Textual and Illustrated Test Performance of Students with Multiple Intelligences

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Abstract: *Equally essential with educational assessment in the teaching-learning process is the consideration of the multiple intelligences (MI) of the learners. This observation led the researchers to conduct a study on the performance of students demonstrating MI using textual and illustrated formative assessment. This study determined the MI of students at PSU Bayambang enrolled during the first semester SY 2015-2016; the textual test performance (TTP) and illustrated test performance (ITP) of the students; the significant difference between these tests and their intellectual abilities (IA); as well as the significant difference of the textual and ITP of the students when grouped according to their IA. The descriptive-comparative method was employed in this research. Findings of the study showed that the respondents demonstrated different IAs. Results also showed that these students performed better in the illustrated test than in their textual tests. When grouped according to IA, results showed that musical learners have better ITP than the kinaesthetic and linguistic learners; mathematical learners have better ITP than the musical, Interpersonal, intrapersonal, kinaesthetic, and linguistic learners. Also, the interpersonal learners have better ITP than intrapersonal learners; and the natural learners have better ITP than the kinaesthetic and linguistic learners. Overall, students with Visual IA were found to have better ITP than all the other learners. From these findings, the researcher recommends that teachers give worthwhile consideration to their students' MI in preparing assessments. Other methods of evaluating students' performance that would fit the variety of IA of their students may be explored to allow broader opportunities of learning.*

Keywords: Intellectual abilities, Formative assessment, learners

Introduction

Assessment is a crucial part in the process of learning. It supports improvements in learning and measures the fulfilment of educational goals. It shows evidence of learning by clarifying understanding and rendering feedback that can motivate learners to perform better. Educational assessment has evolved over the years. With the ever changing curriculum in all levels of education, and the challenges of new teaching strategies introduced to adapt to the ever changing learning environments, so did the methods of educational assessment. Commonly classified, assessment can be initial/pretest, formative, summative and diagnostic (Mctighe, J; O'connor, K, 2005) [1].

Formative assessments are carried out throughout a course and are used to help in the learning process as they are conducted purposely to give feedback on students' progress (Shavelson, 2006) [2]. It may be a range of formal and informal assessment procedures conducted by teachers during the learning process in order to modify teaching and learning activities to improve student attainment (Crooks, T. 2001) [3]. Formative assessments can be given in many ways. Among these are textual or written tests in many forms such as quizzes, flashcards, concept maps, etc. other approaches can be in the form of illustrations or drawings.

Equally crucial to consider in the education process are the Multiple Intelligences represented by intellectual abilities (IA) by which students are most comfortable with. These intellectual abilities are ways by which a learner takes in, processes, and relates information learned in the classroom. Furthermore, a number of intellectual abilities have been identified and recognized by prominent educators over the years to affect the way individual learners gain knowledge in any particular area of learning. Howard Earl Gardner [4], in his theory of multiple intelligences has, since 2000, identified eight major intellectual abilities that represent these multiple intelligences possessed by learners: linguistic/verbal, logical-mathematical, musical, visual/spatial, kinesthetic, interpersonal, intrapersonal, and naturalistic. Visual learners prefer using pictures, images, and spatial understanding. Verbal (linguistic) prefer using words, both in speech and writing, logic-mathematical learners prefer using logic, reasoning, and "systems" to explain or understand concepts, kinaesthetic learners "learn by doing" and prefer the use of their body to assist in their learning. Drawing diagrams, using physical objects or role playing are all strategies of the Physical learner. Interpersonal individuals are the ones who enjoy learning in groups or with other people, and aim to work with others as much as possible. Intrapersonal or solitary learners prefer to learn alone and through self-study. Naturalistic learners are instinctively interested

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in and aware of their surroundings. They are nature smart. They learn very easily outdoors and are drawn to working with nature. They enjoy opportunities to learn about living things, like plants, animals, and other biology-related subjects, and natural events, such as weather or geology. Many naturalistic students do extremely well in science and are often aware of, and are active members on, issues related to the environment. (Pitre, Womack 2003). [5]

Inspired by Gardner's theory, teachers and school administrators have recognized the reality that there is more than one way to define a person's intellect. This recognition has since allowed educators to device varied ways of introducing concepts and information to learners in all levels. Innovations in teaching strategies have since been a challenge to teachers and schools administrators so as to respond to the multiple intelligences of the learners.

