RELATIONSHIPS BETWEEN UNIVERSITY STUDENTS' MULTIPLE INTELLIGENCES AND ACADEMIC PERFORMANCE

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ABSTRACT

Multiple Intelligences (MI) theory asserts that individuals have distinct intelligences in at least eight areas: Naturalistic, Linguistics, Logical-Mathematics, Musical, Bodily-Kinesthetic, Visual-Spatial, Interpersonal, and Intrapersonal. In teaching-learning situations, the MI of students has to be considered because these are related to their academic performance. The aim of the study, therefore, was to determine the relationships between MI and academic performance.

An inventory was used for data collection on MI; for academic performance, final grades were obtained. Results through correlational analysis indicate that for First-Year and Second-Year students, there were no significant relationships between MI and academic performance.

For Third-Year students, there was a significant positive relationship between Logical-Mathematical intelligence and academic performance, but a significant negative relationship between Musical intelligence and academic performance. For Fourth-Year students, there was a significant negative relationship between Bodily-Kinesthetic intelligence and academic performance.

Keywords: Multiple Intelligences, Academic Performance, Statistics Students

INTRODUCTION

Background of the Study

Many student- and teacher-related factors interact to determine the achievement levels of students (Bernardo, 2005). Some of these student factors have been identified: multiple intelligences (Moore, 2009); learning styles, cognitive styles, learning preferences, and gender (Arends, 2009); and aptitudes, abilities, attitudes, beliefs, motivations, prior knowledge, and other related aspects (Bernardo, 2005). The implication of these concerns on teaching is that teachers have to consider these factors as well as their interactions with each other and with other factors like school and environment to enhance learners' academic performance (Arends, 2009).

Multiple intelligences (MI) theory is one of recent considerations that relate to students. This theory asserts that individuals have distinct intelligences relating to their abilities in at least eight areas: Naturalistic, Linguistics, Logical-Mathematics, Musical, Bodily-Kinesthetic, Visual-Spatial, Interpersonal, and Intrapersonal (Gardner, 2003). These intelligences, which may or may not be independent of each other (Almeida, et al., 2011), can be harnessed and activated to help achieve the goal of understanding a certain discipline (Gardner, 2003). For teachers, a knowledge of MI thus can provide assistance in assessing where students' abilities and strengths lie and can serve as a guide in designing teaching and learning materials as well as determining learning experiences in areas of a distinct intelligence (Moore, 2009).

At Benguet State University (BSU), there appears to be a dearth of research on the relationships between MI and the academic performance of college students. Moreover, studies on these relationships in other educational situations show conflicting results. This study was therefore conducted to address these gaps. The corresponding hypothesis was: the academic performance of students has no significant relationship with their MI.

Conceptual Framework

There were two main variables in the study: a) the MI of students, and b) the academic performance of students. Since the study was correlational in nature, both variables were considered to be of equal footing. The interrelationship of these variables is shown in Figure 1.

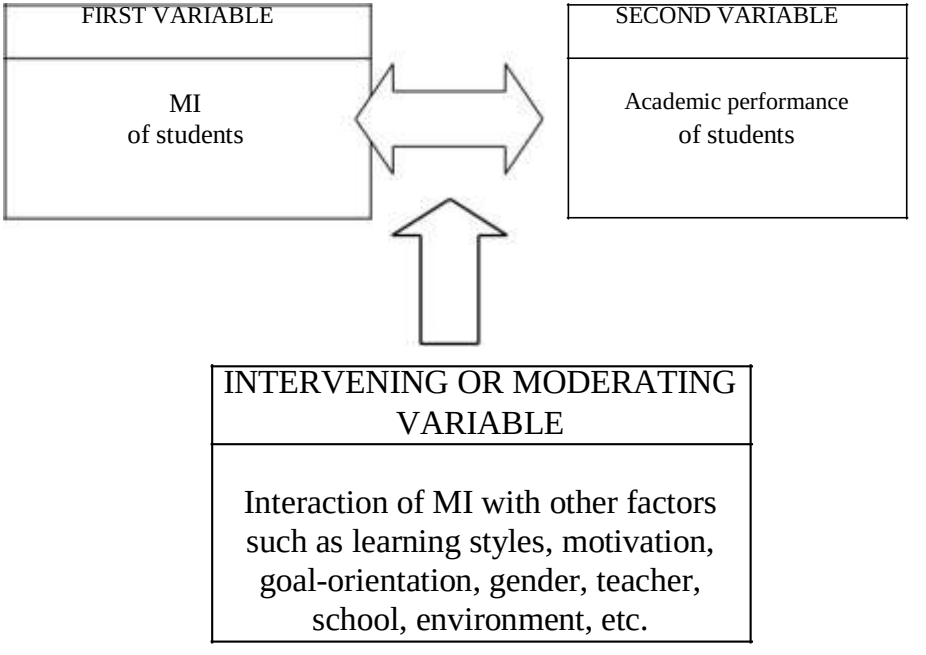

Fig. 1. Interrelationship of the variables of the study

Studies on the relationship between MI and academic performance show contradictory results. Some studies indicate a definite relationship either positive or negative between the two; others do not show any relationships at all.

