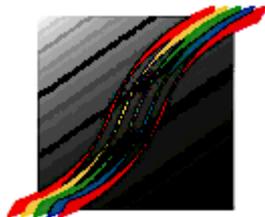

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Educational Measurement and Evaluation on Sustainable Development: Editor's Note

Carlo Magno
De La Salle University

Educational measurement and evaluation take its role in monitoring and providing feedback on performance in order to improve practice and processes at different disciplines. Educational assessment is taken to be interdisciplinary considering that the tools and processes are used to improve industry practice, employee performance, benchmarking, and improvement of practices of different fields. This important function of educational assessment supports the Rio declaration of the United Nations on sustainable development (Rio+20). Sustainable development is the ability to meet the needs of the present while contributing to the future generations' needs¹. As educators and educational specialists, it is our responsibility to train the future generations of assessment practitioners by improving and developing the present systems and approaches. Our venture on continuously reporting our discoveries in educational assessment through research and studies contributes to milestones on educational improvement for the next generation.

This present volume of the Educational Measurement and Evaluation Review supports many aspects of the Rio+20 especially in the roles of human and the right to development. The present volume contains eight empirical studies and three short reports that somehow forward issues on education assessment. The article by Callueng, de Carvalho, Isobe, and Oakland did a cross-national study between children in Japan and in the United States on their temperament styles. The report explained that specific differences between Japanese and U. S. children on their temperament preferences are driven by the interaction among gender role differences, biological, and cultural roots. Findings provide better understanding of Japanese children. The study by Sahranavard and Hassan investigated the factorial validity of the TIMSS 2003 Student's Questionnaire for eighth grade students. The questionnaire measures students' attitude towards science and mathematics. This study focused on the affective part of the TIMSS as opposed to most studies that are concerned about the ranking of students per country. They noted that attitude towards science accounts largely in explaining students' science skills. The article by Chu and Magno extended theory on self-compassion by further confirming its factor structure and relationship with coping styles. Their findings helped confirm that coping strategy is a substantial outcome of self-compassion. The study by David investigated the structural validity and cross-cultural generalizability of the 3 x 2 achievement goal model by examining the achievement goals of Filipino undergraduate students using the 3 x 2 Achievement Goal Questionnaire. By doing a CFA analysis, David showed that the 3 x 2 achievement goal model is structurally valid

¹Needham, M. T. (2011). A psychological approach to a thriving resilient community. *International Journal of Business, Humanities and Technology*, 1(3), 279-283.

among Filipino undergraduate students. The study by Parsano, Loyola, Torres, Aguilar, and San Diego further established the construct cyberdependency by coming up with a tool and testing its factor structure. A new set of factors was derived, providing insights in this construct as an important clinical measure. The study by Johny, Lukose, and Magno looked at the convergence of the Academic-Self-regulated Learning and Learning Strategies Questionnaire. These two questionnaires were also used to predict students' ability in school rather than the usual outcomes such as students' grades and achievement. Their study provided insights and reflections as to why learning strategies are not carried over on to students' abilities in school. Marshall constructed a Tech-savvy scale and extracted specific factors for the construct. He also looked whether Tech-savvy can predict students' achievement. He discussed further how the construct affects specific kinds of outcome. Lumiqued assessed theology students' academic emotions. He found that the divergence of the positive and negative emotions fits well for the theology student sample due to their highly controlled values, reflective formation, and self-motivation. Lian and Lew elaborated further the importance of content validity in constructing achievement tests. They outlined the specific procedure to ensure content validity of achievement tests in their report which is useful for test developers. The report by Valladolid provided a rich insight on standards of a world-class university. The report provided important criteria that serve as a guide for Higher Education Institutions to raise their standards. Lastly, the report by Crisostomo provided the best practices in teaching an educational assessment course for preservice teachers. The report targeted important facets that teachers need to consider in teaching assessment of student learning in the formation of teachers.

The articles included in this volume highlight the development of specific constructs through the practice of educational measurement such as self-compassion, 3 X 2 Achievement goals, cyberdependency, and tech-savvy. Moreover, the articles also strengthened the validity and reliability of existing tools such as the Student Styles Questionnaire (SSQ), Academic Self-regulated Learning Scale (A-SRL-S), TIMSS Mathematics Attitude Questionnaire, and Academic Emotions Questionnaire (AEQ). Lastly, best practices in test development were reflected in the report of Lian and Lew. Practical implications on standards setting was also shown in the paper of Valladolid. Best practices on teaching and learning assessment courses was also shown in the report by Crisostomo. These perspectives somehow forward the development of specific variables, the use of instruments in further studies, and practical assessment and evaluation practices.



Temperament Styles of Children from Japan and the United States: A Cross-national Study

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Abstract Age, gender, and cross-national differences in children ages 9 through 16 in Japan ($N = 493$) and the United States ($N = 500$) are examined on four bipolar temperament styles: extroversion-introversion, practical-imaginative, thinking-feeling, and organized-flexible. Japanese children generally prefer extroverted to introverted, practical to imaginative, and organized to flexible styles. Although their preference for thinking and feeling styles is balanced, gender differences are significant. Males generally prefer a thinking style and females generally prefer a feeling style. Gender and age differences are apparent on organized-flexible styles. Females generally prefer an organized style while males are more likely to prefer a flexible style. In contrast to other age groups, 9-10 old children are more likely to prefer an organized style. An increased preference for a flexible style is seen at each older age. Cross-national differences are found only on extroverted-introverted and practical-imaginative styles. In contrast to children in the U.S., those in Japan are more likely to prefer extroverted and practical styles.

Keywords: Temperament, Student Styles Questionnaire, children, Japanese children

Introduction

People have been interested in temperament to describe and explain behavior for centuries (Joyce, 2010). For example, Hippocrates speculated about temperament in 350 B.C. in his *On the Nature of Man*. Philosophers, including Plato, Aristotle, Galen, Bruno, Hume, Voltaire, Rousseau, Locke, and Kant also discussed the importance of temperament (Kagan, 1989, 1994a, 1994b; Keirse, 1998; Rothbart & Jones, 1978; Strelau & Angleitner, 1994).

Temperament consists of stylistic and relatively stable traits that subsume intrinsic tendencies to act and react in somewhat predictable ways to people, events, and stimuli (Teglasi, 1998a; 1998b). Temperament traits generally are characterized as predispositions to display behaviors, with no assurance that people, events, and stimuli always will elicit the

same temperament behaviors. Temperament is a construct that is associated with certain behaviors. These behaviors reflect a tendency or disposition to act or react in certain ways. Temperament traits appear early in life (e. g., Thomas & Chess 1977; Goldsmith, et al., 1987) and thus are assumed to have a biological origin, one tempered both by one's environment as well as personal choice (Bates & Wachs, 1994; Goldsmith, Buss, Plomin, Rothbart, Thomas, Chess, Hinde, & McCall, 1987; Kagan, 1994; Keogh, 2003; Oakland, Glutting, & Horton, 1996). Age and gender also are assumed to influence temperament.

Children's temperament can have a substantial impact on their behaviors. Temperament is thought to influence the source for personal motivation, learning styles, peer and family relationships, and values (Bates & Wachs, 1994; Hofstede, 1980; Joyce, 2010; Keirsey & Bates, 1984; Keogh, 2003; Lawrence, 1982; Oakland, Glutting, & Horton, 1996). Temperament can account for significant variance associated with vocational interests in children as young as 8 (Oakland, Stafford, Horton, & Glutting, 2001) and may help distinguish children who are and are not gifted (Oakland, Joyce, Horton, & Glutting, 2000) as well as those who do and do not display conduct and oppositional defiant disorders (Joyce & Oakland, 2005). Style preferences of sighted and non-sighted children also were compared (Oakland, Banner, & Livingston, 2000). Thus, knowledge of children's temperament shows promise for use in understanding the impact of temperament on children's behaviors.

Temperament Styles Theory and Current Assessment

Jung advanced a contemporary temperament theory (1953, 1971) that helped launched considerable research and test development (Bassett & Oakland, 2009). Jung (1921, 1959) attributed individual differences to inborn, possibly genetic or physiological qualities mediated by one's environment. He emphasized the importance of two attitudes (i.e. extraversion-introversion) together with four mental functions (i.e. thinking-feeling and sensation-intuition) that impact the apprehension of stimuli. His writings focused heavily on extraversion-introversion, given his belief that they helped define important individual differences. However, for Jung, temperament is understood best by examining interactions between extroversion-introversion and the four mental functions (i. e., thinking feeling and sensation-intuition), not by focusing on each dyadic pair separately.

Briggs and Myers' successful application of Jung's theory in test form, the Myers-Briggs Type Indicator (MBTI; Myers & McCaulley, 1985), brought Jung's theory to life and set the stage for its dissemination and practical applications, with the MBTI reportedly the most widely used measure in the world (Myers et al., 1998). In developing the MBTI, Briggs and Myers utilized Jung's extroversion-introversion, separated his thinking-feeling and sensation-intuition into two separate traits, and added a fourth: judging-perceptive.

Keirsey developed the *Keirsey Temperament Sorter*, a brief self-report measure of the 16 MBTI types (Keirsey & Bates, 1970). In interpreting a person's temperament type, Keirsey believed that similarities rather than the differences are more important and that Hippocrates' idea of body fluids can be related to the four core clusters (i.e., sensing-perceiving, sensing-judging, intuition-thinking, and intuition-feeling) of temperament. The revised and current version of the instrument, *Keirsey Temperament Sorter®- II* (Keirsey, 1998), adopted a new model that reflects the basic functions of individuals in society. Hence, the core clusters were renamed: artisan for sensing-perceiving, guardian for sensing-judging, rational for intuition-thinking, and idealist for intuition-feeling. This new model also is aligned with Plato's notion of temperament (Joyce, 2010).

Two instruments were developed that operationalized the Briggs and Myers' theory of temperament for children and youth. The Murphy-Meisgeier Type Indicator for Children (MMTIC: Meisgeier & Murphy, 1987) is a parallel measure of MBTI's temperament types in children ages seven through 18. The MMTIC was developed primarily to provide information that can be useful in understanding a child's learning process. The current version of the MMTIC is accompanied with teacher resources for classroom application of the temperament type theory (Murphy & Meisgeier, 2008).

The Students Styles Questionnaire (SSQ: Oakland et al., 1996) also assesses the four temperament traits measured by the MBTI for children and youth ages eight through 18. It has been used somewhat more widely internationally. The SSQ is based on the premise that temperament results from an interaction between biologically coded qualities, environmental qualities and personal choice. As presented in Table 1, the SSQ assesses four temperament style dimensions for ages 8-17: extroversion-introversion, practical-imaginative (consistent with the MBTI's sensing-intuitive), thinking-feeling and organized-flexible (consistent with the MBTI's judging-perceiving).

Table 1
Descriptions of Temperament Qualities (from Horton & Oakland, 1997)

Extroversion-Introversion Styles

This dimension describes individuals' orientations to the outer world of people and events around them. Those with extroverted preferences generally are energized by contact with people, while those with introverted preferences generally derive energy from their inner world of thoughts.

<p>Those with an extroverted style generally</p> <ul style="list-style-type: none"> learn by talking enjoy large groups have many interests & friends respond quickly 	<p>Those with an introverted style generally</p> <ul style="list-style-type: none"> learn by reflecting and writing prefer small groups or solitude have a few interests and close friends respond with hesitance & caution
---	---

Practical-Imaginative Styles

This dimension describes individuals' orientations to ideas and experience. Those with practical preferences generally attend to facts and objects, while those with imaginative preferences generally view the world in terms of possibilities and insights.

<p>Those with a practical style generally are</p> <ul style="list-style-type: none"> generally realistic/pragmatic understand things literally enjoy sequential learning notice details 	<p>Those with an imaginative style are</p> <ul style="list-style-type: none"> insightful/visionary/theory oriented enjoy metaphor/symbolism learn by insight/intuitive leaps notice themes/generalizations
---	--

Cont. of Table 1

Thinking-Feeling Styles

This dimension describes individuals' orientations for making decisions. Those with thinking preferences generally use objective standards to make decisions and strive for fairness, while those with feeling preferences generally use personal standards to make decisions and strive for harmony.

Those with a thinking style generally
are analytical/quizzical
value logic over sentiment
brief/businesslike interactions
strive for fairness/truth/justice

Those with a feeling style generally
are trusting/sympathetic/seek harmony
value sentiment over logic display
are tactful/friendly interactions
strive for harmony/compassion

Organized-Flexible Styles

This dimension describes individuals' orientations as to when they make decisions. Those with organized preference styles generally prefer to finalize decisions and have issues settled as soon as possible while those with flexible preference styles generally prefer to delay decisions and keep their options open.

Those with an organized style generally
want to plan/schedule
persist, are dependable
keep personal space neat
enjoy predictable/structure

Those with a flexible style generally
are flexible in commitments
seek opportunity for play
tolerate disorder of possessions
enjoy surprise/adaptive to change

Gender and Age Differences in Temperament

The United States-based New York longitudinal study reported that temperament differences between males and females appear shortly after infancy and increase with age on the following New York longitudinal study qualities: adaptability, approach/withdrawal, activity, and sensory threshold (Thomas & Chess, 1977). During the period from 4 months to 4 years, males are more adaptable and approachable than females. Between ages 8 to 12, males display higher levels of activity and sensitivity (Maziade, et al., 1986).

Older children and youth in the United States generally prefer extroverted, imaginative, and organized styles. They display age related differences on extroversion-introversion styles (i.e., a preference for extroversion increases from 8 to 13), on practical-imaginative styles (i.e., a preference for an imaginative style generally increases with age), and on organized-flexible styles (i.e., a preference for a flexible style generally increases with age) (Oakland, et al., 1996; Bassett, 2005).

Studies also identify the presence of gender differences (Oakland, et al., 1996; Bassett & Oakland, 2009). More females than males prefer feeling and organized styles while more males than females prefer thinking and flexible styles. Gender differences on thinking-feeling

appear early, at least by age 8, are sustained through adulthood, and may be universal (Myers & McCaulley, 1985; Hammer & Mitchell, 1996; Myers, et al., 1998).

Cross-National Studies of Children's Temperament

Research in the behavioral sciences increasingly reflects a need for cross-national information (Achenbach & Rescorla, 2007; Byrne, Oakland, Leong, van de Vijver, Hambleton, Cheung, & Bartram, 2009; Wedding & Stevens, 2004). Such research examines the degree to which psychological traits or behaviors are consistent among people who live in countries that differ by culture (Byrne et. al., 2009; Strelau & Angleitner, 1994). An understanding of children's temperament from a cross-national perspective is important in light of international interest in temperament as well as the continuing debate concerning the extent to which temperament constructs are biologically or environmentally rooted (Joyce, 2010). Cross-national studies of temperament may provide evidence for temperament being biologically rooted and intrinsic to the individual and therefore forms universal human traits. Alternatively, studies may show temperament to be environmentally rooted. Information on temperament qualities in children and youth also may help establish the possible age of onset of temperament differences.

Research by Oakland and his colleagues is cognizant of emic and etic approaches (Berry, Poortinga, Segall, & Dasen, 1992) in their international studies of children's temperament, including children in Australia (Oakland, Faulkner, & Bassett, 2005), Costa Rica (Oakland & Mata, 2007), Gaza (Oakland, Alghorani, & Lee, 2006), Greece (Oakland & Hatzichristou, 2010), Hungary (Katona & Oakland, 2000), India (Oakland, Singh, Callueng, & Goen, 2011), Nigeria (Oakland, Mogaji, & Dempsey, 2006), People's Republic of China (Oakland & Lu, 2006), Pakistan (Oakland, Callueng, Rizwan, & Aftab, 2011), Romania (Oakland, Illiescu, Dinca, & Dempsey, 2009), Samoa (Callueng, Lee Hang, Gonzales, Ling-So'o, & Oakland, 2011), South Africa (Oakland & Pretorius, 2009), South Korea (Oakland & Lee, 2010), United States (Bassett & Oakland, 2009), Venezuela (Leon, Oakland, Wei, & Berrios, 2009), and Zimbabwe (Oakland, Mpofu, & Sulkowski, 2007).

Emic approaches examine culture-specific traits while etic approaches examine whether traits and behaviors are universal and independent of one or more cultures. Initial research on any trait typically is directed toward describing the trait. Thus, the general purposes of this cross-national research are first to examine commonly displayed temperament traits of children within a country or region and then compare them with children in other countries or regions. This strategy is consistent with cross-national studies by McCrae and Costa (1997) and others (e. g., Berry, Poortinga, Segall, & Dasen, 1992; Macdaid, McCaulley, & Kainz, 1991; Plomin & Dunn, 1986) that examine the possible universality of temperament and personality traits.

Current Study

The primary purpose of this research is to describe temperament style preferences in a sample of Japanese students at four age groups, to examine possible influence of gender and age, and to compare their temperament style preferences with children in the U.S. A discussion of temperament styles preferences among U.S. children, including age and gender differences, is not a primary focus of this study and can be found elsewhere (Oakland et al, 1996; Bassett, 2005; Bassett & Oakland, 2009). Data on U.S. children are included to

provide a direct cross-national comparison.

