

AN ANALYTICAL STUDY ON MULTIPLE INTELLIGENCES AND SELF-EFFICACY OF GRADE 10 STUDENTS

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Abstract

The aim of this study was to investigate the effectiveness of multiple intelligences on self-efficacy of Grade 10 students from Yangon and Bago Regions. Quantitative data analysis was used in this survey. Multiple intelligences and self-efficacy questionnaires were applied. Multiple intelligences questionnaire consists of eight subscales (linguistic intelligence, mathematical intelligence, visual intelligence, bodily-kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence and naturalist intelligence) and 80 items and self-efficacy questionnaire consists of 10 items. A total of 748 Grade 10 students (365 males and 383 males) from six Basic Education High Schools in Yangon and Bago Regions participated according to random sampling technique. Based on the results, the participants had higher interpersonal intelligence than other intelligences. The results of independent sample t test showed that male students were higher than female students in mathematical and naturalist intelligences and there was no significant difference in student's self-efficacy by gender. With regard to subject combination, students with science combination (who were majoring in Biology) were higher than students with (science+arts) combination (who were majoring in Economics) in mathematical and naturalist intelligences. The findings of multiple regression analysis revealed that linguistic, mathematical, musical, interpersonal, intrapersonal and naturalist intelligences were significant predictors for self-efficacy. Therefore, the findings of this study shed light on the effectiveness of multiple intelligences.

Keywords: Multiple Intelligences, linguistic intelligence, mathematical intelligence, visual intelligence, bodily-kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence and naturalist intelligence, self-efficacy

Introduction

Multiple Intelligences (MI) theory has been attracting for educators and researchers. It maintains that all human possesses at least eight different intelligences to learn and demonstrate understanding. According to Christison (1999), MI theory provides teachers to use as a guide for developing classroom activities that address multiple ways of learning and knowing. In academic setting, self-efficacy has always been the interest of researchers and educators for a long time. Self-efficacy is the measure of student's own competence to complete tasks and reach goals. When students are valued and appreciated for who they are and how they learn due to their strong sense of self-efficacy will be more successful in their intellectual abilities. Therefore, the current study emphasized the effect of multiple intelligences on self-efficacy of Grade 10 students.

Purposes of the Study

The purpose of the study is to examine the effect of multiple intelligences on self-efficacy of Grade 10 students.

Research Questions

- ◆ Is there in significant difference in multiple intelligences of Grade 10 students by gender?
- ◆ Is there in significant difference in multiple intelligences of Grade 10 students by specialization?

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- ◆ Is there in significant difference in self-efficacy of Grade 10 students by gender?
- ◆ Is there in significant difference in self-efficacy of Grade 10 students by specialization?
- ◆ Is there a significant relationship between multiple intelligences and self-efficacy of Grade 10 students?
- ◆ Which factors of multiple intelligences are the best predictors for self-efficacy of Grade 10 students?

Definitions of Key Terms

Multiple Intelligences: The separate intelligences that enable a person to solve problems or to fashion products that are valued in society. (Gardner, 2004)

Verbal/Linguistic Intelligence: It is the sensitivity to the meaning and order of words. (Gardner, 2004)

Logical/Mathematical Intelligence: It is the ability to handle chains of reasoning and to recognize patterns and order. (Gardner, 2004)

Visual/Spatial Intelligence: It is the ability to perceive the world accurately and recreate or transform aspects of that world. (Gardner, 2004)

Bodily-kinesthetic Intelligence: It is the ability to use the body skillfully and handle objects adroitly. (Gardner, 2004)

Musical/Rhythmic Intelligence: It is the sensitivity to pitch, melody, rhythm and tone. (Gardner, 2004)

Interpersonal Intelligence: It is the ability to understand people and relationships. (Gardner, 2004)

Intrapersonal Intelligence: It is access to one's emotional life as a mean to understand oneself and others. (Gardner, 2004)

Naturalist Intelligence: It is the ability to recognize and classify the numerous species in the environment. (Gardner, 2004)

Self-Efficacy: It is a person's belief in his or her ability to succeed in a particular situation. (Bandura, 1993)

Review of Related Literature

Gardner's Multiple Intelligences Theory

Howard Gardner (1983) introduced Multiple Intelligences (MI) Theory, "*Frames of Mind*". He proposed that human beings possess at least eight intelligences: verbal/linguistic intelligence refers to sensitivity to words and languages; logical/mathematical intelligence has to do with adeptness with numbers and logic; visual/spatial intelligence is related to vision and spatial perception; bodily-kinesthetic intelligence has to do with the nimbleness of a person's body; musical/rhythmic intelligence involves creativity, music and rhythm; interpersonal intelligence enables a person to recognize the personalities and motivations of others; intrapersonal intelligence symbolizes that one can distinctively recognize one's own strength, weakness and emotions; naturalist intelligence refers to the sensitivity to nature and others.