For instance, Buyocan (2011) found that the Linguistic group (i.e. students whose dominant intelligence was along Linguistics) had the greatest academic achievement and the Bodily-Kinesthetic group the least, when a method combining diagrams and lectures was used. Similarly, Bialno (2010) found that the Logical-Mathematical group usually excelled in the subject like physics, possibly because the techniques used by teachers

were geared towards that group. This finding is consistent with that of Madinno (2010) that there was a significant positive relationship between Logical-Mathematical intelligence and academic performance. In the same study, the author discovered that there was a significant negative relation between interpersonal intelligence and academic performance.

On the other hand, Dicos (2008) and Bailey (2005) found that MI was not related to academic achievement. Dicos (2008) claimed that factors involving the students themselves, teachers, and school were the ones that predicted achievement. Bailey (2005) asserted that motivation and effort – both student factors – were the ones that could predict achievement.

These contradicting results indicate that the interaction between MI and other student factors might really have to be considered when dealing with academic performance, as asserted by both Arends (2009) and Bernardo (2005). Such interaction is shown in Figure 1 as a variable that could intervene in, or moderate, the extent of relationship between MI and academic performance.

MATERIALS AND METHODS

The research was conducted at Benguet State University (BSU) on February to May 2012. Purposive sampling was done for the selection of participants. First, it was deemed that the students of only one particular degree program shall be involved in order to provide some form of homogeneity. The second consideration was access to participants.

These considerations led to the selection of the Bachelor of Science in Applied Statistics (BSAS) program as the sample to represent the 17 undergraduate programs of BSU because it was under the mother Department of the current researchers. A possible added benefit for this choice was that because the BSAS program has been awarded an accreditation status of Level III by the Accrediting Agency for Chartered Colleges and Universities in the Philippines, (AACCUP) Inc., the results of the study can be used to further strengthen the program. All 134 BSAS students participated in the study. The distribution was: 41 for First-Year; 36 for Second-Year; 34 for Third-Year; and, 23 for Fourth-Year.

The BSAS students were asked to fill in an MI inventory (Appendix A), based on the idea that the assessment of one's MI can be done through self-perception of abilities and preferences in intelligence-related activities (Chan, 2004). The MI Inventory was derived from Chislet and Chapman (2006), with five Naturalistic items from Bialno (2010) and another five Naturalistic items from Ivanco (1998). Refinements on the Chislet and Chapman (2006) Inventory were done to make the language appropriate to BSAS students. For example, the sentence "I am a convincing liar" was rephrased to "I can convince others, even when I am not telling the truth".

The MI Inventory had 80 items – 10 items for each of the eight intelligences. Each item in the Inventory was rated from 1 (Disagree) to 5 (Agree).

Thus, a perfect 'score' per intelligence was 50. The reliability of the Inventory was determined through Cronbach alpha computation, which came out to be 0.86, an indication of high reliability.

For the academic performance, the final grades of students in their respective major Statistics subjects were obtained. These grades, compared to grades in general education subjects, were deemed appropriate for the study because they gave the essence to the BSAS degree. Moreover, limiting the study to the major Statistics subject of the participants is along the idea of Gardner (2003, p.9) that studies should focus on a smaller number of topics to "uncover" rather than "cover". For the First-, Second-, and Fourth- Year students, there was only one corresponding Statistics subject during the study while for the Third-Year students, there were two Statistics subjects, herein labeled as S1 and S2. Year-level disaggregation of data analysis was done to obtain more specific results that could lead to more specific recommendations.

Pearson product-moment correlation was used for data analysis, which means the score of a student per intelligence was correlated with his/her corresponding Statistics grade. For this correlation, the signs of the r-values were reversed because the BSU grading system uses values from 1.0 to 5.0, with 1.0 as the highest grade and 5.0 the failing grade. For example, r-values with negative (-) signs were replaced by positive (+) signs.

RESULTS AND DISCUSSION

The relationship between students' MI and academic performance is shown in Table 1. For the First-Year and the Second-Year students, there were no significant relationships between MI scores and final grades.

This result validates those of Dicos (2008) and Bailey (2005) and implies that teachers should look for other factors like motivation and effort (Bailey, 2005) or factors involving the students themselves, teachers, and school (Dicos, 2008) to enhance academic performance of learners. It is also possible that the interaction between MI and other factors (e.g., learning styles, gender, motivation, …) is moderating the extent of relationship between MI and academic performance.