The following questions are addressed in this study: Do Japanese children display differences in their preferences for extroversion-introversion, practical-imaginative, thinking-feeling, or organized-flexible styles? Do gender and age influence temperament styles preferences? Do Japanese and U.S. children differ in their preferences for these styles?

Method

Participants

A sample of 493 Japanese children was drawn from four public schools in Miyakonojo, a city of 170,000 inhabitants and one of the main metropolitan areas in the southern Kyushu region in Japan. The sample formed the following four age groups: 9-10 ($n = 147$, 49% males) 11-12 ($n = 141$, 43% males), 13-14 ($n = 93$, 56% males), and 15-16 ($n = 112$, 44% males). All children came from lower to upper middle class families.

A sample of 500 U.S. children was drawn from the U.S. Student Style Questionnaire's standardization sample (Oakland et al., 1996). The sample formed the following four age groups with approximately 50% males in each group: 9-10 ($n = 112$) 11-12 ($n = 164$), 13-14 ($n = 149$), and 15-16 ($n = 75$). The U.S. standardization data were designed to reflect 1990 U.S. Bureau of the Census data. Thus, the US sample is stratified on five variables: age, gender, race/ethnicity, geographic region, and school type. The subject pool of 7,902 public and private school children ranged in ages 8 through 17 years. Three racial/ethnic groups (Whites, Blacks, and Hispanics) were represented proportionately; approximately 50% were males in each racial-ethnic group.

Measure

The Student Styles Questionnaire (SSQ; Oakland, Glutting, & Horton, 1996) is patterned after the Jungian constructs popularized by the Myers-Briggs Type Indicator (Myers & McCaulley, 1985). The SSQ, a self-report paper and pencil group administered measure of temperament type for children ages 8 through 17, is completed within approximately 20 minutes. Each of its 69 forced-choice items has two alternatives that provide for an assessment of preferred behaviors associated with one of four bipolar traits: extroversion (E) or introversion (I), practical (P) or imaginative (M), thinking (T) or feeling (F), and organized (O) or flexible (L). The EI scale has 23 items, the PM scale has 16 items, the TF scale has 10 items, and the OL scale has 26 items. Additionally, 6 items provide information simultaneously on two scales.

Test-retest reliability coefficients derived over an 8 month period, are .80, .67, .70, and .78 for EI, PM, TF, and OL respectively. Results of factor analyses studies indicate the SSQ's factor structure is consistent and stable for U.S. children who differ by age, gender, and racial-ethnic group (Stafford & Oakland 1996a; 1996b). Factor analytic studies of data from children from seven countries generally found a stable factor structure and thus support the use of the SSQ internationally (Benson, Oakland, & Shermis, 2009). External validity, using contrasted groups, convergent validity, and divergent validity, provides additional strong support for the SSQ's validity (Oakland et al., 1996).

Psychometric properties of the SSQ Japanese version were examined with data from the current sample. Results of the confirmatory factor analysis using robust maximum likelihood as estimator and item parcels as factor indicators suggest that the data yield an acceptable fit of a four-factor model of temperament as measured by the SSQ: $\chi^2(38) =$

90.72, $p < .001$; RMSEA = .05 CFI = .95; and TLI = .92. All item parcels load appreciably on their corresponding factors, ranging from .47 to .79. Factor correlations generally were low and not significant except for PM and OL ($r = .29$). The internal structure of the SSQ Japanese version is consistent with previous studies (i.e., Benson, Oakland, & Shermis, 2009; Oakland et al., 1996; Stafford & Oakland 1996a; 1996b)

Cronbach's alpha coefficients (α) of scores from SSQ Japanese version were estimated for each temperament trait using dichotomous item responses. Results indicated acceptable reliability of responses for EI, TF, and OL with alpha coefficients equal to .78, .62, and .73, respectively. Alpha coefficient of .54 for PM suggests a marginal reliability of item responses. These coefficients are considered tentative as Cronbach's alphas underestimate reliability of items with less than five response categories like that used in the SSQ (Zumbo, Gaddermaun, & Zeisser, 2007).

Procedure

Translation of the SSQ for use with Japanese children was accomplished through the back translation sequential method (Hambleton et al., 2005). The SSQ's 69 items and directions were reviewed by the second and third authors (one of whom is native to Japan) who live and work at Japanese universities. They found them to be generally suitable for Japanese children and consistent with their culture. The items and directions for administration were translated separately into Japanese by the two aforementioned authors and their discrepancies were resolved by mutual agreement of the most developmentally and culturally appropriate translation. Subsequently, a professor native to Japan and is competent in both Japanese and English languages was requested to back translate the SSQ into English. Except for minimal syntax and sentence structure differences, the SSQ items in the Japanese and English versions were found to be equivalent by content meaning. Given the extensive work and familiarity of the third author with Japanese children, a pilot study of the SSQ Japanese version was deemed unnecessary. Hence, the translated test was administered to a sample of Japanese children consistent with the administration procedures described on the SSQ record form.

Data Analysis

Temperament typically is considered to be a type rather than a continuous quality (Bassett, 2005; Bassett & Oakland, 2009; Buss & Plomin, 1984; Hall & Lindzey, 1978; Jung, 1946; Lawrence, 1982; Macdaid, McCaulley, & Kainz, 1991; Plomin, & Dunn, 1986; Rothbart & Jones, 1998; Teglasi, 1998b; Thomas & Chess, 1977). Personality also can be and often is viewed in its type form (McCrae & Costa, 1997). This belief guided the data interpretation methods.

The frequency of Japanese and U.S. children who express a preference for each of the eight styles was determined in the following fashion. Individual responses on each of the 69 items were examined to determine whether a child selected more options from one of the two bipolar types. For example, among the 23 extroversion-introversion items, children who selected more extroverted than introverted options were classified extroverted. Conversely, children who selected more introverted options were classified introverted. Children who selected an equal number of options on a scale (e. g., extroversion-introversion) displayed no discernable preference on that bipolar type and thus were dropped from subsequent analyses

on that scale. Less than 5% of the sample was excluded from one of the four bipolar types due to their experiencing an equal number of item preferences on one of the four scales.

Preliminary analysis involved the use of chi-square (χ^2) test to determine whether the frequency of Japanese children who preferred either extroversion or introversion, practical or imaginative, thinking or feeling, and organized or flexible styles differ significantly in reference to the total group. Logistic regression was used to examine the influence of age, sex, and country in differentiating the preferences of children in the four bipolar temperament traits. Logistic regression is deemed appropriate when the purpose is to predict categorical group membership (e.g., extroverted vs. introverted styles) based on variables that are either continuous or discrete (Tabachnick & Fidell, 2006). Logistic regression analyses were conducted for each of the temperament traits to assess the extent to which gender and age influence the temperament style preferences of Japanese children. Similarly, sequential logistic regression analyses were conducted to assess cross-national differences in temperament style preferences controlling for the effects of gender and age. Odds ratio (OR) was used to assess the likelihood of preferences for a temperament style based on the explanatory variables of gender, age, and country. A .05 significance level was set for all analyses.

Results

Temperament Preferences of Japanese Children

As reported in Table 2, more Japanese children prefer extroverted (66%) than introverted (34%) styles, $\chi^2(1) = 51.28, p < .001$; practical (70%) than imaginative (30%) styles, $\chi^2(1) = 67.20, p < .001$; and organized (67%) than flexible (33%) styles, $\chi^2(1) = 50.01, p < .001$. Japanese children have a balanced preference for thinking (50%) and feeling (50%) styles, $\chi^2(1) = .02, p > .05$.

The possible influences of gender and age on temperament styles preferences of Japanese children were examined using logistic regression analyses. Cross-national differences in temperament style preferences also were examined using sequential logistic regression analyses. Results are displayed in Table 3.

Extroverted-Introverted Styles. The general model for extroverted-introverted styles was not significant, $\chi^2(4) = 2.76, p > .05$, Nagelkerke's $R^2 = .01$. Gender [Wald $\chi^2(1) = 1.02, p > .05$] and age [Wald $\chi^2(3) = 1.83, p > .05$] were not associated with children's preferences for extroverted and introverted styles.

Practical-Imaginative Styles. The general model for practical-imaginative styles was not significant, $\chi^2(4) = 3.23, p > .05$, Nagelkerke's $R^2 = .01$. Gender [Wald $\chi^2(1) = 1.67, p > .05$] and age [Wald $\chi^2(3) = 1.80, p > .05$] were not associated with children's preferences for practical and imaginative styles.

Thinking-Feeling Styles. The general model for thinking-feeling styles was significant, $\chi^2(4) = 42.32, p < .001$, with the combination of gender and age accounting for approximately 13% of the variance in the children's preferences, Nagelkerke's $R^2 = .13$. Gender was significantly associated with children's preferences for thinking-feeling styles, Wald $\chi^2(1) =$

39.78, $p < .001$. Males are more likely to prefer a thinking style and females are more likely to prefer a feeling style (OR = 3.81). Age was not significantly associated with children's preferences for thinking-feeling styles, Wald $\chi^2(3) = 0.20$, $p > .05$.

Prediction success indicated that both gender and age correctly classified approximately 64% of children displaying a preference for thinking style and approximately 68% of children displaying a preference for feeling style, with an overall success rate of approximately 66%.

Organized-Flexible Styles. The general model for organized-flexible styles was significant $\chi^2(4) = 34.61$, $p < .001$, with the combination of gender and age accounting for approximately 10% of the variance in the children's preferences, Nagelkerke's $R^2 = .10$. Gender was significantly associated with children's preferences for organized-flexible styles, Wald $\chi^2(1) = 6.43$, $p < .05$. Compared to females, males are more likely to prefer a flexible type (OR = .59). Similarly, age was significantly associated to children's preferences for organized-flexible styles, Wald $\chi^2(3) = 25.67$, $p < .001$. Children ages 9-10 are more likely to prefer an organized style than ages 11-12 (OR = 2.29), 13-14 (OR = 3.19), and 15-16 (OR = 4.26). Preference for a flexible style increases with age.

Prediction success indicated that both gender and age correctly classified approximately 92% of children displaying an organized style and approximately 14% of children displaying a preference for a flexible style, with an overall success rate of approximately 68%.

Table 2

Temperament Preferences of Children from Japan and the United States for total group, gender, and four age groups (by percent)

	E	I	P	M	T	F	O	L
<i>Japan (N = 493)</i>								
Age 9-10	69	31	66	34	50	50	82	18
Age 11-12	67	33	72	28	49	51	67	33
Age 13-14	66	34	71	29	53	47	58	42
Age 15-16	62	38	72	28	51	49	52	48
Male	64	36	73	27	67	33	61	39
Female	68	32	67	33	35	65	72	28
Total	66	34	70	30	50	50	67	33
<i>United States (N = 500)</i>								
Age 9-10	48	52	39	61	54	46	83	17
Age 11-12	56	44	41	59	53	47	73	27
Age 13-14	61	39	43	57	51	49	62	38
Age 15-16	55	45	44	56	48	52	53	47
Male	56	44	43	57	74	26	62	38
Female	55	45	40	60	30	70	75	25
Total	56	44	42	58	52	48	69	31

Note. E = Extroverted; I = Introverted; P = Practical; M = Imaginative; F = Feeling; O = Organized; L = Flexible.

Cross-national Comparisons in Temperament Preferences

A sequential logistic regression analysis was employed to examine the influence of country on each of the four bipolar temperament traits controlling for age and gender. The analysis was conducted in the following manner. In step 1, gender and age were entered in the equation to examine their contribution in differentiating temperament style preferences of children from Japan and the United States. In step 2, country was added to gender and age to examine its unique contribution, if any, in differentiating temperament style preferences over and above that of gender and age.

Extroverted-Introverted Styles. The general model from Step 1 was not significant, $\chi^2(4) = 1.26, p > .05$, Nagelkerke's $R^2 = .00$. Gender [Wald $\chi^2(1) = 0.50, p > .05$] and age [Wald $\chi^2(3) = 0.80, p > .05$] were not associated with preferences for these temperament styles.

When country was added in Step 2, the general model was significant, $\chi^2(5) = 14.04, p < .05$, thus indicating that country [Wald $\chi^2(1) = 12.67, p < .001$] differentiates children's preferences for extroverted and introverted styles and accounts for virtually all of the variance in the preferences for these styles, Δ Nagelkerke's $R^2 = .02$. Compared to U.S. children, Japanese children are more likely to prefer an extroverted style (OR = 1.61). Consistent in Step 1, gender [Wald $\chi^2(1) = 0.40, p > .05$] and age [Wald $\chi^2(3) = 2.11, p > .05$] were not associated with preferences for these temperament styles.

Prediction success indicated that the combination of country, gender, and age in Step 2 correctly classified approximately 100% of children displaying an extroverted style and 0% of children displaying an introverted style, with an overall success rate of approximately 61%.

Practical-Imaginative Styles. The general model from Step 1 was not significant, $\chi^2(4) = 3.30, p > .05$, Nagelkerke's $R^2 = .01$. Gender [Wald $\chi^2(1) = 0.83, p > .05$] and age [Wald $\chi^2(3) = 2.57, p > .05$] were not associated with preferences for these temperament styles.

When country was added in Step 2, the general model was significant, $\chi^2(5) = 78.99, p < .001$, thus indicating that country [Wald $\chi^2(1) = 71.74, p < .001$] differentiates children's preferences for practical and imaginative styles and contributes approximately 10% of the variance in the preferences for these styles, Δ Nagelkerke's $R^2 = .10$. Japanese children are more likely to prefer a practical style and U.S. children are more likely to prefer an imaginative style (OR = 3.35). Consistent in Step 1, gender [Wald $\chi^2(1) = 1.65, p > .05$] and age [Wald $\chi^2(3) = 1.82, p > .05$] were not associated with these temperament styles.

Prediction success indicated that the combination of country, gender, and age in Step 2 correctly classified approximately 59% of children displaying a practical style and 70% of children displaying an imaginative style, with an overall success rate of approximately 64%.

Thinking-Feeling Styles. The general model from Step 1 was significant, $\chi^2(4) = 137.50, p < .001$, indicating that the combination of gender and age differentiates children's preferences for thinking and feeling styles and accounts for approximately 19% of the variance in these styles, Nagelkerke's $R^2 = .19$. Gender was associated to children's preferences for thinking-feeling styles [Wald $\chi^2(1) = 126.45, p < .001$] and age was not [Wald $\chi^2(3) = 0.23, p > .05$]. Males are more likely to prefer a thinking style and females are more likely to prefer a feeling style (OR = 5.08).

When country was added in Step 2, the general model was significant, $\chi^2(5) = 149.78$, $p < .001$. However, the variable of country did not contribute to the variance in thinking and feeling styles (Δ Nagelkerke's $R^2 = .00$). Country [Wald $\chi^2(1) = 0.12$, $p > .05$] and age [Wald $\chi^2(3) = 0.21$, $p > .05$] were not significantly associated to children's preferences for these styles. Consistent in Step 1, gender [Wald $\chi^2(1) = 129.39$, $p < .001$] was found to be associated to children's preferences for thinking-feeling styles (OR = 5.30). Thus, in both Japan and the United States, males generally prefer thinking while females generally prefer feeling styles.

Prediction success indicated that the combination of country, gender, and age in Step 2 correctly classified approximately 68% of children who display a thinking style and 71% of children who display a feeling style, with an overall success rate of approximately 69%.

Organized-Flexible Styles. The general model from Step 1 was significant ($\chi^2[4] = 68.03$, $p < .001$), thus indicating the combination of gender and age differentiates children's preferences for organized and flexible styles and accounts for approximately 10% of the variance in these styles (Nagelkerke's $R^2 = .10$). Gender was significantly associated with children's preferences for organized-flexible styles, Wald $\chi^2(1) = 16.47$, $p < .001$. Compared to females, males are more likely to prefer a flexible style (OR = .56). Similarly, age was significantly associated to children's preferences for organized-flexible styles, Wald $\chi^2(3) = 47.82$, $p < .001$. Children ages 9-10 are more likely to prefer an organized style than ages 11-12 (OR = 2.04), 13-14 (OR = 3.07), and 15-16 (OR = 4.35).

When country was added in Step 2, the general model also was significant, $\chi^2(5) = 69.26$, $p < .001$. However, the variable of country did not contribute to the variance in organized and flexible styles (Δ Nagelkerke's $R^2 = .00$). Country was not significantly associated with preferences for organized and flexible styles, Wald $\chi^2(1) = .12$, $p > .05$. Consistent in Step 1, gender (Wald $\chi^2[1] = 16.59$, $p < .001$) and age (Wald $\chi^2[3] = 48.11$, $p < .001$) were significantly associated to children's preferences for these styles. Prediction success indicated that the combination of country, gender, and age in Step 2 correctly classified approximately 94% of children who display an organized style and 14% of children who display a flexible style, with an overall success rate of approximately 68%.

Discussion

The purpose of this research is to describe temperament style preferences in a sample of Japanese students at four age groups, examine possible gender and age differences among them, and compare their temperament style preferences with children in the U.S. A focus on temperament is important in that these qualities are likely to impact children's learning, family relationships, interpersonal relationships, and formation of values (Keogh, 2003; Kohnstamm, 1987; Lawrence, 1982; Teglasi, 1998b; Thomas, Chess, & Birch, 1968, 1970). Thus, knowledge of children's temperament preferences is essential when understanding their behaviors. When accurately understood, this knowledge can be translated into instructional styles designed to promote learning and minimize behavior difficulties (Horton & Oakland, 1997).