In recognition of these multiple intelligences, educators have to conscientiously consider the method of assessment to be used so as to truly measure concrete evidence of learning. The commonly administered assessment of performance in all levels of education is the written or textual test. However, if a teacher wants to measure the performance of learners particularly taking into consideration other intellectual abilities, other types of assessment may be used. Formative assessment that is conducted to measure day to day learning can be given in a variety of ways so as to measure the multiple intelligences of the learners.

It is for this reason that the researchers conducted a study on the effect of two methods of formative assessment among students with multiple intelligences. The study aimed to find out the Multiple Intelligences of the General Botany students of PSU Bayambang during the 1st semester school year 2015-2016. It also aimed to determine the effect of textual and illustrated tests on the scores of these students with multiple intelligences, and find out if there is a significant difference in the test performance of the students using these two types of test. Likewise, this study intended to determine if there is a significant difference in the TTP and ITP of the students when grouped according to their intellectual abilities.

METHOD

Research Design

This study used the descriptive-comparative method of research. According to Caramani (2008), descriptive comparisons focus on the degree of similarity and difference between two or more cases. In this study, the researcher described and compared the variables of multiple intelligences, two formative assessment methods and the effects to these two to the students' test performance in botany.

Subjects of the Study

The subjects of this study were the second year Bachelor Secondary Education (BSE) - Physical and Biological Science students who were enrolled in general botany during the 1st semester school year 2015-2016 at Pangasinan State University, Bayambang Campus (PSU-BC). There were twenty one (21) BSE- Physical science major students and nine (9) BSE- biological science majors enrolled during the 1st semester. General botany is a major subject offering for both of these BSE science specialization courses. This subject entails a lot of visuals, illustrations and images incorporated in its instruction. Students enrolled in this subject are exposed not only to written or textual presentations but also to a lot of practical applications and visuals using actual specimens. The summary of respondents is presented in Table 1.

Table 1. Distribution of Respondents

Specialization	Male	Female	Total
BSE-Physical Science	13	8	21
BSE-Biological Science	3	6	9
Total	16	14	30

Data Gathering Instrument

To determine the multiple intelligences of the students, they were asked to answer three online "multiple intelligences tests" based on Gardner's Eight multiple intelligences. These instruments are a simple directly reflective assessment tool which works in a single dimension. That is, the results are produced directly from the inputs (the scored answers to the statement questions). There are no complex computations or correlations or scaling. As such, it is less prone to distortion or confusion than a more complicated testing methodology might be, especially one involving convoluted formulae or scales on several dimensions (Chapman 2014). [7] Three online tests were required of the respondents to confirm their intellectual ability that represents their MI.

Romanelli (2008)[8] claimed that much pedagogical research has focused on the concept of multiple intelligences and that several authors have proposed that the ability to identify student intellectual abilities can augment the educational experience by helping instructors to tailor their teaching style so that

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it is more congruent with the student's or class of students' multiple intelligences.

To measure the test performance, two types of formative tests were constructed for the six chapters covering plant organs; the textual tests are purely written multiple choice test, and the illustrated tests are composed of the same questions as the written tests, but the answer choices are presented in images and illustrations. These two types of tests were subjected to validation by three biology professors who are also teaching General Botany. Examples of these two types of test are given in the following:

Example 1:
Textual test:
Which of the following is the male reproductive organ of the flower?:
a) stamen b) petals c) ovary d) all of these

Illustrated test:
Which of the following is the male reproductive organ of the flower?:

a)  b) 
c)  d) 

Example 2:

Textual test.
One of the following refers to the mature reproductive cells in the anther:
a) filament b) megaspores
c) pollen d) microspores

Illustrated test:
One of the following refers to the mature reproductive cells in the anther:

a)  b) 
c)  d) 

The researchers also made use of unstructured interview with the student respondents after all the chapter tests were conducted to find out what they think about the two types of tests and why they think they scored high or low in these tests.

Procedure

The researchers asked permission from the College Dean of the Teacher Education of PSU-BC to conduct the study. Upon approval of the dean, the researchers commenced the study.

The student respondents were divided into two groups. There were six chapter tests constructed covering all the six plant organs in textual and illustrated form. These tests were administered such that in each chapter test, the respondents were divided into two groups, one group were given the textual test while the other group were given the illustrated test. In the next chapter test, the group which took the illustrated test were given the textual test and vice versa. Each chapter test contained equal number of items. The percentage passing for each test was then computed for each student respondent, after which, the overall percentage passing for their textual and illustrated test was also computed.