Table 1. Relationship between MI scores and Statistics grades

MULTIPLE INTELLIGENCE	FIRST YEAR (N=41)	SECOND YEAR (N=36)	THIRD YEAR S1 (N=34)	THIRD YEAR S2 (N=34)	FOURTH YEAR (N=23)
Naturalistic	.19 (.22)	.17 (.33)	.06 (.76)	.09 (.62)	-.16 (.47)
Linguistic	-.13 (.41)	.21 (.22)	-.02 (.90)	-.17 (.35)	-.10 (.65)
Logical-Mathematical	.08 (.64)	.24 (.16)	**.38 *** **(.03)**	.16 (.52)	.14 (.54)
Musical	-.18 (.26)	.08 (.66)	-.22 (.22)	**-.48 **** **(.00)**	-.35 (.10)
Bodily-Kinesthetic	-.14 (.38)	.15 (.38)	.02 (.91)	-.09 (.61)	**-.50 *** **(.02)**
Spatial-Visual	-.03 (.84)	.31 (.07)	-.27 (.13)	-.12 (.50)	-.27 (.22)
Interpersonal	.07 (.9)	.16 (.36)	.00 (1.00)	-.19 (.27)	-.22 (.31)
Intrapersonal	.10 (.53)	.00 (1.00)	.11 (.53)	-.06 (.74)	-.01 (.96)

* significant at 0.05 level; ** significant at 0.01 level

For the Third-Year students, there was a significant positive relationship between logical-mathematical intelligence and the final grade in subject s1 (r = 0.38; prob = 0.03). This meant that the higher the score of a student in logical-mathematical intelligence, the higher the student's grade in subject S1. This result, that specific MI was related to academic performance validates those of Buyocan (2011), Bialno (2010) and Madinno (2010). The plausible reason could be that subject S1 involves many processes involving

numerical manipulation and logical operations; thus, students who were logical-mathematical obtained higher grades in this subject.

Another explanation points towards teachers who are already using strategies that cater to logical-mathematical students. If this were the case, then teachers have to continue designing and implementing teaching-learning situations that are focused on logical-mathematical intelligence. Further, they have to use more frequently teaching techniques involving logical-mathematical intelligence, following the ideas of Bialno (2010) and Buyocan (2011).

Some of these could be: asking students to solve more numerical problems or puzzles, giving opportunities to design systematic procedures, and making them do scientific investigations, among others (Lazear, 1999). Others can be: asking students to determine patterns, conduct surveys, predict winners in a competition, and use deductive and inductive reasoning (Salandanan, 2008).

For the same year level of students, for subject S2, there was a significant negative relationship between musical intelligence and grades ($r = -0.48$; prob = 0.00). This result meant that the higher the score of a student in musical intelligence, the lower the student's grade in subject S2. This result is in agreement with Madinno's (2010) finding that an MI can have a significant negative relation with academic performance.

For this finding, there could be various reasons. One, there could be the interaction between musical intelligence and other factors such as motivation, teaching styles, and learning techniques among others. Another could be that, perhaps, students who are musically inclined have less interest in the numerical focus of statistics. If this were so, teachers will have to provide closer attention and greater guidance to students who were identified to be "musical", so that their academic performance will not suffer.

For the Fourth-Year students, there was a negative significant relationship between bodily-kinesthetic intelligence and grades ($r = -0.50$; prob = 0.02). This meant that the higher the score of a student in bodily-kinesthetic, the lower the student's grade in Statistics.

This result agrees with the finding of Madinno (2010) where a specific intelligence can have a significant negative relation with academic performance. Similar to the result on musical intelligence for Third Year students, there could be various reasons plausible.

It is possible that Fourth-Year students were more interested in extra-curricular activities such as those involving dancing and sports than in their statistics subject. Still, this result implies that teachers need to look more closely into the situation of students who have high bodily-kinesthetic intelligence to assist them in their academic activities.

The general result that indicates specific intelligences can have positive or negative relationships with academic performance has a great implication on teacher training. Specifically, it shows that administrative efforts have to be considered to increase teachers' knowledge of MI theory and its benefits, in order for teachers to accommodate the full utilization of the various intelligences of students. One way to do this is through school-based seminars, workshops, or similar activities. A portion of these seminars can include giving a warning to teachers that students might get distracted from the lesson by the MI techniques employed.

SUMMARY AND CONCLUSIONS

In summary, results of the study indicate that specific intelligences may or may not have relationships (whether positive or negative) with academic performance. Nevertheless, it can still be concluded that the idea of Multiple Intelligences can be an avenue for enhancing academic performance provided that teachers have knowledge of MI theory, the skills to use it, and how it can benefit learners most especially.