Table 3
Summary of Logistic Regression Results

Variables	B	S.E.	Wald χ^2	OR	95% C.I.
Japanese children (N = 493)					
<i>Extroverted-Introverted Styles</i>					
Gender (Female)	-0.19	0.19	1.02	0.82	0.57-1.20
Age			1.83		
<i>Practical-Imaginative Styles</i>					
Gender (Female)	0.28	0.22	1.67	1.32	0.87-2.03
Age			1.80		
<i>Thinking-Feeling Styles</i>					
Gender (Female)	1.34	0.21	39.78***	3.81	2.51-5.77
Age			0.20		
<i>Organized-Flexible Styles</i>					
Gender (Female)	-0.53	0.21	6.43*	0.59	0.40-0.89
Age			25.67***		
11-12	0.83	0.29	8.14**	2.29	1.30-4.04
13-14	1.16	0.31	13.65***	3.19	1.72-5.89
15-16	1.45	0.29	23.70***	4.26	2.38-7.64
Japan & U.S. Children (N = 993)					
<i>Extroverted-Introverted Styles</i>					
Step 1					
Gender (Female)	-0.09	0.13	0.50	0.91	0.71-1.18
Age			0.80		
Step 2					
Gender (Female)	-0.08	0.13	0.40	0.92	0.71-1.19
Age			2.11		
Country	0.47	0.13	12.67***	1.61	1.24-2.09
<i>Practical-Imaginative Styles</i>					
Step 1					
Gender (Female)	0.21	0.13	0.83	1.13	0.87-1.47
Age			2.57		
Step 2					
Gender (Female)	0.18	0.14	1.65	1.20	0.91-1.57
Age			1.82		
Country	1.21	0.14	71.74***	3.35	2.53-4.43
<i>Thinking-Feeling Styles</i>					
Step 1					
Gender (Female)	1.63	0.15	126.45***	5.08	3.83-6.75
Age			0.23		
Step 2					
Gender (Female)	1.63	0.15	126.39***	5.08	3.83-6.75

Cont. of Table 3

Age			.21		
Country	-0.05	0.15	.12	0.73	0.71-1.27
<i>Organized-Flexible Styles</i>					
Step 1					
Gender (Female)	-0.58	0.14	16.47***	0.56	0.42-0.74
Age			47.82***		
11-12	0.71	0.29	8.14**	2.29	1.30-4.04
13-14	1.16	0.31	13.65***	3.19	1.72-5.89
15-16	1.45	0.29	23.70***	4.26	2.38-7.64
Step 2					
Gender (Female)	-0.59	0.14	16.59***	0.56	0.42-0.74
Age			47.82***		
11-12	0.79	0.21	11.91**	2.07	1.37-3.14
13-14	1.15	0.22	28.24***	3.17	2.07-4.85
15-16	1.47	0.23	42.22***	4.34	2.79-6.75
Country	-0.16	0.15	1.23	0.85	0.64-1.13

Note. β = regression coefficient; S.E. = standard error; OR = odds ratio; C.I. = confidence interval

Reference group: Gender = male; Age = 9-10; Country = U.S.

*** $p < .001$ ** $p < .001$ * $p < .05$

General findings indicate that more Japanese children prefer extroverted than introverted, practical than imaginative, and organized than flexible styles. Although their preference for thinking and feeling styles is balanced, gender differences are significant. In general, males prefer thinking and females prefer feeling styles. Gender and age differences are apparent on organized-flexible styles. More females prefer organized style and more males prefer flexible style. Preference for a flexible style increases with age. Cross-national differences are found only on extroverted-introverted and practical-imaginative styles. In contrast to children in the U.S., those in Japan are more likely to prefer extroverted and practical styles.

Temperament Preferences of Japanese Children

Extroversion-Introversion Styles. Male and female Japanese children show a discernable preference for an extroverted style, with 66% reflecting this preference. Gender and age differences are not apparent for extroverted and introverted styles. Children who prefer an extroverted style generally are outgoing and are stimulated by the people and conditions in their environment. They prefer to be with others with whom they can openly talk and share their thoughts and feelings, including very personal issues. In contrast, children who prefer an introverted style generally derive their energy from themselves. They prefer to have a few close friends, have a few well-developed interests, and enjoy spending time alone.

The general preference of Japanese children for an extroverted style is supported by information from teachers who describe Japanese students as sociable (i. e., talkative, cheerful, vital, and energetic) and interpersonally supportive (i. e., considerate of others, warm, and responsive)—qualities consistent with an extroverted style (Shimizu, Gjerde, &

Iwamoto, 1988). Japanese students who are extroverted have been described as improving their academic proficiency by employing learning strategies that involve interacting verbally with peers—again qualities consistent with an extroverted style (Wakamoto, 2000). Extroversion also contributes to intercultural adjustment among Japanese high school students (Yashima, 1995).

Practical-Imaginative Styles. Male and female Japanese children show a discernable preference for a practical style, with 70% reflecting this preference. Gender and age differences are not apparent for these styles.

Children who prefer a practical style generally are oriented to current conditions, not the future, and focus their attention on conditions in the environment that appeal to their physical senses. They prefer details, precision, simplicity over complexity, and focus on practical daily events and issues. Practical styles share some features of analytic and field-independent learning styles that characterized Japanese students (Oxford & Burry-Stock, 1995).

In contrast, children who prefer an imaginative style prefer theories to facts and focus their attention on generalizations and global concepts. They often base their decisions on intuitive hunches and may overlook details. They enjoy opportunities that allow them to use their imagination and to contribute their unique ideas.

Thinking-Feeling Styles. Japanese children show a balanced preference for thinking and feeling styles. However, gender differences are apparent. Approximately two-thirds of males prefer a thinking style while a similar percent of females prefer a feeling style. Age differences are not apparent.

Whether the origin of temperament preferences is biologically or environmentally rooted has been subject to considerable debate (Joyce, 2010). Most scholars who specialize in temperament believe temperament to be influenced primarily by its biological roots yet may be influenced somewhat by the environment and personal choices (Bates & Wachs, 1994; Goldsmith, et al., 1987; Kagan, 1994; Keogh, 2003; Oakland, Glutting, & Horton, 1996).

Thus, thinking-feeling preferences are assumed to be largely inherent and thus influence gender role preferences. For example, the finding that differences in thinking-feeling preferences occur during infancy support prevailing theory among temperament scholars that its origin mainly is biological, not cultural (Rothbart, Ahadi, & Evans, 2000).

We recognize that some scholars believe gender differences in thinking-feeling styles may be attributed to gender role expectations found in Japanese culture (Sugihara & Kasturada, 2000). These roles characterize Japanese males as competitive, objective and analytical—traits typical of people with strong a preference for thinking style. In contrast, Japanese females generally are characterized as affectionate and sensitive to other's feelings. However, we advance the belief that the Japanese culture may reflect and reinforce biologically-based temperament, including thinking-feeling, rather than originating from its culture.

Organized-Flexible Styles. Japanese children show a discernable preference for an organized style, with 67% reflecting this preference. Gender and age differences are apparent. Females generally prefer an organized style (72%), and relatively more males (39%) than females (28%) prefer a flexible style. Age preferences for an organized style decline linearly.

Children who prefer an organized style like to make decisions as soon as possible and

prefer structure and organization. They generally prefer structured and organized setting and tend to be persistent. The preferences for organized style among Japanese children is consistent with the description that Japanese students generally are orderly, organized, and rely on plans (Oxford & Burry-Stock, 1995). Moreover, this orientation to an organized style is assumed to be reinforced by the Japanese culture, given its emphasis on process over product. That is, the process by which work is completed may be more important than the resulting product. Hence, Japanese teachers have been described as motivating students to achieve by encouraging them to follow and perfect desired processes (White, 1987).

In contrast, children who prefer flexible styles delay decision-making as long as possible and feel that they never have sufficient information to make decisions. They prefer a flexible, open schedule, enjoy surprises, and adapt well to new situations. They may not respond well to externally imposed rules and regulations. The tendency to prefer flexible styles as children become older may be related to a developmental trajectory (Bassett & Oakland, 2009). This developmental trajectory also includes a desire for increased autonomy and sense of responsibility together with adult expectations for higher levels of adaptive behaviors. Additionally, the finding that Japanese males are more likely than females to prefer a flexible style is consistent with other literature (Bassett & Oakland, 2009; Costa & MacCrae, 1992; Hammer & Mitchel, 1996). Males generally prefer fewer externally imposed rules while females generally are more willing to accept them for themselves and expect them from others.

Cross-national Comparisons in Temperament Preferences

Children from Japan and the U.S. display similar preferences for organized-flexible styles: both prefer organized over flexible styles. They have a balanced preference for thinking-feeling styles. They differ on extroverted-introverted and practical-imaginative styles. More Japanese than U.S. children prefer extroverted and practical styles.

Children from 12 of the 16 countries on which we have similar data also show a general preference for an extroverted style: Australia (Oakland, Faulkner, & Bassett, 2005), Costa Rica (Oakland & Mata, 2007), Greece (Oakland & Hatzichristou, 2010), India (Oakland, Singh, Callueng, & Goen, 2011), Pakistan (Oakland, Callueng, Rizwan, & Aftab, 2011), People's Republic of China (Oakland & Lu, 2006), Romania (Oakland, Illiescu, Dinca, & Dempsey, 2009), Samoa (Callueng, Lee Hang, Gonzales, Ling-So'o, & Oakland, 2011), South Korea (Oakland & Lee, 2010), United States (Bassett & Oakland, 2009), Venezuela (Leon et al, 2009), and Zimbabwe (Oakland, Mpofu, & Sulkowski, 2007). Thus, the children from most countries share these preferences shown by Japanese children.

Children from 12 countries also show a general preference for a practical style: Gaza (Oakland, Alghorani, & Lee, 2006), Greece (Oakland & Hatzichristou, 2010), Hungary (Katona & Oakland, 2000), India (Oakland, Singh, Callueng, & Goen, 2011), Nigeria (Oakland, Mogaji, & Dempsey, 2006), Pakistan (Oakland, Callueng, Rizwan, & Aftab, 2011), People's Republic of China (Oakland & Lu, 2006), Romania (Oakland, Illiescu, Dinca, & Dempsey, 2009), Samoa (Callueng, Lee Hang, Gonzales, Ling-So'o, & Oakland, 2011), South Africa (Oakland & Pretorius, 2009), Venezuela (Leon et al, 2009), and Zimbabwe (Oakland, Mpofu, & Sulkowski, 2007).

Children in eight countries generally prefer a thinking style while children in six countries generally prefer a feeling style. Gender differences on thinking-feeling styles, with males more likely to prefer thinking and females more likely to prefer feeling styles, are more

common among children from Australia (Oakland, Faulkner, & Bassett, 2005), Costa Rica (Oakland & Mata, 2007), Greece (Oakland & Hatzichristou, 2010), Nigeria (Oakland, Mogaji, & Dempsey, 2006), Pakistan (Oakland, Callueng, Rizwan, & Aftab, 2011), People's Republic of China (Oakland & Lu, 2006), Romania (Oakland, Illiescu, Dinca, & Dempsey, 2009), South Africa (Oakland & Pretorius, 2009), United States (Bassett & Oakland, 2009), Venezuela (Leon et al, 2009).

Children from all countries with the exception of South Korea (Oakland & Lee, 2010) also show a general preference for an organized style—albeit with more males than females preferring a flexible style. Moreover, similar to the data on Japanese children, children in most countries show an early and strong preference for an organized style, one that decreases with children's age.

Implications of Temperament Preferences

This study contributes to existing literature on temperament style preferences in Japanese population, most especially extending the application of temperament styles theory in Japanese children and youth. Knowledge of temperament styles can provide meaningful ideas to enhance self-understanding and personal performance. Application of temperament styles is multi-faceted (Joyce, 2010). Temperament qualities impact school achievement (Keogh, 2003; Horton & Oakland, 1997). Thus, the proper use of temperament styles can promote academic/educational experiences of students through curriculum planning, academic intervention, classroom management, and teaching/learning strategies. More broadly, knowledge of temperament promotes the attainment of goodness-of-fit or matching preferred temperament preferences of students and teachers in classroom setting. Students' educational experiences are expected to be more successful when teachers align their teaching approaches and practices to the temperament styles of their students.

Temperament preferences are associated with non-pathological social-emotional functioning (Keogh, 2003). They convey psychological strengths and resources of children that can suggest practical and personalized approaches for mental health professionals in schools and other clinical settings that assist children and youth to manage their difficulties and problems. For example, Japanese children who prefer extroverted style may benefit from group interventions and those who prefer introverted style may benefit from more individualized interventions. The findings on gender and age differences in temperament styles of Japanese children can be incorporated into intervention planning. For example, given their thinking style preferences, use of cognitive restructuring through cognitive-behavioral interventions may be more appealing to Japanese males. Scaffolding and the use of homework in counseling benefit Japanese children who prefer organized styles, especially the younger children. In contrast, older Japanese children who display a proclivity for a flexible style may benefit from a less directive and eclectic approach to counseling.

Cross-national research on temperament preferences of can provide additional explanation to the idea that temperament may be tempered by the environment and cultural choice. Temperament preferences become more defined and stable through the process of enculturation and accommodation, an idea that is associated with culture as constitutive of behavior (Miller, 1999).

Limitations and Future Research

This is the first known report of temperament styles among Japanese children. The availability of current data from other temperament style studies of Japanese children and adults would allow us to examine the reliability of these findings and further trace possible gender and age trends (e.g. those seen in thinking-feeling and organized-flexible styles). Moreover, Japanese children living in Miyakonojo in the southern Kyushu region may not be representative of Japanese children generally. Additional research using the Japanese adapted version of the SSQ with children in other regions of Japan also is encouraged. Lastly, temperament scales developed in the light of Japanese culture and standardized on Japanese children may be preferable to those that are adapted for use in this country.

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The Investigation of Construct Validity of TIMSS 2003 Student's Questionnaire among 8th Grade Malaysian Students

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Abstract This study is aimed to investigate the construct validity of TIMSS 2003 student's questionnaire among 8th grade Malaysian students' performance in science. Data from 5314 eighth-grade students (3071 male and 2243 female, in the age 14.3 years old) from Malaysia who participated in the Trends in International Mathematics and Science Study (TIMSS) 2003 were analysed for this study. Principal component analysis was performed to determine underlying constructs among items on the TIMSS 2003 student's questionnaire. Factor analysis showed that the 16 items from the questionnaire were distributed among four factors for the groups under study. The overall findings showed that attitudes towards science and students' science self-concept were important factors based on the variance on science achievement. Attitudes towards school and family background were also significant factors on the variance on science achievement but their effects were less than the first three factors.

Keywords: TIMSS 2003 student's questionnaire, construct validity, Malaysian students

Introduction

Student science performance has received a great deal of attention among researchers in education. This attention stems from the importance of science in students' future educational paths and in continuing to develop an innovative and creative society. Previous studies have identified factors that influence student performance in science from various countries. Notable among these studies is the Trends in International Mathematics and Science Study (TIMSS), which documents student achievement in both mathematics and science. Malaysia was a participating country in the last two cycles of TIMSS, in 1999 and 2003 at the eighth-grade level (Beaton, et al., 1996; Martin, et al., 1997; Martin, Mullis, Foy, & Olson, 2008; Mullis, et al., 2000; Mullis, et al., 2008). Malaysia participated in the last three cycles of TIMSS, from 1999 to 2007, at the eighth-grade level.

These studies consider student-specific and school-related factors that may have impacts on student performance. In a study of data from TIMSS 1999, Mokshein (2002)

found that self-concept of science ability, as well as awareness of the social implications of science, gender and home educational resources were significantly related to Malaysian students' achievement, but students' attitudes towards science and parents' educational level were not significantly related to science achievement. Kiamanesh (2004) reported that some school-related variables, such as students' science self-concept, awareness of the role of science in society and future career options, are fostered to some degree by the educational system and may be directly influenced by school interventions. Although variables like family background are not under the control of educational systems, they are worthy of investigation because they may indirectly influence both student performance and school interventions. Kiamanesh (2004) also found that science self-concept, view of science in the world, home background, belief in the importance of science and external motivation had significant influences on eighth-grade Iranian students' science achievement, while neither the students' attitudes towards science nor the home-school interface had a significant influence. Mettas et al. (2006) reported a significant relationship between students' self-beliefs and attitudes and science achievement. Research findings indicate a strong positive relationship between students' science performance and the accessibility of educational resources (a dictionary, a personal study desk, and a computer) at home among countries that have participated in TIMSS studies (Beaton, et al., 1996; Martin, Mullis, & Chrostowski, 2004; Martin, et al., 2008; Martin, et al., 2000). There is also a positive relationship between parents' educational level and students' science achievement in eighth grade (Beaton, et al., 1996; Davis-Kean, 2005; Feinstein, Duckworth, & Sabates, 2004; Martin, et al., 2008; M. O. Martin, et al., 2000; Nordtveit, 2005). Research findings have shown that in most countries, home schooled students with more books have higher proficiency in science (Beaton, et al., 1996; Martin, et al., 2004; Martin, et al., 2008).