Data Analysis

Frequency count was used to determine the multiple intelligences of the students. Mean percentage score of the students in their textual and illustrated tests was employed. T-test was used to find the significant difference in the test performance of the students in their textual and illustrated test. Analysis of variance (ANOVA) was used to find the significant

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difference in the textual and illustrated test performance of students when grouped according to their intellectual abilities. The least significant difference (LSD) for pairwise comparison was used.

Results and Discussions

Table 1 presents the frequency and percentage distribution of the student respondents in terms of their intellectual abilities.

Table 1. Multiple Intelligences of the Botany Students

Intellectual abilities	f	%
Musical	4	13.33
Visual	3	10.0
Intrapersonal	2	6.67
Interpersonal	7	23.33
kinesthetic	5	16.67
Logical math	3	10.0
Linguistic	3	10.0
natural	3	10.0
Total	30	100.0

As reflected in the table, out of 30 respondents, seven or 23.33 percent have 'interpersonal', five or 16.67 percent kinaesthetic', four or 13.33 percent are 'musical' in their intellectual abilities. Likewise, as can be seen in the table, third or 10 percent of the respondents are 'visual', 'logical-mathematical', 'linguistic' and natural separately, and only two or 6.7 percent are 'intrapersonal' in their intellectual abilities

The performance of the respondents in their textual and illustrated tests is presented in Table 2. It can be gleaned from the table that five or 16.7 percent of the respondents performed excellently in both textual and illustrated test, four or 13.35 percent had very satisfactory performance in the textual test and eight or 26.7 percent had the same performance in the illustrated test.

Table 2. Textual and Illustrated Test Performance of the botany students

Test performance	**Textual test**		**Illustrated test**	
	f	**%**	**f**	**%**
Below 75 (P-poor)	10	33.3	3	10.0
75 – 82 (S- satisfactory)	11	36.7	14	46.7
83 – 90 (VS- very satisfactory)	4	13.3	8	26.7
91 and above (E- excellent)	5	16.7	5	16.7
Total	30	100.0	30	100.0
Mean Performance	**81.20**	**S**	**83.93**	**VS**

11 or 36 percent performed satisfactorily in the textual test in contrast with 14 or 46.7 percent who performed the same in the illustrated test. The table also shows that there were more students, i.e., 10 or 33.3 percent who performed poorly in the textual test in contrast with only 3 or 10 percent who did the same in the illustrated test.

It can be interpreted from the table that while there are equal number of students who had excellent performance in both textual and illustrated tests, there were more students who performed satisfactorily and very satisfactorily in the illustrated test than in the textual tests. Also, there were more students who performed poorly in the textual tests than in the illustrated test.

Table 3 presents the significant difference in the test performance of the students in their textual and illustrated test. The table revealed that only the logical-mathematical learners had a significant difference in the results of their textual and illustrated tests.

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Table 3. Test Performance of the Students in their Textual and Illustrated Test

Intellectual Ability	Type of Test	Mean %	Sig.
Musical	Textual	81.80	.275
	Illustrated	87.20	
Visual	Textual	84.00	.696
	Illustrated	88.67	
Intrapersonal	Textual	78.00	.500
	Illustrated	81.00	
Interpersonal	Textual	84.38	.744
	Illustrated	86.13	
Bodily Kinesthetic	Textual	77.50	.781
	Illustrated	78.00	
Logical-Mathematical	Textual	75.67	.025
	Illustrated	88.33	
Linguistic	Textual	84.00	.405
	Illustrated	77.33	
natural	Textual	83.00	.686
	Illustrated	80.33	
Over-all	Textual	81.20	.153
	Illustrated	83.93	

Results show that these students performed better in their illustrated tests with a mean percentage of 88.33 percent than in their textual tests with a mean percentage of 75.67 percent, and with a significant difference of .025, indicating that logical-mathematical learners perform better in the illustrated test than in the textual tests. Scarince (2003) [9] describes these learners to recognize patterns easily, as well as connections between seemingly meaningless content such as figures and illustrations.

On the other hand, it can be gleaned from the table that the linguistic and natural learners showed a higher mean percentage of 84 percent and 83 percent respectively in their TTP over their ITP performance of 77.33 percent and 80.33 percent respectively, indicating that these learners perform better in their textual test than in their illustrated test. With regards to linguistic learners, this result confirms Connie Hine's (2008) [10] description of linguistic learners as those who prefer to process information through words and language versus pictures. There is still a dearth of researches however that could explain why naturalistic learners perform better in the textual tests than in the illustrated tests.