RECOMMENDATIONS

1. For Teachers:

a. They should consider other factors (not only MI) such as motivation and effort or factors involving the students themselves, teachers, and school to enhance the academic performance of their students. Nevertheless, they could utilize various strategies that will accommodate various intelligences of their students for optimum use.

b. Through seminars, workshops, or similar activities, teachers have to be made more knowledgeable of MI theory and its effects on learning so that they can use deliberately MI-related techniques.

2. For the sake of the Third-Year BSAS students:

Teachers have to design learning experiences that are focused on Logical-Mathematical intelligence. Some of these can be: asking students to solve more numerical problems or puzzles, giving them opportunities to design systematic procedures, making them do scientific investigations, and provide them exercises and instances to determine patterns, conduct surveys, predict winners in a competition, and use deductive and inductive reasoning skills.

3.Further research has to be conducted to investigate the negative correlation between MI and academic performance.

4.Further research involving other conditions (e.g., degree programs, universities, etc.) is needed to validate the results of this study. Perhaps these studies could include an investigation on the interaction between MI and other factors that influence learning.

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APPENDIX A

The Multiple Intelligence Inventory

Name:_____

Multiple Intelligence Inventory

Score the statements in the corresponding white box, using the following scale:
1 = Disagree 2 = Slightly disagree 3 = Not sure 4 = Slightly agree 5 = Agree

Statement	Score							
I often have a song or piece of music playing in my mind								
I like to learn more about myself								
I enjoy gardening and learning about plants								
I can play a musical instrument								
I find it easier to solve problems when I am doing something physical								
I feel alive when in contact with nature								
I find budgeting and managing my money easy								
I find it easy to make up stories								
I have always been physically well co-ordinated								
When talking to someone, I tend to listen to the words that are used not just what they mean								
I enjoy crosswords, word searches or other word puzzles								
I like things to be clear, I do not like ambiguity or uncertainty								
I enjoy solving puzzles								
I like to meditate								
Music is very important to me								
I can convince others, even when I am not telling the truth								
I play a sport or dance								
I am very interested in personality testing and IQ tests								
I am annoyed by people behaving unreasonably								
The music that appeals to me is often based on my mood								
I like being with other people								
I like to be systematic and thorough								
I find graphs and charts easy to understand								
I can throw things well - balls, darts, stones, frisbees, etc								
I find it easy to remember quotes or phrases								
I can always recognize places that I have been before, even when I was very young								
I enjoy a wide variety of musical styles								
When I am concentrating I tend to doodle or make drawings								
I could manipulate people if I choose to								


I enjoy learning the names of living things, such as trees and flowers
I can predict accurately my feelings and behaviors in certain situations
I find mental arithmetic easy
I can identify most sounds without seeing what causes them
At school one of my favorite subjects is / was English
I like to think through a problem carefully, considering all the consequences
I enjoy debates and discussions
I love scary rides and adrenaline sports
I enjoy individual sports
I care about how those around me feel
I like putting pictures or photographs in my personal space
I enjoy and am good at making things – I am good with my hands
I like having music on in the background
I find it easy to remember telephone numbers
I set myself goals and plans for the future
I enjoy having pets
When looking at things, I like touching them
I can tell easily whether someone likes me or dislikes me
I can easily imagine how an object would look from another point of view or perspective
I have trouble sitting still for any length of time
I love to go walking, looking at trees and flowers and feeling the wind
I find it easy to talk to new people
To learn something new, I need to just get on and try it
I often see clear images when I close my eyes
I don't use my fingers when I count
I often talk to myself – out loud or in my head I
keep a diary
At school I loved / love music lessons
I find it easy to pick up the basics of another dialect or language
I find ball games easy and enjoyable
My favorite subject at school is / was math
I always know how I am feeling

I like to collect things such as rocks, stamps, coins, etc.								
I am realistic about my strengths and weaknesses								
I am very much aware of my surroundings and of what goes on around me								
I like working with others in groups								
My favorite subject at school was / is related to art								
I find pleasure in reading								
I can read a map easily								
I like to camp, hike, walk, and climb								
It upsets me to see someone cry and not be able to help								
I am good at solving quarrels or disputes between others								
I have always dreamed of being a musician or singer								
I prefer team sports (compared to individual sports)								
Singing makes me feel happy								
I am bothered by pollution								
I never get lost when I am on my own in a new place								
If I am learning how to do something, I like to see drawings/diagrams of how it works								
If something breaks down, I look around me to see what I can use to fix the problem								
I am happy spending time alone								
My friends always come to me for emotional support and advice								
TOTAL SCORE (PER COLUMN)								