Science knowledge among its citizens is critical to Malaysia's goal of becoming a developed nation by the year 2020, and knowledge of science is paramount to this goal. The importance of science and technology is officially documented in the government blueprint as articulated by the Malaysian Prime Minister (Mohamad, 1993): "*one of the nine challenges in the actualization of the Vision 2020 is to establish a scientific and progressive society - a society that is innovative and forward-looking, one that is not just a consumer of technology but also a contributor to the scientific and technological civilization of the future*" (as cited by Mokshein, 2002, p. 5). However, despite important gains, Malaysia remains only slightly above the international average in science achievement based on TIMSS 2007 and still lags behind other fast-growing Asian nations, such as Singapore and Taiwan. In each of the last four cycles of TIMSS (1995 to 2007), Singapore was the top-performing country in both mathematics and science. In 1995, it was the top performer in mathematics at both the fourth- and eighth-grade levels and in science at the eighth-grade level. In 1999, it led in mathematics at the eighth-grade level and was outperformed by just one scale-score point by Chinese Taipei in science at the eighth-grade level. In 2003, it was again the top performer in both mathematics and science at both grade-levels, and most recently in 2007, it outperformed all other participating countries in science at both the fourth- and eighth-grade levels (Beaton, et al., 1996; Martin, et al., 1997; Martin, et al., 2008; Martin, et al., 2000; Mullis, et al., 1997; Mullis, Martin, Gonzales, & Chrostowski, 2004; Mullis, et al., 2000; Mullis, et al., 2008). Results of the TIMSS 2003 study rank Malaysia below many other countries in this international evaluation of student achievement (Martin, et al., 2004; Mullis, et al., 2004).

Malaysia is a multicultural country with three major ethnic groups: Malay, with 58% of the population; Chinese, with approximately 30%; and Indian, with 10%; the remaining 2% is made up of various other ethnic groups (Dixon, 2005; Malaysia, 2004; Wong, Kaur, Koay, & Jamilah, 2008). The results of TIMSS 1999 showed that Malaysian students performed slightly but insignificantly below the international average in life science and chemistry. Malaysians performed above the international average in all other categories, including environmental science, earth science and physics, but these differences were only significant for environmental science. On the average, Malaysian students in both TIMSS 1999 and 2003 achieved performance scores above the international average in life science, chemistry, physics, earth science and environmental science by 11, 19, 26, 16, and 27 scale-score points, respectively. However, Malaysians scored considerably higher than the international average in the five content areas in TIMSS 1999 and 2003 on average (See Appendix 1).

The TIMSS 2007 data are not yet available for secondary analysis. While limited descriptions have been given of Malaysian students' performance in mathematics and science based on previous TIMSS data (Awang & Ismail, 2006; Mokshein, 2002), analysis of the factors influencing student achievement in mathematics, and particularly in science, have been limited. To help fill this gap, this paper attempts to identify these factors and to evaluate the effects of school-related variables on students' science performance in Malaysia.

There is a great deal of evidence that student performance in science is influenced by contextual variables, such as a student's attitude towards science, science self-concept, family background, aspirations for further education, attitude towards school, school environment, leisure time and so on (Beaton, et al., 1996; Kiamanesh, 2004; Martin, et al., 1997; Martin, et al., 2004; Martin, et al., 2008; Mettas, et al., 2006; Mokshein, 2002). This study focused on three important student-related factors that can be directly impacted by school, such as attitude towards science, science self-concept, and attitude towards school, as well as two other factors that may have an indirect influence, i.e., family background.

Based on the above mentioned and importance of the factors in academic achievement, this study generalized this information to specifically Malaysian eighth-grade students. Some studies obtained similar results and others were different. The importance of some student-related variables is examined by investigators (Kabiri & Gharbi, 2009; Kiamanesh, 2004). The present study aimed at evaluating the construct validity of the TIMSS 2003 student's questionnaire using a Malaysian. Also, this study determined whether, TIMSS 2003 student's questionnaire is a valid instrument for the assessment of student-related factors among 8th grade Malaysian students' performance in science. Therefore, this scale would provide a tool for any future TIMSS studies.

We made use of the TIMSS database and applied factor analysis. In the next section, we explained the data used. Section 3 outlines the empirical approach. We discussed the results in Section 4. Finally, Section 5 concludes with the main findings and some final remarks.

Previous Research Conducted on TIMSS in Science

Studies have shown that a large percentage of Malaysian students display a highly positive attitude towards science (Martin, et al., 2000). Although internationally there is a positive correlation between students' self-concept in learning science and their eighth-grade science scores, the relationship between these two factors at the country level is more complex. Reports indicate that relatively few students (21% or less) in several high performing

countries, including Singapore, Japan, Hong Kong, Chinese Taipei, and Korea, had high levels of self-concept in science (Martin, et al., 2004; Martin, et al., 2000). Researchers comparing science achievement among Singaporean and Japanese eighth-grade students based on TIMSS 1999 pointed out that a higher percentage of Singaporean than Japanese students indicated that they liked science (91.9% compared with 56.1%). Based on TIMSS 1999 data, Moksheim (2002) found that self-concept in learning science, awareness of the social implications of science, gender and home educational resources were significantly related to Malaysian students' achievement, but students' attitudes towards science and parents' education levels were not significantly related to science achievement. Researchers have indicated that students' self-beliefs and attitudes are significantly related to science achievement (Mettas, et al., 2006). Janjetovic and Malinic (2004) have shown positive correlations between family variables and self-concept. Hammouri (2004) examined achievement in the 1999 TIMSS-R data (TIMSS Repetition data) at the student level. He investigated factors affecting perceptions of the importance of math (self, maternal and peer items) and attribution of success in math (two items) in addition to the TIMSS Positive Attitude and self-concept indices. Parental expectations for their children's future careers reflected gender typing. Male students were encouraged to pursue technical careers in the hard sciences while female students were directed towards careers in literature (O'Connor-Petruso & Miranda, 2004).

Research findings indicate that there is a strong positive relationship between students' science performance and the availability of educational resources (dictionaries, a personal study desk, and a computer) at home in the countries that participated in the TIMSS (Martin, et al., 2004; Martin, et al., 2000). There is a positive relationship between parents' educational level and students' science achievement in eighth grade (Davis-Kean, 2005; Feinstein, et al., 2004; Nordtveit, 2005). Additionally, research has shown that in most countries, home study students with more books had higher levels of achievement in science (Martin, et al., 2004). Researchers have shown that boys generally scored significantly higher in science than girls (Beaton, et al., 1996).

Method

Participants

The data for the present study included student-related variables from 5314 eighth-grade students (3071 girls and 2243 boys) from Malaysia, with a mean of 14.3 years old, who participated in TIMSS 2003.

Measure

In the TIMSS 2003 Student Questionnaire, students were asked about their home environments and school experiences, and their attitudes toward mathematics and science. At the eighth grade, three indices were constructed representing three aspects of students' attitudes toward mathematics and science: positive affect, self-confidence, and valuing the subject. The eighth grade also included an index of time students spend on homework in mathematics and science and an index of students' perceptions of being safe in school (Martin & Preuschof, 2008). TIMSS student questionnaire includes 39 items. Each student in the sampled eighth grade TIMSS classes completed a Student Questionnaire (Erberber, et al., 2008).

Procedure

Data for this study came from the Third International Mathematics and Science Study (TIMSS) 2003 conducted by the International Association for the Evaluation of Educational Achievement (IEA). The study is designed to illustrate trends in eighth-grade mathematics and science achievement in an international context with the participation of almost fifty countries, including Malaysia. The present study uses the science achievement data from Malaysia for the 2002 school year.

Data Analysis

Our analysis first examined at the underlying structure of the items on the student questionnaire. Based on methods used in previous research, the 16 items from the student questionnaire were analysed using principal components extraction factor analysis followed by a Varimax rotation procedure. Because the sample was composed of two different groups (girls and boys) and to meet the assumption of homogeneity of samples in factor analysis, the data were analysed for these groups separately. The KMO and Bartlett's Sphericity tests were used to test the hypothesis that the correlation matrix was an identity matrix and the variables were independent. The results showed that chi-square values were significant at $p < .001$ for all groups; therefore, the hypothesis of the correlation matrix as an identity matrix was rejected. Authors have argued that KMO statistics values between .8 and .9 are high (Colman & Pulford, 2006; Field, 2005, p. 650; George & Mallery, 2003, p. 256). Thus, it was concluded that factor analysis was an appropriate procedure for analysing the variables. To determine the number of factors to be extracted, two conventional criteria, eigenvalue and scree test, were used. First, only factors with eigenvalues of 1 or greater were considered as independent factors, and the result of the first criteria was examined with the scree test. The scree plot confirmed the eigenvalues of 1 or greater for all factors considered to be independent, indicating consistency between the two criteria. As a result, variables with factor loadings of .40 or greater were considered to be a criteria affecting multiple variables. The factors determined to be appropriate for extraction are based on the evidence from previous research (Kiamanesh, 2005; Kiamanesh & Mahdavi-Hezaveh, 2008; Mullis, et al., 2004; Papanastasiou, 2008).

Results

The results of factor analysis are summarized in Table 1. As shown in Table 1, the 16 items with factor loadings above .40 were identified and grouped according to four factors. Some items were grouped differently for girls than for boys. For Malaysian girls, the item "I think that most teachers in my school care about the students" were grouped under the attitude towards school factor rather than the attitude towards science factor. The item "Science is not one of my strengths" was included with the other items under the students' science self-concept factor for Malaysian boys.

Table 1
Extracted Factors with the Survey Items and Their Factor Loadings

Factors	Items	Malaysia	
		Girls	Boys
Attitude towards Science	I need to do well in science to get the job I want.	.798	.781
	I need to do well in science to get into the university of my choice.	.780	.735
	I would like a job that involves using science.	.776	.745
	I think learning science will help me in my daily life.	.659	.656
	I enjoy learning science.	.634	.636
	I would like to take more science in school.	.643	.697
Attitude towards School	I need science to learn other school subjects.	.610	.626
	I think that most teachers in my school care about the students.	.807	.777
	I think that most teachers in my school want students to do their best.	.748	.745
	I think that most students in my school try to do their best.	.646	.640
Students' science self-concept	I like being in school.	.600	.626
	Science is more difficult for me than for many of my classmates.	.781	.760
	Sometimes when I do not initially understand a new topic in science I know that I will never really understand it.	.718	.721
Family background	Science is not one of my strengths.	.707	.696
	What is the highest level of education completed by your father (or stepfather or male guardian)?	.893	.902
	What is the highest level of education completed by your mother (or stepmother or female guardian)?	.893	.901

Table 2
The Variance in Malaysian Students' Science Achievement Accounted for by Each Factor

Factors	Rotation Sums of Squared Loadings			
	Girls		Boys	
	% of Variance	Cumulative %	% of Variance	Cumulative %
Attitude towards science	22.567	22.567	22.188	22.188
students' science self-concept	13.401	35.968	13.175	35.364
Attitude towards school	11.419	47.387	11.105	46.469
Family background	10.009	57.396	10.258	56.727

Table 2 shows the percentage of variance explained by each factor and the total variance explained by all factors for male and female Malaysian students. The factors explained 57.395%, and 56.727% of the variance of the items for Malaysian girls and boys, respectively. These overall factors could explain 0.66% variance on the variables for Malaysian girls than boys, respectively. Attitude towards science had the largest explained variance for girls and boys. Student's science self-concept was the second greatest factor for girls and boys. The remaining factors contributed almost equally for both boys and girls.

Discussion

This study was designed to investigate the construct validity of TIMSS 2003 student's questionnaire in science among Malaysian eighth-grade students.

Factor analysis showed that four factors explained the highest proportion of the variance among the 16 items for both genders (59.91%).

The four factors explained slightly more variance in science performance among boys than among girls (16% and 15%, respectively). Although the pattern of factors was approximately equal for boys and girls, attitude towards science and students' science self-concept explained 2.1% and 1.37% more variance, respectively, for boys than for girls. In contrast, family background and attitude towards school, explained 1.18%, .80%, and 59%, more variance, respectively, for girls than boys. Results show that attitude towards science and students' science self-concept was the factors that most influenced the variance in science achievement for Malaysian students. Family background and attitude towards school were also significant, though their effects were considerably less important than the other three factors. The present findings show both similarities and differences in comparison with previous studies. For example, Mokshein (2002) found that self-concept in learning science, awareness of social implications of science, gender and home educational resources explained a low proportion (13%) of variance in Malaysian students' science achievement based on TIMSS 1999. She also concluded that parents' education level and attitude towards science did not significantly affect on the variance in Malaysians students' science achievement. Similarity, Kiamanesh (2004) found that attitude towards science among Iranian eighth-grade students did not significantly affect science achievement; in contrast, the findings of the present study suggest that students' attitude towards science is one of the most important factors affecting science achievement.

In summary, the percentage of Malaysian students who agreed that science was very important did not change significantly between TIMSS 1999 and TIMSS 2003 (from 43% to 42%). The percentage of students who slightly agreed with this statement significantly decreased from 1999 to 2003 (51% to 44%), and the percentage who disagreed with the question significantly increased from 1999 to 2003 (from 5% to 13%). That is, the overall percentage of Malaysians who agreed with the statement significantly decreased over four years. The percentages of students who slightly agreed with the statement were similar those for students who disagreed, with values from 1995, 1999 and 2003 significantly increasing (10%, 13% and 17%, respectively). The percentage of students who placed science education at the high, medium and low levels of importance in 2003 were 73%, 25% and 2%, respectively. This index shows that learning science has become more highly valued among Malaysian students. However, a significant correlation has been shown between students' value of science education and their level of science achievement (Martin, et al., 2004).

Students' science self-concept was a less important factor for Malaysian boys, than girls. The percentage of students who reported a high level of science self-concept (38%) was lower for Malaysian students than the international average while the percentage of Malaysian students reporting a low level of science self-concept (14%) was higher than the international average). Forty-eight percent of Malaysian students reported a medium level of science self-concept. The results showed a positive relationship between this index and students' science scores (Martin, et al., 2004).

At the international level, Malaysian students who indicated that they had a computer and a study desk at home achieved higher scores in science than those who did not. Only 57% and 87% of Malaysians reported having a computer and a study desk at home, respectively (Martin, et al., 2004). International performance in science was positively correlated with computer use, particularly among eighth-grade students, and this result was similar for Malaysians. Only 26% of Malaysian students reported using a computer both at home and school. Twenty-six of Malaysians reported using a computer at home but not at school, and 24% reported using a computer and used at school but not at home eleven

percent of Malaysians reported no use of a computer (Martin, et al., 2004). Findings for students internationally showed a positive correlation between the number of books at home and science achievement. This pattern was also found for Malaysian students. Among Malaysian students only 5% reported having more than 200 books at home, 9% reported having between 101 and 200 books at home, and 28% reported having between 26 and 100 books at home (Martin, et al., 2004).

Attitude towards school had less of an impact on science achievement for Malaysian students. Family background was a more significant factor for girls. Several researchers have reported that family background, including family income, and parents' education directly and indirectly influence students' school performance (Davis-Kean, 2005; Feinstein, et al., 2004; Nordtveit, 2006). Parents with higher levels of education may spend money differently than those with lower education, and thus, they may be better able to protect their children from the effects of poverty or to derive greater developmental advantages from their higher incomes (Feinstein, et al., 2004). Parents' participation in their children's education has long been acknowledge as a key factor in children's success at school (Khong & Ng, 2005). Researchers have demonstrated that parental involvement in their children's education can have a variety of effects including higher grades and graduation rates, better attendance, more regular completion of homework, more positive attitudes and behavior in school and greater higher rates of enrollment in post-secondary education (Henderson & Berla, 1994, cited in Khong & Ng, 2005).

The present study shows that each of four factors explain 15.5% of the variance in science performance for Malaysian students who participated in TIMSS 2003. The remaining variance in science performance may be influenced by other factors not investigated in this study. As shown in Appendix 1, there is a gap between Malaysian students' science achievement in TIMSS 1999 and 2003. The results of the present study show that attitudes towards science and students' science self-concept are relatively low for Malaysian students, but this difference is not remarkable. Thus, there are other important factors influencing Malaysian students' science performance that require further investigation.