The table also shows that the TTP of the students with musical, visual, interpersonal, intrapersonal, kinaesthetic, linguistic and natural intellectual ability do not have significant difference with their ITP, indicating that their test performance in these two types of tests is comparable.

The significant difference between the TTP and ITP of students when grouped according to their intellectual abilities is presented in Table 4

Table 4. ANOVA of the Textual and Illustrated Test Performance of the Students

Type of Test		Sum of Squares	Sig.
Textual	Between Groups	323.99	.566
	Within Groups	1514.84	
	Total	1838.80	
Illustrated	Between Groups	576.19	.020
	Within Groups	689.67	
	Total	1265.87	

Analysis of variance of the TTP and ITP of the botany students as revealed in the table shows that there is no significant difference (.566) in the TTP among the students with multiple intelligences. This means that the TTP is comparable among the students with varied intellectual abilities. However, the analysis of variance for their ITP showed that there is a significant difference (.020) among the students demonstrating multiple intelligences. This means that the ITP is not comparable among students having varied intellectual abilities.

The pairwise comparison for the ITP of the students is reflected in Table 5.

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Table 5. ANOVA test of the illustrated test performance of the students

Intellectual ability (I)	Intellectual Abilities (J)	Mean Difference (I-J)	Sig.
musical	visual	-.417	.922
	intrapersonal	7.25	.144
	interpersonal	1.53	.662
	kinesthetic	9.85*	.014
	logical-math	-.08	.984
	linguistic	10.92*	.017
	natural	7.92	.074
visual	intrapersonal	7.67	.143
	interpersonal	1.95	.614
	kinesthetic	10.27*	.019
	logical-math	.33	.942
	linguistic	11.33*	.020
	natural	8.33	.078
intrapersonal	interpersonal	-5.71	.211
	kinesthetic	2.60	.580
	logical-math	-7.33	.160
	linguistic	3.67	.475
	natural	.67	.896
interpersonal	kinesthetic	8.31*	.018
	logical-math	-1.61	.675
	linguistic	9.38*	.022
	natural	6.38	.108
kinesthetic	logical-math	-9.93*	.022
	linguistic	1.067	.794
	natural	-1.93	.637
logical-math	linguistic	11.00*	.023
	natural	8.00	.090
linguistic	natural	-3.00	.513

As reflected in the table, the pairwise comparison between the 'musical' learners and the other types of learners showed that there is a significant difference in the ITP of the 'musical' learners with that of the 'kinesthetic' and 'linguistic' learners, showing a mean difference of 9.85 and 10.92 respectively, both giving a significant difference lower than .05. This means that the 'musical' learners have better ITP than the 'kinesthetic' and 'linguistic' learners. It can also be seen from the table that the 'visual', 'intrapersonal', 'interpersonal' 'logical-math' and 'natural' learners have comparable ITP with the musical learners.

Looking at the comparison between the 'visual' learners and those with other intellectual abilities, 'kinesthetic' and 'linguistic' learners also showed a mean difference of 10.27, and 11.33 respectively in their ITP with the 'visual' learners, showing a significant difference lower than .05. This means that the 'visual' learners, have better ITP than the 'kinesthetic' and 'linguistic' learners. According to Williams (2003) [11], people with visual intelligence think in terms of patterns. For example, they look for patterns and figures in new information in order to increase learning. Moreover, as can be seen in the table, the 'interpersonal', 'intrapersonal', 'logical-math' and 'natural' learners have comparable ITP with the 'visual' learners.

A closer look at the table also indicates that in the pairwise comparison of the ITP of the 'intrapersonal' learners with the other types of learners, there is no significant difference in their ITP, indicating that their ITP is comparable.

Likewise, the comparison between the ITP of the 'interpersonal' learners with the other types of learners showed that the 'logical-math' and 'natural' learners have shown no significant difference in their ITP with the 'interpersonal' learners indicating that their results are comparable. However, a significant difference lower than .05 was computed in the ITP of the interpersonal with those of the 'kinesthetic' and 'linguistic' learners with a mean difference of 8.31 and 9.38 respectively, and a significant difference of .018 and .022 respectively. This means that, the 'interpersonal' learners have better ITP than the 'kinesthetic' and 'linguistic' learners. Howard Gardner (2015) [12] described the 'interpersonal' learners as individuals who are able to pick up on the mood, characteristics, emotions, and intentions of those around them. They are also able to use this information to tailor their approach of interacting with each individual. Also, upon interview with the student-respondents showing 'interpersonal' intelligence, they were asked what they think about their scores in the two types of tests, they responded that they find the illustrated tests interesting and easier to answer at times, but sometimes they also find the textual test easier than the illustrated tests. Some of them also mentioned that they can handle both the two types of test with equal ease or difficulty.

