-factor model has a better fit according to the findings stated above. In the subsequent applications of the test, the 11-factor model might be used as well as the 5-factor model. It could be argued that researchers should consider that the 11-factor model has a better fit. Since the test under development is an achievement test each item is graded as 1 or 0. Because of this it should be understood that, as the grade achieved in test increases, the science process skill increases and as the grade achieved in test decreases the science process skill decreases accordingly. This is valid for all sub-dimensions and for the whole test.

The questionnaire reliability coefficient was calculated for finding out the internal consistency of the 30 items that make up the Science Process Skills test then it was found as 0.83. This value is an important proof for the reliability of the test as it shows that the questions are consistent with each other.

The students' science process skills based on the suggestion of the author are summarized as follows: 1. Observation, 2. Categorization, 3. Inference, 4. Measurement,

5. Prediction, 6. Describing and controlling variables, 7. Hypothesizing, 8. Analyzed Data, 9. Deriving Relationship, 10. Measurement, and 11. Designing a research.

2.4 Data Analysis

All the numerical data that was gathered was subject to the different statistical treatment and tested at $\alpha = 0.005$ level of significance with the help of statistician.

The quantitative data was processed and analyzed using Statistical Package for Social Sciences (SPSS) software. The Descriptive Statistics like frequency, and percentage, were used to describe the age of the respondents, grade level last attended.

Pearsons's correlation was also used to determine if there was a significant relationship between the respondents' profile in terms of their age, grade level last attended and their conceptual understanding and science process skills. It was also used to determine if there was a significant relationship between the students' conceptual understanding and science process skills.

The CUT and SPST, also underwent t – test independent samples to determine if there were significant differences between their pretest and posttest mean score.

3. Results and Discussion

The following section presents the results after analysis of the data.

Table 1 Number and Percentage Distribution of the Respondent's Profile in terms of their Age

Age	Frequency	Percent (%)
Below 21	22	36.7
21 – 25	22	36.7
Above 25	16	26.7
Total	60	100

As shown in the table 1, the findings indicate a relatively balanced representation of respondents across the age groups below 21 and 21-25 which are (36.7%), with a slightly lower proportion of respondents above the age of 25 which is (26.7%). This distribution suggests that ALS attracts learners from diverse age cohorts, reflecting the program's accessibility to individuals seeking educational opportunities outside the traditional schooling system. And those students who left the school due to several reasons such as early marriage, child labor, financial problems, secondary/elementary dropouts, or leaver.

Table 2 Number and Percentage Distribution of the Student's Profile in terms of their Grade Level Last Attended

Grade Level	Frequency	Percent (%)
7	26	43.3
8	6	10.0
9	11	18.3
10	17	28.3
Total	60	100

As shown in the table above that the findings reveal a varied distribution of respondents across different grade levels last attended. Grade 7 has the highest representation, comprising (43.3%), followed by Grade 10 with (28.3%). Grade 9 has a representation of 18.3%, while Grade 8 has the lowest percentage at (10.0%). This implies that the students enrolled in the ALS are composite learners coming from different grade levels. This result showed that the Alternative Learning System of the government is successful in

accommodating learners who cannot enroll in the regular education due to many valid reasons mentioned.

Table 3 T-test and Significant (p) value on the Comparison of Students' Pre-test and Post-test Mean Score in the Conceptual Understanding Test

Testing Period	Mean Score	Mean Difference	t-value	p-value
Before Intervention	11.15	21.90	19.142	.000(s)
After Intervention	33.05			

Note. S = significant at 0.05 level

As shown in Table 3, there was a significant difference between the pretest and posttest of the students. Since, the mean score increase from 11.15 in the pretest to 33.05 in the posttest. Which the t-value is 19.142 and a p-value of .000. Meaning, there was a significant improvement in the conceptual understanding of the students and it indicates that the intervention had a positive effect.

The result aligns with the findings of Konicek-Moran and Keeley (2015), to understand science concepts is through direct instruction involving the passing on of information from the teacher to the student through techniques such as lecture. This means that through direct supervision of the teacher during the lecture will help the students to understand the concept in science.