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Appendix 1

Average Students' Science Achievement by Content Areas at 8th Grade in Malaysia on TIMSS 1999 and 2003 Compare with the International Average (from: Mullis et al., 2000; 2004)

Contents Areas		Malaysia	International average
Life Science	1999	479	488
	2003	504	474
Chemistry	1999	485	488
	2003	514	474
Physics	1999	494	488
	2003	519	474
Earth Science	1999	491	488
	2003	502	474
Environmental Science	1999	502	488
	2003	513	474



Assessing Filipino-Chinese High School Students Self-Compassion

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Abstract The present study assessed the construct self-compassion by (1) testing its six-factor structure and its concurrent validity with coping strategies. Self-compassion is understanding, non-judgmental attitude toward one's inadequacies and failures. This construct is relevant among Asians because of its consistency with their beliefs and values about the self. Self-compassion is a psychological construct that encompasses the Buddhist perspective on the meaning of suffering and how it is developed over a period of difficulty. The self-compassion scale and the coping style scales were administered to 201 Filipino-Chinese high school students of a Buddhist school in the Philippines. It was found in the study that the six factors of self-compassion were significantly correlated with all the factors of coping strategies (problem-focused, emotion-focused, and avoidance-oriented). The six-factor structure of the self-compassion was supported by the data obtaining an adequate fit (RMSEA=.08, $\chi^2=2.84$, CFI=.94, and TLI=.95). Concurrent validity was determined where the six factors of self-compassion were structured to affect the three factors of coping strategies. The estimates of the explained variances of the factors of self-compassion on the three coping strategies were significant. The model also attained a good fit (RMSEA=.06, $\chi^2=3.88$, CFI=.94, and TLI=.94).

Keywords: self-compassion, coping strategies, problem-focused, emotion focused, avoidance -oriented, Filipino-Chinese high school students

Introduction

When people are faced with failures, losses, and rejections, they deal with their problems with level-headedness and composure, whereas, others would react maladaptively to unpleasant situations or worse, aggravate their miseries by blaming themselves for their mistakes and shortcomings. In the same way, when students who have been taught to become compassionate in a Buddhist school resort to varied ways to cope from the problems and protect themselves against stressful events. It is either that they face these difficulties by planning how to confront, or to get emotional support from other people or just avoid by

simply denying or disengaging from the problem. Neff (2003a) defined the psychological construct “Self-Compassion” as it plays an important role in how individuals cope with life’s problems. According to Neff, persons who are self-compassionate take an understanding, non-judgmental attitude toward one’s inadequacies and failures, and recognize that one’s experience is part of the common human experience. Presumably, a person high in self-compassion sees his or her problems, weaknesses and shortcomings accurately, yet reacts with kindness and compassion rather than with self-criticism and harshness. Thus, self-compassion protects people against negative events and stimulates positive self-feelings when their life goes badly. Previous studies have shown that by becoming self-compassionate, students may become kinder, more understanding to themselves to liberate them from negative emotions (Neff, Hseih, & Dejithirat, 2005). They succeed despite difficulties and failures in their studies as they are able to alter negative emotions of self-condemnation and shame into more productive emotions of compassion for one’s imperfect humanity.

Self-compassion needs to be assessed among students studying in a Buddhist school to provide a more contextual perspective on how it operates within an Asian context. When the self-compassion scale was developed by Neff (2003b), the Asian sample was mixed with other groups assuming that they all operate in the same wavelength of self-compassion. The studies in self-compassion have also identified numerous constructs that are psychologically adaptive such as well-being (Gilbert, 2005; Neff, 2004), wisdom, happiness, optimism, positive affect (Neff, Rude, & Kirkpatrick, 2007), life satisfaction, social connectedness, and emotional intelligence (Neff, 2003a). There is a strong indication that coping is also a potential correlate of self-compassion but this factor was not emphasized in previous studies. Neff, Hseih, and Dejithirat’s (2005) study showed that after students have experienced failure in a midterm exam, they reported ways of coping with the experience. The present study provides empirical evidence on the prediction of coping from self-compassion. This prediction also served as concurrent validity for the self-compassion scale when applied in a Filipino-Chinese sample.

The Meaning of Self-Compassion

By being compassionate means a “humane quality of understanding the suffering of others and wanting to do something about it”. And to be compassionate for others would simply mean individuals allowing themselves to be touched by their experience of suffering (Salzberg, 1997).

Neff (2004) defined self-compassion as a healthy form of self-acceptance that includes three components. The first is a tendency to treat oneself kindly in the face of perceived inadequacy by engaging in self-soothing and positive self-talk. Another component of self-compassion involves recognizing that one’s discomfort is an unavoidable part of the human experience. This recognition of “common humanity” promotes a sense of connection to others even in the face of feelings of isolation and disappointment. Finally, self-compassionate individuals are able to face their own painful thoughts without avoiding or exaggerating them, managing their disappointment and frustration by quelling self-pity and melodrama. In the definition of self-compassion, Neff (2003a) explained that it is closely related to and informed by the construct of mindfulness (Brown & Ryan 2003). Similar to mindfulness, self-compassion involves turning one’s wisdom and awareness inward, thereby promoting a perspective of connectedness and recognition of temporality. On the other hand, self-compassion implies being emotionally warm and forgiving to oneself. It is the ability to be kind to oneself in the face of failure, rejection, defeat, and other negative events (Leary,

Adams, & Tate, 2005). According to Buddhist theory, suffering is caused by attachment to fixed beliefs about the self, particularly unexamined assumptions that we perpetuate (diSilva, 1986, 2005). However, ongoing self-reflection into the nature of our suffering allows for internal transformation (Kongrul, 2005). The classic story of Buddha illustrates that it was the understanding of suffering that inspired his search for self-determination. When we face difficulties, rather than avoid or give in to them, it forces us to uncover inner resources we may never have known. We become more self-reflective as we tune into the experience of suffering, over time depersonalizing it, and ultimately liberating us from negative emotions, guiding our life in a new direction (diSilva, 1986, 2005; Kalupahana, 1987). This openness to possibility generates humility, contentment, and self-compassion (Ekman, Davidson, Richard, & Wallace, 2005; Kongrul, 2005; Leary 2003, 2004; Neff, 2003b).

Coping Strategies Defined

Lazarus (1977) defines coping as a reaction to stressors. This reaction is the individual's attempt to master conditions of harm, threat or challenge. Coping mechanisms are "those direct, active tendencies aimed at eliminating a stressful event" (Lazarus, 1977, p. 8).

Folkman, and Lazarus (1980) defined coping strategies as specific efforts, both behavioral and psychological, that people employ to master, tolerate, reduce, or minimize stressful events. Two general coping strategies have been distinguished: problem-solving strategies are efforts to do something active to alleviate stressful circumstances, whereas emotion-focused coping strategies involve efforts to regulate the emotional consequences of stressful or potentially stressful events. Research indicates that people use both types of strategies to combat most stressful events. The predominance of one type of strategy over another is determined, in part, by personal style (e. g., some people cope more actively than others) and also by the type of stressful event; for example, people typically employ problem-focused coping to deal with potential controllable problems such as work-related problems and family-related problems, whereas stressors perceived as less controllable, such as certain kinds of physical health problems, prompt more emotion-focused coping.

An additional distinction that is often made in the coping literature is between active and avoidant coping strategies. Active coping strategies are either behavioral or psychological responses designed to change the nature of the stressor itself or how one thinks about it, whereas avoidant coping strategies lead people into activities (such as alcohol use) or mental states (such as withdrawal) that keep them from directly addressing stressful events. Generally speaking, active coping strategies, whether behavioral or emotional, are thought to be better ways to deal with stressful events, and avoidant coping strategies appear to be a psychological risk factor or marker for adverse responses to stressful life events (Holahan & Moos, 1987). In another coping literature, coping strategies are generally classified into three broad categories: (1) problem-focused; (2) emotion-focused; and (3) avoidance-oriented (Zeidner, 1995). Problem-focused coping attempts to change stressful situations by taking pro-active actions to change circumstances for the better; Emotion focused coping attempts to change the way a person attends to or interprets the situation so that the resulting affective reaction is altered and avoidance-oriented coping is aimed at avoiding the stressor rather than facing it and may include denying the reality of a situation, giving up, or mentally disengaging through excessive sleep or intoxicants (Carver, Scheier, & Weintraub, 1989).

The Present Study

In the present study, the six factors of self-compassion are tested. These factors are organized into three main components: Self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification. The first factor on each pair that includes self-kindness, common humanity, and mindfulness are the positive characteristics of self-compassion which involves offering oneself warmth and non-judgmental understanding, recognition of being imperfect, and a balanced approach to one's negative experiences (Neff, Kirkpatrick, & Rude, 2006). In order to support the factor structure proposed by Neff, Hseih, and Dejjithirat (2005), a measurement model needs to be tested involving the six factors. These six factors need to be significantly related to provide evidence that they measure self-compassion as a construct. Previous studies of Neff (2003b) also conducted CFA as an approach to confirm the factor structure although low goodness of fit estimates were obtained using a mixture of ethnic samples from the USA. The present study will use Filipino-Chinese sample where the characteristics of self-compassion is more consistent with their culture.

To further validate the construct self-compassion, it should correlate with a variable that strongly indicates adaptive mental functioning (Gilbert, 1989; Gilbert & Irons, 2005, Leary, Adams, & Tate, 2005). Coping is one of the variables that indicate an adaptive mental functioning and a good outcome of self-compassion. Coping as a correlate and outcome of self-compassion is based on Neff's theory (2003a) which posits that self-compassion directly operates as an emotional regulation coping strategy by neutralizing negative emotional patterns and creating more positive feelings of kindness, understanding and connectedness. Thus, self-compassion is hypothesized to have direct link with adaptive coping. Neff (2003a) further explains that students who experience academic failure enables them to see failure situations clearly without the loss of perspective that stems from excessive self-criticism and feelings of isolation. Neff, Hseih, and Dejjithirat (2005) study supported this idea when they found that students' who had recently failed a midterm exam further exhibited more adaptive ways of coping with the failure. Having to test the relationship of self-compassion and coping also addressed the issue on the call for more studies exploring how other factors would explain self-compassion. The validation study conducted by Neff (2003b) in the past looked at the divergence and convergence among the six factors. However, the present study only focused on how coping strategies would be a result of self-compassion. In the present study, this idea is tested by structuring a model where the factors of self-compassion should have significant effects on coping. More specifically, the factors of self-compassion should affect each factor of coping strategies.

The aim of the present study is to assess the factors structure of self-compassion. Once the factor structure is established, its contribution to further understand college students' coping strategies (problem and emotion-focused strategies and more so with avoidance oriented strategies) needs to be conducted.

The study aimed to address the following questions: (1) Are there relationships among the factors of self-compassion and the coping strategies of the Filipino-Chinese high school students when they are faced with difficulties and failures in their Math subjects? (2) Will the existing factor structure of self-compassion be supported by the data? (3) Which among the coping strategies are significantly predicted by self-compassion?

Method

Research Design

The study used a cross-sectional and non-experimental research design which utilized a correlational analysis to investigate the relationships of the variables, self-compassion and coping strategies. Self-report measures were also used in obtaining substantial data to determine the direct linkages of the variables.

Participants

The study involved 201 Filipino-Chinese high school students 129 boys (69%), 72 girls (31%) from first to fourth year levels enrolled at a Buddhist school. They were randomly selected from their Math classes. Initially, the students who participated in the study were asked to fill out the survey questionnaires after they were given orientation regarding the survey activities. The survey asked students whether they have experienced failing a recent exam. The students who admitted failure were the ones included in the study.

Measures

Self-Compassion Scale. The Self-Compassion Scale was developed by Neff (2003b) and is based on the Buddhist construct of self-compassion. The Self-Compassion Scale consists of 26 items. The SCS respondents indicate how frequently they have the experience described in each statement using a 5-point Likert scale from 1 (almost never) to 5 (almost always). Scores range from 0 to 5, with higher scores equaling more self-compassion. Self-compassion consists of three components. Each of the three components is measured by two factors, one of which is reverse scored. The six factors are self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. Items include: (1) *Self-kindness* - "I try to be loving towards myself when I'm feeling emotional pain" (2) *Self-judgment* - "When I fail at something important to me I become consumed by feelings of inadequacy." (3) *Common humanity*- "I try to see my failings as part of the human condition" (4) *Isolation* - "When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world" (5) *Mindfulness* - "When something upsets me I try to keep my emotions in balance." (6) *Over-identification* - "When I'm feeling down I tend to obsess and fixate on everything that's wrong." The internal consistency of the scale reported in the previous study was alpha =.94(Neff et al., 2005).

Coping Style (COPE Scale). The COPE scale was developed by Carver, Scheier and Weintraub's (1989) which contained 15 sub-scales and sixty (60) items. The responses being given is a 4-point scale of 1= "I usually don't do this at all", 2 = I usually do this a little bit, 3 = I usually do this a medium amount and 4 = I usually do this a lot.

The three scales showed evidence of convergent validity with the following: active coping=.62; planning=.80; suppression of activities=.68; restraint coping=.72; seeking social support (instrumental)=.75; seeking social support (emotional)= .85; positive reinterpretation=.68; acceptance=.65; turning to religion= .92; focus on and venting of emotions=.77; denial= .71; behavioral disengagement=.43, mental disengagement=.45 (Carver, Scheier, & Weintraub, 1989).

Data Analysis

The study employed descriptive statistics by determining the mean and the standard deviation to describe the respondents' age and the levels of their coping strategies and self-compassion. The Pearson r was also used to determine the relationships among the variables, the self-compassion scales and the three coping strategies, problem-focused, emotion-focused, and avoidance-oriented coping strategies.

Confirmatory Factor Analysis was conducted to test the six-factor model of self-compassion. The model would be sufficient if the covariances among the six latent factors will be significant and attain a positive estimate. The items were used as indicators for their respective latent constructs. The estimates of each item should likewise be significant. The fit of the hypothesized six-factor model were assessed by examining several fit indices including three absolute and one incremental fit index. The minimum fit function chi-square, the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR) are absolute fit indices. The chi-square statistic (χ^2) assessed the difference between the sample covariance matrix and the implied covariance matrix from the hypothesized model (Fan, Thompson, & Wang, 1999). A statistically non-significant χ^2 indicates adequate model fit. Because the χ^2 test is very sensitive to large sample sizes (Hu & Bentler, 1995), additional absolute fit indices were examined. The RMSEA is moderately sensitive to simple model misspecification and very sensitive to complex model misspecification (Hu & Bentler, 1998). Hu and Bentler (1998) suggest that values of .06 or less indicate a close fit. The SRMR is very sensitive to simple model misspecification and moderately sensitive to complex model misspecification (Hu & Bentler, 1998). Hu and Bentler (1998) suggest that adequate fit is represented by values of .08 or less. In addition, two incremental fit indices, the comparative fit index (CFI) and the Tucker-Lewis Index (TLI) were examined. The CFI and the TLI are moderately sensitive to simple model misspecification and very sensitive to complex model misspecification (Hu & Bentler, 1998). Hu and Bentler (1998) recommend a cutoff of .95 or greater for both the CFI and the TLI.

After establishing the factor structure of the self-compassion construct, its concurrent validity is further established by using coping strategies as its criterion. The final structure of self-compassion was used to predict the three factors of coping strategy (problem focused, emotion focused, and avoidant oriented). The same fit indices for the measurement model of self-compassion will also be used to assess the fit of the model for the concurrent validity.

Results

Descriptive statistics, such as the means, and standard deviations were used to determine students' responses on the measures used in the study. Reliability estimates were also established using Cronbach's alpha. The factors of self-compassion and coping strategies were intercorrelated. The six-factor model of self-compassion was tested to confirm its factor structure. Finally, concurrent validity of the self-compassion was established by testing whether it predicts the three factors of coping strategies.

Table 1
Descriptive Statistics for Self-compassion and Coping Strategies

Variables	<i>N</i>	<i>M</i>	<i>SD</i>	Cronbach's alpha
Coping Strategies				
Emotional-focused	201	2.78	.52	.85
Avoidance-oriented	201	2.37	.40	.83
Problem-focused	201	2.82	.49	.87
Self-compassion	201	3.24	.55	.87
Self-kindness	201	3.05	.74	.86
Self-judgment	201	3.44	.78	.81
Common humanity	201	3.34	.74	.88
Isolation	201	3.34	.73	.81
Mindfulness	201	3.15	.72	.82
Over-identification	201	3.17	.68	.86

Results showed that the measure for self-compassion had the highest mean ($M=3.24$, $SD=.55$). High mean scores were also obtained for the factors of self-compassion ($M=3.05$ to $M=3.44$). For coping strategies, the mean for problem-focused was the highest ($M=2.82$ and $SD=.49$). The measure for avoidance-oriented had the lowest mean ($M=2.37$, $SD=.40$). This indicated that the students' responses for the self-compassion scales showed they are moderately self-compassionate and their preference for their coping strategies indicated that they were more of problem-focused than emotional-focused.

To determine the degree of consistency of all items within the same construct, the reliability of the self-compassion scales' 26 items was also conducted. Results showed a Cronbach's alpha of .87, indicating a very high internal consistency of overall self-compassion items. Similarly, for emotion-focused, problem-focused, and avoidance-oriented, Cronbach's alpha are .85, .87 and .83, respectively.

Table 2 presents correlations between the self-compassion scales and the coping strategies of the respondents. As hypothesized, all the factors of self-compassion had a significant correlations with all the three subscales of coping strategies (emotion- focused, avoidance-oriented and problem-focused) at $p<.01$ level of significance. The correlations within the factors of each construct were also substantial and significant. Among the factors of self-compassion, negative correlations were obtained for the set of self-kindness, common humanity, and mindfulness with the set on self-judgment, isolation and over-identification. This further supports the divergent validity of the scales.