Furthermore, looking at the pairwise comparison between the 'kinaesthetic' learners and the 'logical-mathematical', 'linguistic' and 'natural' learners, the table showed that the 'kinaesthetic' and 'linguistic' learners do not have a significant difference in their ITP. However, the 'logical-math' learners showed a significant difference of .022 with the 'kinesthetic' learners indicating that the 'logical-math' learners have better ITP than kinaesthetic learners. When asked why they think they had better scores in their illustrated tests than in their textual tests, the 'logical math' student respondents revealed

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that they easily associate the images in the illustrated tests in the patterns and figures that they learn in their math subjects.

The table also revealed that the 'logical-mathematical' learners have a significant difference of .023 in their ITP with the 'linguistic' learners, indicating that the 'logical-math learners have better ITP than the 'linguistic' learners. When the 'linguistic' or 'verbal' student respondents were asked why they think they have lower scores in their illustrated than in their textual tests, all three of them revealed that they find difficulty associating the images with words, but they find it easier to associate the words with images.

Also, the ITP of the 'natural' learners showed no significant difference with the 'linguistic' learners, indicating that their performance is comparable.

Summary of Findings

Of the thirty student respondents, seven were found to have 'interpersonal' intellectual ability, five were 'kinesthetic', four demonstrated 'musical' intellectual ability, three were found to be 'visual', three were 'logical-mathematical', three were 'linguistic', three were 'natural', and two were 'intrapersonal' in their 'intellectual' ability.

In terms of the test performance of the student- respondents, their textual test performance had a computed mean of 81.2% which is interpreted as "Satisfactory", while their illustrated test performance had a computed mean of 83.93% which was also interpreted as very satisfactory.

Among the students with different intellectual abilities, there is a significant difference in the textual and illustrated tests of the students with 'logical-mathematical' intellectual ability, with an illustrated test mean percentage of 88.33% and a textual test mean percentage of 75.67%, having a significant difference of .025. There is no significant difference between the textual and illustrated test performance of the students with 'musical', 'visual', 'interpersonal', 'intrapersonal', 'kinaesthetic' and 'linguistic' intellectual ability.

Comparison between the two types of tests when grouped according to multiple intelligences revealed that there is no significant difference in the textual test performances of the students as shown by a .566 level of significance. However, there is a significant difference in their illustrated test performances as revealed by the computed .020 level of significance.

Pairwise comparison of the students having multiple intelligences in terms of their ITP revealed that there is a significant difference between the ITP of 'musical' learners and that of the 'kinaesthetic' and 'linguistic' learners, both with a computed significance lower than .05. The 'visual', 'intrapersonal', 'interpersonal', 'logical-math', and 'natural' learners have comparable ITP with the musical learners.

The 'visual' learners showed a significant difference with the 'kinesthetic' and 'linguistic' learners in terms of their ITP having a mean difference of 10.27, and 11.33 respectively showing a significant difference lower than .05. Even so, the 'interpersonal', 'intrapersonal', 'logical-math' and 'natural' learners have comparable ITP with the 'visual' learners. The 'intrapersonal' learners showed no significant difference with the other types of learners in terms of their ITP. The 'interpersonal' learners showed no significant difference with the 'logical-math' and 'natural' learners in terms of their ITP, but showed a significant difference with those of the 'kinesthetic' and 'linguistic' learners with a mean difference of 8.31 and 9.38 respectively at .018 and .022 level of significance respectively. The 'kinaesthetic' learners showed a significant difference of .014. in their ITP with the 'logical-mathematical' learners but showed no significant difference with the 'linguistic' and 'natural' learners. The 'logical math' learners showed a significant difference of .023 in their ITP with that of the 'linguistic' learners, but had no significant difference with the 'natural' learners. The ITP of the 'linguistic' learners showed no significant difference with the 'natural' learners in terms of their ITP.