Self-Efficacy

Bandura (1997) was first to present, research, and expand on the construct of self-efficacy. He posited that self-efficacy beliefs impact how people motivate themselves, think, feel and act. Wood & Bandura, (1989) defined self-efficacy as “beliefs in one’s capabilities to mobilize the motivation, cognitive responses, and courses of action needed to meet given situation demands”. Bandura claimed that beliefs of efficacy constitute the key factor of human agency.

Methodology

Sampling

The participants for this study were chosen by using stratified random sampling technique. Finally, the six schools were randomly selected in Yangon Region and Bago Regions. They are B.E.H.S (2) Hlaing, B.E.H.S (1) Hmaw Bi, B.E.H.S (1) Insein, B.E.H.S (1) Pyay, B.E.H.S (2) Pyay, B.E.H.S (3) Pyay. Secondly, 748 Grade 10 students from selected schools were participated in this study. There were 365 males and 383 females.

Research Method

In this study, descriptive survey design and quantitative approach will be used.

Research Instrumentation

The Multiple Intelligences Questionnaire adapted Dr. Moe Moe Naing (2008, May) comprises eight subscales: Linguistic Intelligence, Mathematical Intelligence, Visual Intelligence, Bodily-kinesthetic Intelligence, Musical Intelligence, Interpersonal Intelligence, Intrapersonal Intelligence and Naturalist Intelligence and total of 80 items. General Self-Efficacy Scale developed by Schwarzer & Jerusalem (1995) consists of 10 items used in this survey questionnaire. The internal consistency coefficient of MI inventory was 0.743 and SEQ was 0.805.

Data Analysis and Research Findings

To investigate the differences in students’ multiple intelligences by gender and subject combination, descriptive statistics and independent sample *t*-test were carried out.

Table 1 Descriptive Statistics and Results of Independent Sample *t*-test for Students’ Multiple Intelligences by Gender

Intelligence Area	Gender	N	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Linguistic Intelligence	Male	365	6.94	1.51	-1.031	746	.303
	Female	383	7.06	1.68			
Mathematical Intelligence	Male	365	6.58	1.96	2.439*	746	.015
	Female	383	6.23	1.88			
Visual Intelligence	Male	365	6.45	1.56	1.809	746	.071
	Female	383	6.25	1.57			
Bodily-kinesthetic Intelligence	Male	365	6.88	1.50	.974	746	.330
	Female	383	6.77	1.63			

Intelligence Area	Gender	N	M	SD	t	df	p
Musical Intelligence	Male	365	7.52	1.78	-.514	746	.608
	Female	383	7.59	1.78			
Interpersonal Intelligence	Male	365	8.52	1.64	-.037	746	.970
	Female	383	8.52	1.58			
Intrapersonal Intelligence	Male	365	7.20	1.67	.692	746	.489
	Female	383	7.12	1.36			
Naturalist Intelligence	Male	365	8.15	1.56	.207	746	.045
	Female	383	7.90	1.91			

Note. * $p < 0.05$

Based on the results in table 1, it was also observed that the mean score of male students in mathematical and naturalist intelligences were higher than that of female students. As independent sample t test, there was also significant difference in mathematical and naturalist intelligences by gender at 0.05 level. So, it can be claimed that male students had higher in mathematical and naturalist intelligences than female students. In other words, male students used numbers effectively, think logically and understand nature and recognize different things according to their sensitivity than female students.

Table 2 Descriptive Statistics and Results of Independent Sample *t*-test for Students' Multiple Intelligences by Subject Combination

Intelligence Area	Subject Combination	N	M	SD	t	df	p
Linguistic Intelligence	Biology	371	6.99	1.62	-.160	746	.873
	Economics	377	7.01	1.58			
Mathematical Intelligence	Biology	371	6.68	1.86	3.972***	746	.000
	Economics	377	6.12	1.96			
Visual Intelligence	Biology	371	6.37	1.58	.352	746	.725
	Economics	377	6.33	1.55			
Bodily-kinesthetic Intelligence	Biology	371	6.77	1.46	-.843	746	.400
	Economics	377	6.87	1.64			
Musical Intelligence	Biology	371	7.44	1.80	-1.806	746	.071
	Economics	377	7.67	1.75			
Interpersonal Intelligence	Biology	371	8.59	1.62	-1.186	746	.236
	Economics	377	8.45	1.60			
Intrapersonal Intelligence	Biology	371	7.08	1.63	-1.422	746	.155
	Economics	377	7.24	1.40			