Table 2
Intercorrelations among the Factors of Self-compassion and Coping Strategies

	1	2	3	4	5	6	7	8	9
Coping Strategies									
1 Emotion-focused	---								
2 Avoidance oriented	.58**	---							
3 Problem-focused	.79**	.58**	---						
Self-compassion									
4 Self-kindness	.25**	.33**	.26**	---					
5 Self-judgment	.42**	.23**	.47**	-.39**	---				
6 Common humanity	.35**	.23**	.35**	.33**	-.61**	---			
7 Isolation	.30**	.24**	.40**	-.40**	.50**	-.52**	---		
8 Mindfulness	.33**	.36**	.41**	.35**	-.55**	.46**	-.58**	---	
9 Over-identification	.40**	.32**	.40**	-.50**	.47**	-.43**	.59**	-.66**	---

** $p < .01$

To further prove the proposed factor structure of self-compassion before further analysis is done, a Confirmatory Factor Analysis (CFA) needs to be conducted. The CFA was conducted to provide factorial validity of the self-compassion construct. A measurement model was constructed composed of a six-factor model. These latent variables are self-kindness, self-judgment, common humanity, isolation, mindfulness, and over identification. The indicators used are the items under each factor. The six latent constructs were intercorrelated because according to Neff (2003a) that the domains are related to establish factor convergence within self-kindness, common humanity, and mindfulness. Divergence was also expected for the three positive self-compassion scales with self-judgment, isolation, and over-identification. Significant parameter estimates should be produced to establish the relationship among the latent constructs. The hypothesized convergence needs to yield positive directions and the divergence should yield negative estimates. The components should have significant estimates as well in order to provide proofs of inclusion of the item for their respective latent constructs. The viability of the model as a whole is judged by examining the fit indices of the model.

In the six factor structure, all items had a significant estimate under each of their factor. All items significantly load under their specified factor. The intercorrelations among the six factors were all significantly correlated as well. The opposite factors of self-kindness, common humanity, and mindfulness which are self-judgment, isolation and over-identification, respectively, attained divergence as shown by the negative parameter estimates. There was also divergence within self-kindness, common humanity, and over-identification. The same convergence was also obtained within self-judgment, common humanity, and over-identification. The estimates for the correlations indicate high values. The factors of the model are strongly linked to each other indicating that they are within the same construct supporting the original concept of Neff (2003b) that the six factors engender one another. The six-factor structure was also supported where the data adequately fitted the model. The RMSEA=.08, $\chi^2=2.84$, CFI=.94, and TLI=.95 values all indicate support for the six factor model of self-compassion.

To further test the validity of self-compassion, concurrent validity with coping strategies as a criterion was conducted. Structural Equations Modeling was conducted to test whether the six factors of self-compassion would increase the variance of each of the three factors of coping strategy.

The results show that the effect of six factors of self-compassion on each factor of coping strategy was significant. More specifically, the effect of mindfulness and self-judgment had the highest explained variance on each of the coping strategies. Each factor of self-compassion contributes highly to emotion focused as compared to other factors of coping. The RMSEA=.06, $\chi^2=3.88$, CFI=.94, and TLI=.94 values indicate that the model attained a good fit.

Discussion

The assessment of self-compassion among Filipino-Chinese students provided support how self-compassion explains adaptive mental functioning factors. The present study achieved two things: (1) the six-factor structure of self-compassion was supported by the data coming from a Filipino-Chinese sample; (2) self-compassion strongly produces tolerance to stressful events by coping.

The assessment of the Filipino-Chinese sample supported the components of self-compassion. The support for the six-factor structure is consistent with the values and beliefs in their culture. For example, the Filipino-Chinese which are typically Asian are more fluid when they face arguments (Lun, Fischer, & Ward, 2010) and more complex in their beliefs about learning (Magno, 2010a). Their ability to integrate conflicts and complex cognitions allows them to be more forgiving and kind of themselves in the face of inadequacy. For example, a typical Asian would smile when they commit mistakes in order to cope well with the situation. They, relax themselves when faced with failures and takes time to try again. Asians remain silent when they experience confusion and takes time to clarify things out. These specific behaviors are indicators how Filipino-Chinese as Asians are self-compassionate.

Assessing the compassion of Filipino-Chinese student sample provide insights on key characteristics that allow them to cope when faced with difficulties in school. Having identified the students who have high levels of self-compassion are the ones who can tolerate specific challenges and difficult tasks provided. These students are flexible in the way they handle challenging and difficult situations. Authority figures in school need not worry about them too much because when faced with failures, these students are more understanding and kind of themselves.

It was found in the study that self-compassion is directly associated with the three sub-categories of the coping strategies such as emotion-focused, problem-focused, and avoidance-oriented coping strategies. The result showed that self-compassion was significantly associated with the tendency to cope with one's negative feelings by using all the three coping strategies. As opposed to Neff's study (2005), which showed that her self-compassion scales was only positively and significantly correlated with most of the sub-scales of the emotion-focused strategies, this study examined that this new psychological self-attitude construct may as well be considered as an important correlate of students' coping as shown by the direct and high correlations of self-compassion with all the three coping strategies.

Figure 1
Six-Factor Model of Self-Compassion

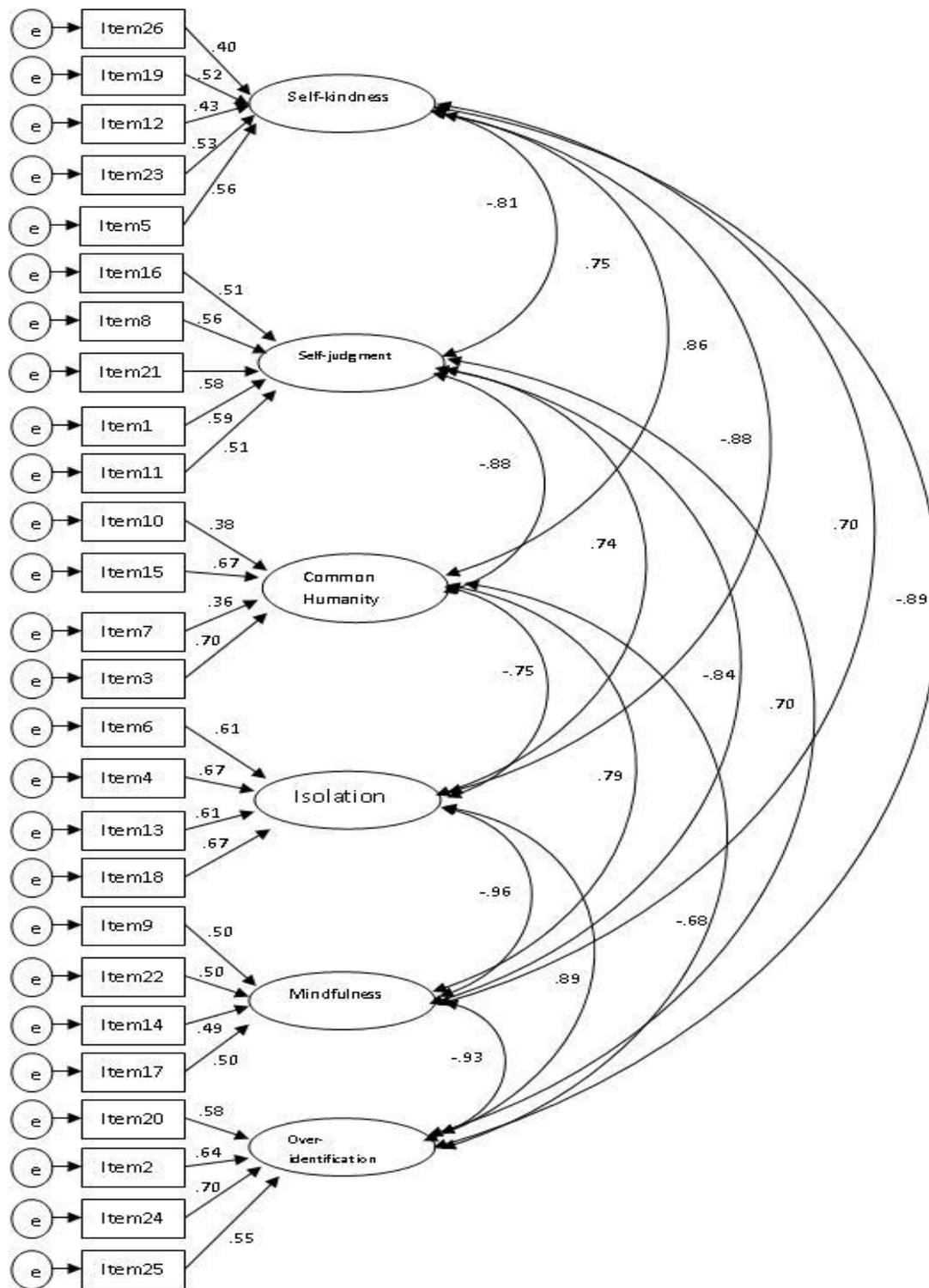
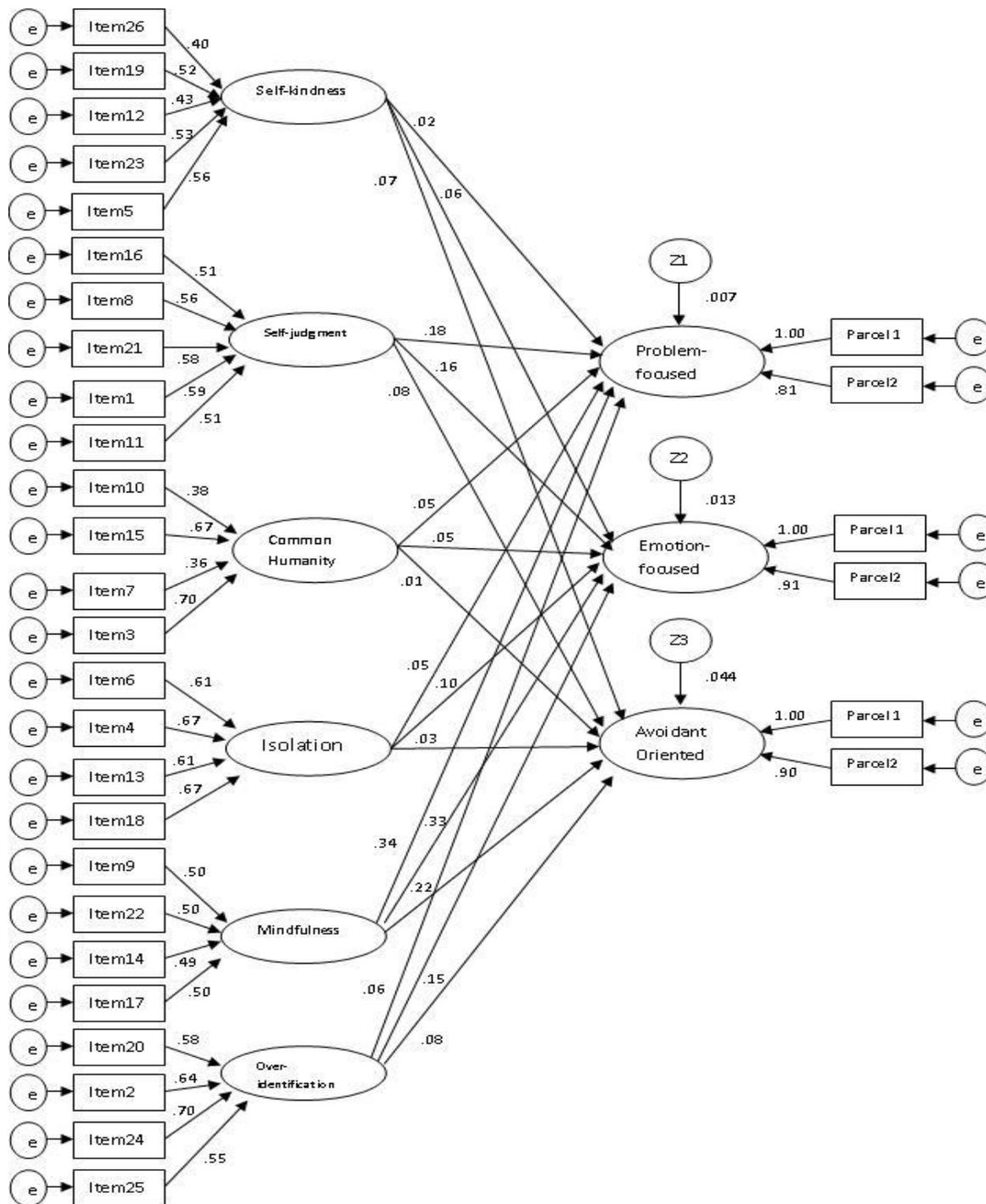


Figure 2
Concurrent Validity of Self-Compassion with Coping Strategies



The zero order correlations in the study showed that all factors of self-compassion and coping are significantly related. For problem focused, it supports Carver, Scheier, and Weintraub's (1989) report that students who adopt problem solving for their coping strategies resort to exerting efforts to remove the stressors by thinking how to confront their problems or avoid involvement in other activities in order to concentrate more completely on dealing with the stressor. Similar to Neff, Hseih, and Dejithirat's findings in 2005, in which self-compassion was found highly correlated with emotion-focused strategies, the respondents in this study also showed that they have the tendency to get emotional support from another and make the best of situation by growing from it or viewing the difficulty in a less negative light. Although the result of the current study showed self-compassion was also positively linked with avoidance-oriented coping strategy, as opposed to that of Neff's study (2007), it is to be noted that the students obtained the lowest mean in this factor. There is likely the possibility that some of the students preferred the use of denial, mental or behavioral disengagement as their way of coping.

The relationship between the factors of self-compassion and coping strategies forms a theoretical link that further explains how Asian students perceive difficulties. Asian students form an attribution of failure for themselves but they are not hard on themselves for the failure. Rather than engaging in harsh self-blame, understanding oneself allows them to cope better with the problem. The process in this theoretical link further explains how individuals become resilient and flexible when faced with difficulties. It also provides insight on explaining why others easily cope and the others find difficulty in coping.

The results in the SEM also showed that all six factors of self-compassion directly increase the variance on all three coping strategies. Primarily, there were no specific hypotheses forwarded regarding the effect of self-compassion factors on each coping strategy. However, self-knowledge, common humanity, and mindfulness even increased the explained variance for avoidant-oriented coping. This coping strategy entails avoiding problems rather than facing it which denotes a maladaptive behavior. Although it can be argued that avoidance is still a coping strategy that allows individuals to deal with perceived difficulties. It can be assumed that self-compassion factors are relevant for any type of coping strategy.

Another pattern that was observed in the link between self-compassion and coping strategies is that all six self-compassion factors tends to have higher explained variance for emotion-focused coping. The strong variance further supports the notion that self-compassion is present to handle some emotional disturbance and the best way to do this is by emotion-focused coping. Self-compassion helps facilitate the alternative interpretation of the attributions of failure so that emotional disturbances will be deactivated. In this way, self-compassion becomes a mechanism of deactivating the negative emotions.

It can also be seen in the link that mindfulness had the highest explained variance for all three coping strategies. This further supports the idea that mindfulness is the paramount characteristic of self-compassion where the idea of self-compassion started with the concept of mindfulness (see Neff, 2003b). Mindfulness involves keeping ones emotion in balance and in proper perspective. There are specific types of emotions that serve to ruminate ones cognition (see Magno, 2010b), however mindfulness serves to activate strongly all three strategies in coping which make it a strong predictor. Being able to manage well one's emotions through balance and keeping things in the proper perspective allows one to extensively use the three varieties of coping. Mindfulness as a strong predictor of coping extends the idea that students who are highly mindful on their emotions are more able to cope well.

The overall findings of the study reveal that when examining the association between self-compassion and coping, self-compassion was highly and positively linked with Asian students' ability to deal with their difficulty, failure or any negative events by using all the strategies, namely problem-focused, emotion-focused, and avoidance-oriented strategy. These findings help confirm that coping strategy is a substantial outcome of self-compassion. The findings further suggests that when students are highly self-compassionate, they may have the tendency to effectively adapt and deal with any form of failures by using the three coping strategies. When they treat any negative thoughts, feelings and events kindly, or with shared humanity, or in mindfulness, they will be able to actively confront or plan the process of overcoming the stressor (problem-focused); or make the best of the situation by growing from the problem or viewing the it in a less negative way, get emotional support from another (emotion-focused), and they may just disengage from the event by rejecting or denying the stressors (avoidance-oriented). However in this particular study, the sample seemed to prefer to use the problem-focused more based on mean estimates. This may be attributed to their ability to analyze and plan as to what action to take when they are confronted with difficulties rather than use their emotions. This is a typical characteristic of the Filipino-Chinese showing that they are more analytical than emotional.

Previous studies have shown that adaptive psychological functioning plays significant role in self-compassion. Those who experience ongoing difficulty develop internal resources thus, reframe their life's hardships and propel themselves toward the future by continually re-adjusting their life's circumstances. Self-compassion may be reflected in forms of coping strategies. The findings of the study can guide teachers, counselors, and school administrators to discover and understand how students can cope with failures in their subjects and how positive attitudes can be encouraged and developed. Further assessment of self-compassion helps teachers to better understand students with difficulties.