Table 4 Correlation of each Profile of the Respondents and the Conceptual Understanding of the Students

Relationship		Correlation	p-value	Remarks
Age	CUT Posttest	r = .032	.809	ns
Grade Level Last Attended		r = .056	.669	ns

Note: ns = not significant at .05 level

It is indicated in Table 4 that there is no significant relationship in the student's respondents' profile in terms of age and the grade level last attended with their conceptual understanding after intervention. With the given p values for age (0.809) and the grade level last attended (0.669) show that both are greater than 0.05 level of significance. Meaning, these factors did not influence students' conceptual understanding significantly. Therefore, the null hypothesis is accepted.

Moreover, the outcome could be interpreted as since the older students stopped schooling, they may have forgotten the concepts learned when they were still in school or there was no knowledge retention that caused them to be with equal footing with the other students in terms of scientific knowledge.

Table 5 T-test and Significant (p) value on the Comparison of Students' Pre-test and Post-test Mean Score in the Science Process Skills Test

Testing Period	Mean Score	Mean Difference	t-value	p-value
Before Intervention	5.87	7.50	11.731	.000(s)
After Intervention	13.37			

Note. S = significant at 0.05 level

Table 5 indicates that after the intervention, there was an increased in the mean score from pretest 5.87 to posttest 13.37. This gives a t-value of 11.731 and a p-value of .000. It only means that there is a significant difference in the science process skills of the students. This also implies that the intervention significantly improved students' science process skills.

This finding also suggests that the ALS program, through targeted intervention, has a positive impact on students' ability to perform science process skills, which is a crucial aspect of scientific literacy.

Table 6 Correlation of each profile of the respondents and the science process skills of the students

Relationship		Correlation	p-value	Remarks
Age	SPST Posttest	r = -.204	.117	ns
Grade Level Last Attended		r = .112	.351	ns

Note: ns = not significant at .05 level

As shown in the table above, there are no significant relationship between the respondents' profile in terms of age and the grade level last attended to their science process skills after the intervention. With the given p values of age .117 and grade level last attended .351 that both are greater than 0.05 level of significance. This means that there is no significant relationship between the respondents' profile in terms of age and grade level last attended to their science process skills.

The result implies that even though the students are of different ages and different grade levels, these cannot affect their science process skills.

This can also explain by lack of science process skills development in students due to textbooks with limited composition of these skills. This is supported by Akben (2015) he stated that when the level of incorporation of these methods in the books tended to be at the structured inquiry level.

Table 7 Correlation of Students' Conceptual Understanding and Science Process Skills

		Pretest Science Process Skills	Posttest Science Process Skills
Pretest Conceptual Understanding	Pearson Correlation	-.032(ns)	-.085(ns)
	Sig. (2 – tailed)	.805	.517
	N	60	60
Posttest Conceptual Understanding	Pearson Correlation	.148(ns)	.081(ns)
	Sig. (2 – tailed)	.259	.536
	N	60	60

Note: ns = not significant at .05 level

Table 7 shows that all the p-values exceed 0.05. which indicates that there is no significant relationship between the students' conceptual understanding and science process skills. meaning there is no significant relationship between the two factors. This

suggests that the null hypothesis is accepted, indicating that students' understanding of the concepts didn't have a significant effect on their science process skills.

Moreover, the result of the study indicates that students' conceptual understanding of a certain topic domain does not influence their science process skills.

The findings of this study imply that the conceptual understanding of students in a specific topic does not appear to have an immediate impact on their science process skills. This might be due to the fact that the participants were from the Alternative Learning System (ALS), while other research with different findings comprised students in the regular curriculum.

Conversely, Tan, Yangco, and Que (2020) learned that science process skills were associated with improved conceptual understanding in biology. Likewise, Sari, Sudargo, and Priyandoko (2018) also demonstrated an association between science process skills and conceptual understanding in physics.

4. Conclusion

The results suggest that after the classroom instruction it was found that there was a significant difference in the students' conceptual understanding and science process skills. Moreover, it was found that no significant relationship between the conceptual understanding and science process skills since the p-value is higher than the significant value. Furthermore, it was found that more activities given to the students will increase their conceptual understanding and will enhance their science process skills. However, repetitions of activities, and availability of the materials are some factors that need to be considered to ensure its effectiveness in teaching science.

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