Intelligence Area	Subject Combination	N	M	SD	t	df	p
Naturalist Intelligence	Biology	371	8.27	1.61	3.908***	746	.000
	Economics	377	7.78	1.85			

Note. *** $p < 0.001$

Based on the results in table 2, it was observed that the mean scores of Grade 10 students in linguistic and visual intelligences were not quite different. But the mean scores of students who were majoring in Biology were higher than that of students who were majoring in Economics concerning mathematical, interpersonal and naturalist intelligences. So as to observed clearly the significant difference of the multiple intelligences by specialization, independent sample t test was executed again. The results showed that there were significant differences in mathematical and naturalist intelligences at 0.001 level. Therefore, it was concluded that Grade 10 students who were majoring in Biology developed and used fully their logical process and classified features of natural and artificial environments than Grade 10 students who were majoring in Economics.

To investigate the differences in students' self-efficacy by gender and subject combination, descriptive statistics and independent sample t-test were carried out.

Table 3 Descriptive Statistics and Results of Independent Sample t-test for Students' Self-Efficacy by Gender

Self-Efficacy	Gender	N	M	SD	t	df	p
Student's General Self-Efficacy	Male	365	7.16	2.06	.814	746	.416
	Female	383	7.04	2.15			

According to the results, the mean score of male students was slightly higher than that of female students. But in order to see clearly the differences t-test was calculated, there were no significant differences in students' self-efficacy by gender. So, it can be said that gender is not a related factor of self-efficacy among students.

Table 4 Descriptive Statistics and Results of Independent Sample t-test for Students' Self-Efficacy by Subject Combination

Self-Efficacy	Subject Combination	N	M	SD	t	df	p
Student's General Self-Efficacy	Biology	371	7.25	2.20	.814	746	.053
	Economics	377	6.95	1.99			

Based on the t-test results, the mean score of students who were majoring in Biology was slightly higher than that of students who were majoring in Economics. But in order to see clearly the differences t-test was calculated, there were no significant differences in students' self-efficacy by subject combination. So, it can be claimed that subject combination is not a related factor of self-efficacy among students.

Relationship Between Multiple Intelligences and Self-Efficacy

To find out the correlation between multiple intelligences and general self-efficacy, Pearson product-moment correlation was carried out. The following table presented the correlation between eight categories of multiple intelligences and general self-efficacy of Grade 10 students.

Table 5 Intercorrelations Between Multiple Intelligences and Self-Efficacy

Variables	GSE	LI	MTI	VI	BI	MUI	IEI	IRI	NI
GSE	-	.34**	.31**	.20**	.12**	.18**	.24**	.30**	.27**
LI		-	.20**	.28**	.20**	.33**	.26**	.22**	.24**
MTI			-	.24**	.19**	.10**	.18**	.12**	.32**
VI				-	.30**	.30**	.17**	.18**	.29**
BI					-	.34**	.23**	.15**	.19**
MUI						-	.29**	.17**	.19**
IEI							-	.15**	.24**
IRI								-	.12**
NI									-

** Correlation is significant at the 0.01 level (2-tailed).

Note: GSE= General Self-Efficacy, LI= Linguistic Intelligence, MTI= Mathematical Intelligence, VI= Visual Intelligence, BI= Bodily-kinesthetic Intelligence, MUI= Musical Intelligence, IEI= Interpersonal Intelligence, IRI= Intrapersonal Intelligence, NI= Naturalist Intelligence

Based on the results of table 4, all factors of multiple intelligences were correlated with one another. Especially, linguistic, mathematical and intrapersonal intelligences were strongly correlated with general self-efficacy.

Therefore, in order to investigate the predictive power of multiple intelligences to Grade 10 student’s general self-efficacy, multiple regression analysis was conducted.