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Structural Validation of the 3 X 2 Achievement Goal Model

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Abstract In the past two decades, the achievement goal construct has been one of the most studied variables in the area of students' achievement motivation. From the initial conceptualization of achievement goals as a dichotomy (Ames, 1992; Ames & Archer, 1988) to its expansion as a *trichotomous model* (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) and as a *2 x 2 model* (Elliot & McGregor, 2001), the literature has seen the proliferation of empirical studies on the structure, antecedents, and consequences of achievement goals in the academic domain. The importance given to the construct can be attributed to the premise that achievement goals, defined as "competence-based aim that guide behaviour" (Elliot, Murayama, & Pekrun, 2011, p.632), may shape or influence achievement-related, as well as learning-related outcomes. Recently, a *3 x 2 achievement goal model* was proposed and empirically tested by Elliot and colleagues to significantly advance the conceptualization of achievement goals. At the core of the new model is differentiating achievement goals as *task-based*, *self-based*, and *other-based goals* in terms of definition and as *approach* and *avoidance goals* in terms of valence. This study investigated the structural validity and cross-cultural generalizability of the 3 x 2 achievement goal model by examining the achievement goals of Filipino undergraduate students using the 3 x 2 Achievement Goal Questionnaire (Elliot et al., 2011).

Keywords: AGQ, Achievement Goal Model, undergraduate students

Overview of the Achievement Goal Models

The construct *achievement goal* traced its roots from a number of theorists who were focused on determining what types of goals students adopt in relation to achievement in the academic domain. Early in its conceptualization in the 1980s, two dominant definitions emerged: achievement goal as the purpose for achievement behavior *and* achievement goal as an orientation toward achievement tasks (see Elliot & Trash, 2001, for a comparison and analysis of these two perspectives). In addition, achievement goals have been conceived as a dichotomy. At the onset, several conceptual labels of this dichotomy emerged but conceptualizing them as mastery and performance goals (Ames & Archer, 1988) became widely accepted. In *mastery goals*, the purpose is the development of a competence with a task-based standard for competence evaluation while in *performance goals* the purpose is the demonstration of competence with a normative standard for competence evaluation (Elliot & Trash, 2001). Many researchers who reviewed the literature on achievement goals noted

considerable evidence that point to the adaptive effects of mastery goals and the negative effects of performance goals on a host of achievement and learning-related behaviors (e. g., Ames, 1992; Harackiewicz & Elliot, 1993). The view that mastery goals lead to adaptive responses and performance goals lead to maladaptive responses is known as the *mastery goal perspective*. This perspective “implies that individuals are best off exclusively focusing on mastery in their achievement pursuits” (Barron & Harackiewicz, 2001, p. 707).

In the 1990s, Elliot and Harackiewicz (1996) proposed an expansion of the dichotomous model of achievement model by incorporating the approach-avoidance distinction in the original model. Specifically, a revision in the model was proposed by maintaining the mastery goal construct and partitioning the performance goal construct into two: *performance-approach* and *performance-avoidance goals*. The former is directed toward the demonstration of competence or success while the latter is directed at avoiding the demonstration of incompetence or failure (Elliot, 1999). This is referred to as the trichotomous achievement goal model and central to this revised model are the assumptions that performance-approach and performance-avoidance goals are distinct and separate achievement orientations and that performance-approach and mastery goals both represent approach orientations (Elliot, 1999; Elliot & Harackiewicz, 1996). Empirical findings provided support for the model. For example, Elliot and Harackiewicz (1996) examined the predictive utility of the model in the intrinsic motivation domain. Results from two experiments conducted by the researchers supported the notion that only performance-avoidance goals undermined intrinsic motivation providing support to the instrumentality of making a distinction between performance-approach and performance-avoidance goals.

Elliot and Church (1997), on the other hand, were able to demonstrate in their study that mastery, performance-approach, and performance-avoidance goals differ in terms of their antecedents and consequences. Specifically, achievement motivation and high competence expectancies were found to be antecedents of mastery goals while fear of failure and low competence expectancies were linked to performance-avoidance goals. Moreover, achievement motivation, fear of failure, and high competence expectancies were the antecedents for the performance-approach goals. In terms of the consequences of the three goals, findings revealed that mastery goals have a positive influence on intrinsic motivation but were not predictive of grades. On the other hand, performance-approach goals have a positive influence on grades but were not predictive of intrinsic motivation while performance-avoidance goals have a negative influence on both grades and intrinsic motivation. Overall, the findings provided support for the usefulness of revising the achievement goal model into a trichotomous framework.

In the previous decade, Elliot and McGregor (2001) proposed a further revision of the achievement goal model by highlighting the need to conceptualize achievement goals in terms of the *definition* (absolute/intrapersonal and normative) and *valence* (positive and negative) dimensions of competence. Thus, the 2 x 2 achievement goal model was forwarded wherein the construct of *mastery-avoidance goals* which focus on “avoiding task-based or intrapersonal incompetence” (Cury, Elliot, Da Fonseca, & Moller, 2006) was added to the three achievement goal constructs defined by the trichotomous model. Using Confirmatory Factor Analysis (CFA) and regression analyses in three separate studies, Elliot and McGregor (2001) were able to provide support to the structural validity of the four achievement goal construct, as well as evidence on the distinct antecedents and consequences of the four achievement goal constructs in relation to a host of variables like self-determination, deep processing, worry, fear of failure, and overall need for achievement. In addition, in the same

study, it was found that mastery-avoidance goals tend to be more associated with negative outcomes compared to mastery-approach goals but were less deleterious compared to performance-avoidance goals. These findings provided support to the usefulness of the 2 x 2 achievement goal model.

The 3 x 2 Achievement Goal Model

At the onset of their introduction of the 2 x 2 model, Elliot and McGregor (2001) already argued for a 3 x 2 conceptualization of the achievement goal framework. This is based on the premise that the absolute and intrapersonal definitions of competence can be separated conceptually which then may entail separate goals. More recently, Elliot et al. (2011) formally proposed a revision of the achievement goal construct by arguing a need for a 3 x 2 model. Central to this model is the separation of task-based (absolute) and self-based (intrapersonal) definition of competence which led to the partitioning of the mastery goal construct into *task-based goals* and *self-based goals*. For task-based goals, “competence is defined in terms of doing well or poorly relative to what the task itself requires” while in self-based goals “competence is defined in terms of doing well or poorly relative to how one has done in the past or has the potential to do in the future” (Elliot et al., 2011, p.633). For conceptual consistency, performance goals are renamed as *other-based goals* wherein “competence is defined in terms of doing well or poorly relative to others” (Elliot et al., 2011, p. 633).

Crossing the three competence definitions with the two ways competence are valenced (approach-based goals and avoidance-based goals) yield a 3 x 2 achievement goal model consisting of six distinct achievement goals. Elliot et al. (2011, p. 634) provided the following definitions for the six achievement goals: (1) “a task-approach goal focused on the attainment of task-based competence (e. g., “Do the task correctly”),” (2) “a task-avoidance goal focused on the avoidance of task-based incompetence (e. g., “Avoid doing the task incorrectly”),” (3) “a self-approach goal focused on the attainment of self-based competence (e. g., “Do better than before”),” (4) “a self-avoidance goal focused on the avoidance of self-based incompetence (e. g., “Avoid doing worse than before”),” (5) “an other-approach goal focused on the attainment of other-based competence (e. g., “Do better than others”),” and (6) “an other-avoidance goal focused on the avoidance of other-based incompetence (e. g., “Avoid doing worse than others”).”

Using the 3 x 2 Achievement Goal Questionnaire, Elliot et al. (2011) investigated the structural validity of the 3 x 2 achievement goal model in two studies and findings provided data supporting the 3 x 2 structure of achievement goals among German (Study 1) and American (Study 2) undergraduate students. In both studies, CFA provided support for the 3 x 2 achievement goal model while supplementary analyses showed that the 3 x 2 achievement goal model was superior to alternative models (e. g., 2 x 2, trichotomous). In both studies, the six achievement goals were also significantly and positively correlated with each other. Furthermore, findings on the antecedents and consequences of the six achievement goals in Study 2 provided support on the predictive utility of the 3 x 2 achievement goal model. One interesting finding is that while task-based and self-based goals have the same antecedents, they were related to different consequences. These particular findings provided further evidence on the need to conceptualize the task-based aspects and self-based aspects of mastery goals as separate and distinct achievement goals.

The Present Study

As in most psychological constructs, the viability of the achievement goal construct outside of the Western environment has been examined. In studies involving Asian students, findings point to the applicability of the achievement goal construct among Asians but certain differences on how achievement goals operate or function among Asian students as compared to their Western counterparts were noted (e. g., Bernardo, 2008; Chang & Wong, 2008; Ho & Hau, 2008; Tao & Hong, 2000). Such differences are usually explained in terms of the cultural differences between Western (i. e. American) and Asian students. For example, Bernardo and Ismail (2010) described that many Asian researchers argue that achievement goals have different meanings with Asian students. Hence, it may be important to examine the structural validity of the 3 x 2 achievement goal model among Asian students, and Filipino students in particular. This is consistent with the recommendations of Elliot et al (2011) to extend the focus of studies on the 3 x 2 achievement goal model beyond Western countries.

In my review of the literature, I have come across only one published study that primarily aimed to validate the achievement goal construct among Filipino students (Dela Rosa, 2010). In this study, the structural validity of the 2 x 2 achievement goal model among Filipino high school students was examined using exploratory factor analysis (EFA) and CFA. Findings from the EFA revealed only three factors: mastery-approach, performance-approach, and avoidance goals (mastery-avoidance and performance-avoidance items loaded on the same latent factor). Dela Rosa reported that the CFA confirmed the findings of the EFA and that the data did not satisfy most of the criteria for a good fitting model. In sum, the structure of the 2 x 2 achievement goal model was not confirmed in the study. It would be interesting to determine if similar or different findings may be revealed in examining the structural validity of the 3 x 2 achievement goal model among Filipino students.

Method

Participants and Procedure

The participants in the study are 350 (84 male and 266 female) first-year undergraduate from a university in Manila, Philippines. The participants (mean age = 16.95; SD = 2.17) were selected through purposive sampling and were currently enrolled in a mathematics class during the period of the data gathering. Data gathering occurred during the participants' fourth week on the course. Participants completed the achievement goal questionnaire in group sessions. The participants were informed that the data from the questionnaire will only be used for research purposes and that individual data would remain private and confidential.

Instrument

The 3 x 2 Achievement Goal Questionnaire (AGQ) by Elliot et al. (2011) was adopted in the present study. The AGQ is an 18-item instrument that was designed to assess each of the six achievement goals in the context of achievement in an exam. The AGQ has six subscales corresponding to the six achievement goals. Each goal is represented by three items. The items were reworded so that all of the 18 items would pertain to the students'

mathematics course (the original instrument pertains to a psychology course). Adopting the instructions provided by Elliot et al in their study, participants were informed that they would be responding to statements that represent types of goals that they may or may not have for their mathematics course. The participants responded to the instruments using a 7-point Likert-type scale which range from 1 (*not true of me*) to 7 (*extremely true of me*). In the present study, the Cronbach's alpha values of the six subscales ranged from .79 to .90 and the Cronbach's alpha value for the full instrument is .93, suggesting that the AGQ and its six subscales are reliable measures.

The following are sample items from the AGQ: "To get a lot of questions right on the exams in this class" (task-approach); "To avoid missing a lot of questions on the exams in the class" (task-avoidance); "To do better on the exams in this class than I typically do in this type of situation" (self-approach); "To avoid doing worse on the exams in this class than I normally do on these types of exams" (self-avoidance); "To do better than my classmates on the exams in this class" (other-approach); "To avoid doing worse than other students on the exams in this class" (other-avoidance).

Data Analysis

Descriptive statistics (means, standard deviations), internal consistencies, and intercorrelations of the achievement goals in the study were determined using the software Statistical Package for the Social Sciences (SPSS) Version 16. To establish structural validity, a CFA using structural equation modeling technique was conducted on the achievement goal items using the software AMOS Version 16. In the CFA, the structure of the participants' achievement goals was examined by determining if items load on their respective latent trait (e. g. task-approach goal) and by determining if the overall structure of the hypothesized 3 x 2 model meets the criteria for a good fitting model. CFA was also used to compare the hypothesized model with alternative models.

The goodness of fit of the hypothesized model was tested using the following indexes: chi square (χ^2), chi-square to degrees of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and the root mean square of approximation (RMSEA). The Akaike Information Criterion (AIC) and the Browne-Cudeck Criterion (BCC) were used to compare the hypothesized model with alternative models. To evaluate the model fit, χ^2 should not be significant ($p > .05$), χ^2/df should be less than two, CFI and TLI should at least be .90, and the RMSEA should not be higher than .08. In terms of the AIC and BCC, lower values suggest a better fitting model.

Results

Confirmatory Factor Analysis

The results from the CFA showed that all of the items loaded significantly into their respective latent traits and that standardized factor loadings ranged from moderate to strong (.65 to .88). The CFA also indicated a good fitting model. The fit indexes were: χ^2 (120, $N=350$) = 301.28, $p < 0.00$; $\chi^2/df = 2.51$; CFI = .95, TLI = .94, RMSEA = 0.066. In sum, the results provide support for the hypothesized model.

Descriptive Statistics, Internal Consistencies, and Intercorrelations

Descriptive statistics show that the participants have the highest mean scores in the self-based goals (self-approach and self-avoidance goals) and the lowest mean scores in the other-based goals (other-approach and other-avoidance goals). The latter findings share similarities with the findings of Elliot et al. (2011) where German and American students also had their lowest mean scores in the other-approach and other-avoidance goals. However, unlike the Filipino students of the present study, the German and American students in the study of Elliot et al. had their highest mean scores in the task-based goals (task-approach and task-avoidance).

In terms of reliability, each of the six achievement goals demonstrated a high level of internal consistency and the values approximate the internal consistencies of the six achievement goals reported by Elliot et al. in their study. Moreover, intercorrelations of the six achievement goals reveal that all the achievement goals have moderate but significant and positive relations with one another, which is also consistent with the results reported by Elliot et al. Table 1 provides the descriptive statistics and internal consistencies of the six achievement goals; Table 2 provides the intercorrelations among the six achievement goals.

Table 1
Descriptive Statistics and Internal Consistencies

Variable	<i>M</i>	<i>SD</i>	Cronbach's α
Task-approach goals	4.82	1.35	.79
Task-avoidance goals	4.85	1.33	.84
Self-approach goals	5.33	1.21	.85
Self-avoidance goals	5.14	1.25	.83
Other-approach goals	3.99	1.52	.86
Other-avoidance goals	4.84	1.46	.90

Table 2
Intercorrelations among the Achievement Goal Variables

Variable	1	2	3	4	5	6
1. Task-approach goals	--	.68**	.60**	.55**	.45**	.51**
2. Task-avoidance goals		--	.62**	.59**	.43**	.50**
3. Self-approach goals			--	.61**	.40**	.44**
4. Self-avoidance goals				--	.42**	.52**
5. Other-approach goals					--	.64**
6. Other-avoidance goals						--

** $p < 0.01$

Comparison with Alternative Models

Following the analytic procedure conducted by Elliot et al. (2011), the 3 x 2 achievement goal model was compared with alternative models by conducting a series of CFA to examine the fit of eleven alternative models (I examined an eleventh alternative model in addition to the ten alternative models investigated by Elliot et al.). These models are the following: (a) a 2 x 2 model, (b) a *Trichotomous* model, (c) a *Dichotomous* model, (d) a *Task-approach/Task-avoidance (Tap/Tav)* model, (e) a *Self-approach/Self-avoidance* model (*Sap/Sav*), (f) an *Other-approach/Other-avoidance model (Oap/Oav)*, (g) an *Approach* model, (h) an *Avoidance* model, (i) a *Definition* model, (j) a *Valence* model, and (k) a *Goal* model. The first ten alternative models (a to j) were conceptualized and examined in accordance to the models' conceptualization as described by Elliot and colleagues (for a full description of the alternative models, see Elliot et al., 2011, p. 636). In the *Goal* model, which I added as an alternative model, all items were made to load on one single latent factor. As can be seen in Table 3, model comparison using the AIC and BCC values indicates that the 3 x 2 model provided a better fit to the data than any of the eleven alternative models examined. The 3 x 2 model also has the lowest χ^2 and χ^2/df values among the models tested, providing additional evidence that the 3 x 2 model is a better fitting model than any of the alternative models. Another interesting finding is that the 2 x 2 model did not provide adequate fit for the data which is somehow consistent with the findings of Dela Rosa (2010).