Conclusions

Based from the significant findings of the study, the following conclusions were derived:

The student respondents demonstrated multiple intelligences represented by different intellectual abilities such as musical, kinesthetic, linguistic, interpersonal, intrapersonal, and logical mathematical. Among these students with multiple intelligences, findings show that the 'logical-math' learners perform better in their illustrated tests than in their textual tests. When grouped according to intellectual abilities, the ITP of the students with multiple intelligence were not comparable. The pairwise comparison of the students with multiple intelligence revealed that the 'musical' learners perform better in illustrated test than the 'kinaesthetic' and 'linguistic' learners; the 'visual' learners, have better ITP than the 'kinesthetic' and 'linguistic' learners; the 'interpersonal' learners have better ITP

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than the 'kinesthetic' and 'linguistic' learners; the logical-math learners have better ITP than kinaesthetic and linguistic learners.

Recommendations

It is recommended that teachers give important consideration to their students' multiple intelligences at the beginning of classes. This will help them make adjustments in their teaching styles that would allow more students be given opportunities to pass or obtain higher grades.

It is also recommended that teachers explore other methods of evaluating students' performance that would suit the varied intellectual abilities of their students and find out if their performance will be affected by these methods. Teachers can also try to construct examinations composed of items, procedures or techniques that would measure a variety of intellectual abilities.

Further similar studies are also recommended making use of illustrated tests to confirm the results of this study. Similarly, studies on other types of assessment and teaching intervention that responds to multiple intelligences are also recommended.

References:

[1] Mctighe, J; O'connor, K (2005). "Seven practices for effective learning". Educational leadership 63 (3): 10–17.) Retrieved March 2, 2016 from ascd.org database

[2] Shavelson, R. J. (2006). On the Integration of Formative Assessment in Teaching and Learning with Implications for Teacher Education. Paper prepared for the Stanford Education Assessment Laboratory and the University of Hawaii Curriculum Research and Development Group. Retrieved February 27, 2016, from https://teal.ed.gov

[3] Crooks,, T. (2001). "The Validity of Formative Assessments". British Educational Research Association Annual Conference, University of Leeds, September 13–15, 2001.Retrieved February 27, 2016 from.Education-line Database

[4] Howard Gardner's Multiple intelligence Tests. Retrieved August 30, 2015 from http://www.businessballs.com/howardgardnermultipleintelligences.htm#multiple intelligences tests

[5] Giles, E., Pitre, S., Womack, S. (2003). Multiple intelligences and learning styles. In M. Orey (Ed.), Emerging perspectives on learning, teaching, and technology. Retrieved February 27, 2016, fromhttp://epltt.coe.uga.edu/

[6] Caramani D. (2008). Introduction To The Comparative Method With Boolean Algebra. Retrieved April 22, 2016 fromhttp://www.corwin.com/upm-data/23152_Chapter_1.pdf

[7] Chapman, Alan (2014). Howard Gardner's Multiple Intelligences. Retrieved December 15, 2015 from ww.businessballs.com/howardgardnermultipleintelligences.htm

[8] Romanelli, Frank. Learning Styles: A Review of Theory, Application, and Best Practices. Retrieved April 18, 2016 from American Journal of Pharmaceutical Education. http://www.ncbi.nlm.nih.gov/pmc/articles/

[9] Scarince, Christine (2003) Logical/Mathematical Learning Style: Characteristics & Strategies. Retrieved April 5, 2016 from study.com database

[10] Connie Hine's (2008) Developing Multiple Intelligences in Young Learners. Retrieved april 10, 2016 from http://www.earlychildhoodnews.com/earlychildhood/article_view.aspx?ArticleID=251

[11] Yollanda Williams (2003), Musical Intelligence: Definition, Experiments & Characteristics. Retrieved from http://study.com/academy/lesson/musical-intelligence

[12] Gardner, 2015

[13] Anonymous (2013. Retrieved April 18, 2016 from American Institute for Learning and Development. http://www.institute4learning.com/multiple_intelligences.php

ISSN-2704-2901 (Print) www.psubc.com.ph

[14] Multiple Intelligences Self-Assessment. Retrieved August 30, 2015 from edutopia: http://www.edutopia.org/multiple-intelligences-assessment

[15] Multiple Intelligences- Assessment - Literacynet.org: retrieved August 30, 2015 from www.literacynet.org/mi/assessment/findyourstrengths.htm

[16] Multiple Intelligences -- Assessment - Literacynet.org: retrieved August 2015 from www.literacynet.org/mi/assessment/findyourstrengths.htm

[17] Multiple Intelligences Self-Assessment | Edutopia www.edutopia.org/multiple-intelligences-assessment