Table 6 Multiple Regression Analysis Between Multiple Intelligences and Self-Efficacy

Variables	B	β	t	p
GSE (constant)	10.338		2.409*	.016
LI	3.246	.247	7.326***	.000
MTI	2.613	.239	7.233***	.000
LRI	2.966	.214	6.438***	.000

* $p < 0.05$, *** $p < 0.001$

Note: GSE= General Self-Efficacy, LI= Linguistic Intelligence, MTI= Mathematical Intelligence, IRI= Intrapersonal Intelligence

The result showed that linguistic, mathematical and intrapersonal intelligences were significantly related with general self-efficacy. Linguistic, mathematical and intrapersonal intelligence were significant predictors in positive direction. So, it can be interpreted that the

higher the linguistic, mathematical and intrapersonal intelligences of students, the higher the general self-efficacy. The produced multiple regression equation for the relationship between multiple intelligences and general self-efficacy was:

$$\text{GSE} = 10.338 + 3.246\text{LI} + 2.613\text{MTI} + 2.966\text{IRI}$$

Based on the results of multiple regression analysis, the following model was drawn by depicting how multiple intelligences significantly affected student’s self-efficacy.

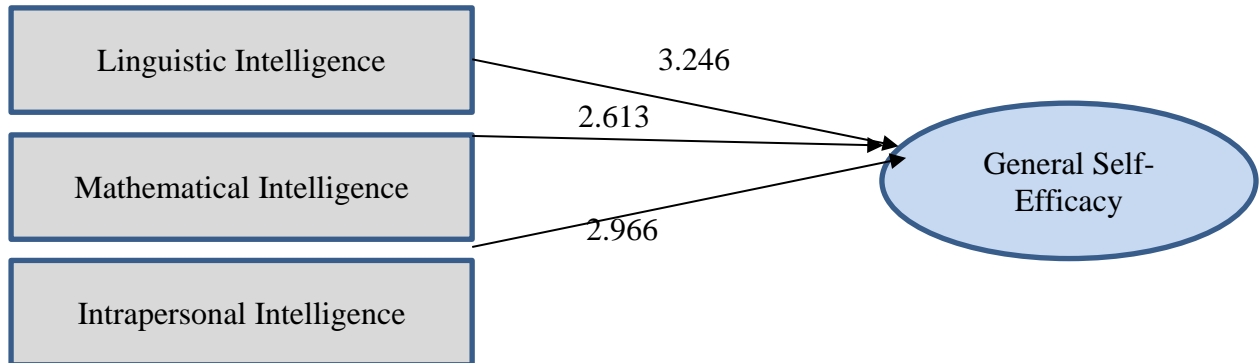


Figure 1 Predictive Powers of Multiple Intelligences on Self-Efficacy

According to the above figure, general self-efficacy and linguistic intelligence, mathematical intelligence and intrapersonal intelligence of Grade 10 students in Yangon and Bago Regions were strongly correlated. Linguistic intelligence, mathematical intelligence and intrapersonal intelligence can be predicted for general self-efficacy of Grade 10 students.

Discussion and Suggestions

From the theoretical standpoint, it was suggested for the future that the educators and psychologists need to emphasize the effectiveness of students’ multiple intelligences to cultivate the students with a high sense of self-efficacy and to fulfill the student’s education. The present study has some necessities because of its recruited scope and selected sample and it is limited by its special focus on only eight categories of intelligences except from existentialism. Furthermore, the future researchers should conduct the studies with larger sample size from different states and regions to be more reliable and valid. Moreover, longitudinal study should be extended to explore the effectiveness of multiple intelligences and self-efficacy.

Conclusion

The main objective of this study was to investigate the effect of multiple intelligences on self-efficacy of Grade 10 students. Based on the descriptive analyses, there were significant differences in mathematical and naturalist intelligences by gender. This finding was the same with the previous report in the literature of Moe Moe Naing, 2008. Male students in Yangon and Bago have higher in mathematical and naturalist intelligences than female students. Moreover, it was also observed that Grade 10 students from Yangon and Bago Regions who were majoring in Biology have higher in mathematical intelligences than Grade 10 students who were majoring in Economics. But there were no significant differences in self-efficacy with gender and subject combination.

As expected in the present study, linguistic, mathematical and intrapersonal intelligences self-efficacy was found to have a positive correlation with multiple intelligences. This finding in

line with the previous research (Yazdanimoghaddam & Khoshroodi, 2010). Linguistic, mathematical and intrapersonal intelligences were significant predictors in positive direction for self-efficacy. The higher the linguistic, mathematical and intrapersonal intelligences of students, the higher the self-efficacy. So, the present study suggested that teachers and educators need to promote students' multiple intelligences because it was positively associated with multiple intelligences. It can contribute to teachers and educators for integrating multiple intelligences into the school curriculum.

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