Table 3
Fit Statistics of the 3 x 2 Achievement Goal Model and Alternative Models

Model	χ^2	<i>df</i>	χ^2/df	CFI	TLI	RMSEA	AIC	BCC
3 X 2 model	301.28	120	2.51	.95	.94	.066	439.284	447.229
2 x 2 model	570.08	129	4.42	.89	.87	.099	690.079	696.988
Trichotomous model	619.17	132	4.69	.88	.86	.103	733.170	739.733
Dichotomous model	832.77	134	6.22	.82	.80	.122	942.772	949.105
Tap/Tav model	338.30	125	2.71	.95	.93	.070	466.304	473.674
Sap/Sav model	459.51	125	3.68	.92	.90	.088	587.509	594.879
Oap/Oav model	516.46	125	4.13	.90	.88	.095	644.457	651.827
Approach model	861.80	129	6.68	.82	.78	.128	981.802	988.712
Avoidance model	868.64	129	6.73	.81	.78	.128	988.640	995.549
Definition model	709.72	132	5.38	.85	.83	.112	823.724	830.288
Valence model	1,353.23	134	10.10	.69	.65	.161	1,463.227	1,469.561
Goal model	1,395.63	135	10.34	.68	.64	.164	1,503.633	1,509.851

Discussion

The purpose of the present study is to examine the achievement goals of Filipino students within the 3 x 2 achievement goal framework. There are several important findings in this study. First, the structure of the 3 x 2 achievement goal model was confirmed among the participants of this study. This means that the 3 x 2 achievement goal model is structurally valid among Filipino undergraduate students. In other words, the Filipino students' achievement goals may be described as task-approach, task-avoidance, self-approach, self-avoidance, other-approach, or other-avoidance goals.

In general, the present study provide empirical support to the arguments of Elliot et al. (2011) on the need to revise the way we conceptualize achievement goals, specifically on the separation of task-based and self-based goals which is not provided for by the dichotomous, trichotomous, and 2 x 2 models. Hence, it is reasonable that future studies and educational interventions on Filipino students' achievement goals be contextualized within the 3 x 2 achievement goal framework. Previous studies on Filipino students' achievement goals and their correlates, antecedents, and consequences can be re-examined in light of the 3 x 2 model. For example, Bernardo and Ismail (2010) reported that Filipino students tend to have higher level of mastery goals compared to Malaysian students. It would be interesting to determine if Filipino students will also have higher levels in the task-based goals and self-based goals than their Malaysian counterparts or not. Given that the present study replicated the findings of Elliot et al. (2011), this study provides some evidence on the cross-cultural generalizability of the 3 x 2 model and it is indeed encouraging to examine the validity and utility of the 3 x 2 model with other Asian samples (e. g., Korean, Singaporean) if the same structure will be found among such samples.

The second important finding pertains to the Filipino students' achievement goals levels as depicted by their mean scores in the six achievement goals and their intercorrelations. It is interesting to note that the Filipino students' reported higher levels of self-based goals than task-based goals and other-base goals. This may suggests that Filipino students tend to adopt a self-based standard of the evaluation for their competence. It would be important to investigate if Filipino students do endorse self-based goals more than task-based and other-based goals by conducting more studies that seek to determine the achievement goals of Filipino students within the 3 x 2 model and by conducting studies that seek to compare Filipino students' achievement goals with the achievement goals of students from Western and other Asian countries.

The results of the intercorrelations of the six achievement goals which show that the six goals are significantly and positively related is not surprising as the same results were obtained by Elliot et al. (2011). One may be tempted to suggest that these findings is an evidence that the participants of the present study endorsed multiple goals but it is more likely that the intercorrelation values were inflated as a result of the AGQ items sharing common foci and being worded in a highly similar fashion (see Elliot et al, 2011, p.642; see also sample items in Method section). Indeed, Elliot et al. were able to document the distinct antecedents and consequences of the six achievement goals even though the six goals were significantly and positively related in their study. Hence, the findings in the present study that the six achievement goals are positively and significantly related do not invalidate the assumptions of the 3 x 2 achievement goal model on the separation and distinctiveness of the six achievement goals.

One important implication of the study of Elliot et al. and the present study is on the need to revisit existing measures of achievement goals that were designed within the dichotomous, trichotomous, or the 2 x 2 achievement goal framework. It is of theoretical and practical significance that these measures be revised to fit the 3 x 2 achievement goal model. Obviously, it is also important to develop new psychometric measures to assess an individual's achievement goals within the 3 x 2 model. A noteworthy endeavor is to revise the current 3 x 2 AGQ so the items will pertain to achievement tasks other than taking an exam in a course or rewording the items to avoid response sets that may affect the statistical properties of the variables being measured. As argued by Elliot et al. (2011), "an important avenue for future research is to examine various sets, response formats, and perhaps even

item wordings that may afford a cleaner and more sensitive assessment of the 3 x 2 achievement goals” (p. 642).

The revision of theories is necessary and important. Given the findings that the 3 x 2 achievement goal model is a valid way of conceptualizing the achievement goals of Filipino students, it is necessary to replicate or confirm the findings of this study with similar or different student samples (e. g., high school students) to further provide evidence on the structural validity of the 3 x 2 achievement goals. It would also be a worthy endeavor for psychometricians and researchers of the achievement goal construct to begin conceptualizing their research and instrument development within the 3 x 2 achievement goal framework and for the predictive utility of the 3 x 2 model among Filipino students to be examined and established. I do hope that with the 3 x 2 achievement goal model, we will have a clearer and fuller understanding of the psychological processes involved in the achievement motivation of Asian students in general, and Filipino students in particular.

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Exploring Adolescent Cyber Dependency: Conceptualization and Measurement

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Abstract The purpose of this study is to conceptualize cyber dependency and construct a non-diagnostic scale that would measure the impact of Internet misuse. The study was based on the Internet addiction scale of Young (1996). From the said framework, exploratory factor analysis was used to identify data driven Filipino based factors, 8 factors were hypothesized and 103 items were developed and reviewed by an expert and group of students. Preliminary items were reduced into 98 and were administered to college students ($N=320$). The results showed reduction of factors, wherein, lack of time management, detachment from primary social groups, escapism, neglecting personal tasks and preoccupation remain. The revised version containing 53 items were used for further development of the scale. A confirmatory factor analysis ($N=803$) was used to check the scale's measurement fitness. Provision towards validation of the scale and counseling implications were discussed.

Keywords: *cyber dependency, Internet, exploratory factor analysis, confirmatory factor analysis, psychological test development*

Introduction

The Internet was developed because of the visionary thinking of the people during the 1960's. They saw that computers have a great potential in giving and sharing research information that leads to developing science.

With these discoveries and developments, the Internet is now leading in the digital industrial revolution. It cannot be helped that many people engage in too much Internet use. It is the cheapest entertainment and leisure that every people can have even if they are just at home. The internet can have a powerful psychological impact on some people's lives as its use can sometimes be addicting. A couple of articles and discussion show that heavy internet use can affect the lives of internet users because of loss of control and escapism. Examples of the effects on internet users are falling out of school, splitting up relationships and receiving hospital treatment. Internet misuse is defined as when internet usage affects daily living. (Egger & Rauterberg, 1996; Greenfield, 2000).

Ivan Goldberg coined the term "Internet Addiction Disorder" (Egger & Rauterberg, 1996). Internet addiction can also be defined as an impulse-control disorder that does not involve inhibited drugs (Young, 1998).

This paper describes the development of a scale to measure the cyber dependency of adolescents. The study is important because research shows that Internet can also have a negative impact on academic performance, family relationships, and emotional state of adolescents. The authors hypothesized that the scale developed and proposed in this paper would demonstrate good internal consistency and reliability and thus, adequately measuring the impact of internet misuse among adolescents.

The eight sub factors, mainly diagnostic items that constitute addiction were lifted from the DSM IV (Young, 1996). On her research, "Internet Addiction: The Emergence of a New Clinical Disorder", in this study she developed an eight item Diagnostic Questionnaire (DQ), that serves as an instrument to screen for addictive Internet use. Respondents who answered "yes" to five or more of these questions were classified as an addicted Internet user.

DQ: (1) Do you feel preoccupied with the Internet (think about previous on-line activity or anticipate next on-line session)? (2) Do you feel the need to use the Internet with increasing amounts of time in order to achieve satisfaction? (3) Have you repeatedly made unsuccessful efforts to control, cut back, or stop Internet use? (4) Do you feel restless, moody, depressed, or irritable when attempting to cut down or stop Internet use? (5) Do you stay online longer than originally intended? (6) Have you jeopardized or risked the loss of significant relationship, job, educational or career opportunity because of the Internet? (7) Have you lied to family members, therapist, or others to conceal the extent of involvement with the Internet? (8) Do you use the Internet as a way of escaping from problems or of relieving a dysphoric mood (e. g., feelings of helplessness, guilt, anxiety, depression)? (Young, 1996, pp. 238-239)

Young also examined other problems that are caused by internet addiction. There were five categories of the problems: academic, relationship, financial, occupational, and physical. The categories were arranged according to which category has the most number of problems.

Shaffer, Hall, and Vanderbilt (2000) said that the conceptual framework of addiction was used to examine the problems related to internet use. The idea of addiction has been applied to many and varied human activities. The public began to view the Internet as a mainstream communication in 1995. Researchers have estimated that there are 20-25 million Internet users in the mid-1990s and approximately 100 million in 1997. The new computer

technologies have made access to computer-based information easy and ordinary. The growth of internet use drew attention to the concern that addiction to this new technology and its excessive use may give rise to new psychological disorders. An example is the users' loss of control with internet usage which in turn may lead to adverse consequences. Specifically neglecting the family, work, or school obligations because the users devote more time checking their e-mails, participating on chat rooms or surfing the web.

In the study of Ko et al. (2009), "Predictive Values of Psychiatric Symptoms for Internet Addiction in Adolescents: A 2-Year Prospective Study" they used the Chen Internet Addiction Scale (CIAS) in assessing their participants. The CIAS contains 26 items on a 4-point Likert scale with a scoring range of 26 to 104. The internal reliability of the scale and its subscales ranged from 0.79 to 0.90. According to the CIAS diagnostic criteria of internet addiction, the score of 64 has the highest diagnostic accuracy. Consequently, subjects with scores of 64 or higher were categorized as the Internet addiction group in their study.

In "Problematic Internet use or Internet addiction?" (Yellowlees & Marks, 2007), the syndrome indicating internet addiction are the following: extreme preoccupation with using the internet, too much amount of time spent online, uncontrollable use of the internet, difficulty in controlling the time spent on the internet, feeling that the world outside of the internet is boring, becoming irritated if bothered while online, decreased social interaction with "real" people, and increased isolation and depression. Young (1996) also observed that people can also be addicted to various internet applications (i. e., online gambling, shopping, or chatting) and not on the internet or medium itself. Young's original criteria for internet addiction was modified to problematic Internet use because it categorizes the "disorder" more appropriately.

Counselors and psychologists in the Philippines even suggested that the improper use of the internet should be under impulse control disorder not otherwise specified with excessive internet use. Some also hypothesized that students are more prone to developing problematic internet use because for most of them, online access is free and available all the time. These students will most likely prefer online activities rather than sleeping and attending classes.

Toronto (2009) said that the Internet presents a substitute for the real world. It also allows people to interact and communicate with ease. Across boundaries and time, people can interact and satisfy their pleasure of connecting with friends and loved ones. The present generation has fully accepted the "unreal" world that the internet offers through blog, social networking sites, internet games and even pornography. People are more likely to have less satisfying relationships and social functioning if they are overly preoccupied with the virtual world. Too much preoccupation with the virtual world may lead to internet addiction and dependency. It further results to impairment in academic and social activities. In addition, with just a few clicks of the mouse people are able to escape their real emotions and may impair development of having true relationships with other people. Furthermore, the internet can be the source of support and venue to repair for past unavoidable failures of a person. The internet is a way for people to reconstruct themselves since the Internet is an unsecured human relatedness wherein only a few really knows who you are. In this case, people build a sense of completeness that enables them to move on with life.

Sheldon (2008) conducted a survey with 172 students in a research university to examine how unwillingness-to-communicate in inter-personal communication influences satisfaction sought and obtained from Facebook use. The main purpose of social networking, as indicated in the study, is to make new friendships or to maintain those who already exist.

This study of Sheldon investigated the relationship of the unwillingness-to-communicate and the different motives of Facebook users. It also examined the relationship between communication and the behavioral and attitudinal outcomes of Facebook use.

Willoughby (2008) said that excessive internet use has different impacts on people depending on regularity of their internet use. He said that there are some applications on the internet that enhance social and family relationships. In contrast, there are also internet applications that bring violence and detachment from social groups because of internet misuse. In his study, he found that internet use can improve cognitive functioning. However, the result of the same study showed that too much internet use can influence a student to have poor academic standing. It is primarily because its use is prioritized more than studying. Also, negative parental relationships may also cause the excessive use of the internet among adolescents. It was also observed that people with moderate internet use exhibited stronger friendship bonds than those who use the internet excessively and those who do not use the internet at all. Moderate users have better academic standings than the extreme users of the internet.

Kraut et al. (1998) found that some people with internet access at home tend to neglect to go to church, attend parties, and may tend to have less participation because they are preoccupied in their internet use. However, they said that internet used for communicating with significant people may help sustain and nurture long distance relationships. Depression is one of the consequences of internet misuse because people tend to be active in online social communications but would also tend to decline in social participations among friends and family. They also said that internet misuse can lead to poor psychological well-being since people tend to stay up in the internet even if there's no reason for them to stay online. In addition, depression is very rampant among internet users. Prolonged internet use may promote laziness and sedentary lifestyle. In addition, it was also observed that when people use the internet for a long time, they tend to forget their responsibilities.

Van den Eijnden et al. (2008) on the other hand, argue that the internet can also have positive effects on people who use it. The internet does not always give bad consequences because it can also be the source of social online support and it can connect people more easily than the traditional snail mails. Also, the internet is the safest and easiest place to make friends because having social skills may not be required at all. However, too much internet use may also cause the depletion of psychosocial well-being of a person. A person may feel bad when one is not able to use the internet. Another is that the internet becomes the escape for people's depression and loneliness. Excessive internet users end up using the internet longer than they originally intended to. Internet is said to be attractive in the eyes of isolated people because they can change their profiles making them look nicer to other people. On the negative side, the internet can destroy real communication and can deter the development of strong relationship connections among family and friends. It can also cause depression because people may feel isolated from the world and from the community.

According to Shapira et al. (2003), a report from the Commerce Department's National Telecommunications and Information Administration and Economics and Statistics Administration in the United States of America, show that computer and internet access increased from December 1998 to August 2000. Internet usage worldwide also expanded rapidly and as this expands, problematic behaviors related to this application also increased. Overall, the problematic use of internet could be characterized by the inability to control

internet use. This problem may lead in turn to distressed feelings and to the functional impairment of daily activities.

A study of Kraut et al. (1998) as cited in Shapira et al. (2003) indicated that there is an association between a person's increased internet usage and his/her withdrawal from family activities. The internet can therefore provide a false sense of interaction which may result to the isolation of individuals from their peers and from any social interactions. Milani, Osualdella, and Di Blasio (2009) conducted a research about adolescents' problematic internet use and the quality of their interpersonal relationships. The study shows that adolescents appeared to be attracted to communication technologies that offer them the opportunity to interact with others to experience that sense of social acceptance and community. Milano et al. administered three test instruments namely: Internet Addiction Test, Test of Interpersonal Relationship and Children's Coping Strategies Checklist, to 98 adolescent participants. The Child Behavior Checklist was administered to the parents of the participants. From the administered tests, 36.7% of the adolescents showed signs of Problematic Internet Use or PIU, the participants' responses fall within the global interpersonal relationships index, avoidance coping and active coping. Lastly, the study showed that the adolescents use of the internet for many hours, may lead to problematic interpersonal relationships and to dysfunctional coping strategies.

The aim of the study is to construct a scale and conceptualize cyber dependency. With the scale that would measure the impact of internet misuse, the authors will make the adolescents aware of their condition and may be able to help stop the growing number of adolescents who misuse the internet or is dependent on it. By measuring the impact of internet misuse, it will be easier to identify the necessary and appropriate treatment or intervention for their particular concern. The proposed scale is different from the ones in the literature because this scale is non-diagnostic.

Method

Purpose and Preliminary Item Development

There were eight hypothesized factors based from the literature of Young (1996): losing track of time, preoccupation, isolation, escapism, trouble completing tasks, change in behavior and loss of control. Losing track of time is defined as using the internet longer than the person thought; the minutes turn to hours. Preoccupation means the person thinks about the internet while he/she is offline. Isolation is when the social life of the person is suffering because he/she prefers being online than being with his or her friends and family. Escapism is the compulsion to cheer one's self up by surfing the web. Trouble completing tasks is when one is too busy online that he/she neglects his or her school work or chores. Change in behavior is when the person feels restless, moody, depressed and irritable when attempting to cut down internet use. Loss of control is when one cannot manage and stop the use of the internet. The one hundred three preliminary items were developed based on the literature.

Griffiths (2000) identified the seriousness of addiction consisting of salience, mood modification, tolerance, withdrawal, conflict, and relapse state. In this regard, the researchers identified the weakness of Young's model which consists of 8 items to categorically identify an internet addicted individual. Given the said criteria of addiction, Young's scale fall short in the dimensionality of problematic use of internet among adolescents. It is clear that an 8-item questionnaire cannot determine the misuse of the internet or exceeds to become

pathological. Kesici and Sahin (2010) presented studies of different experts regarding time control among internet addicted individuals beyond the categorical criteria from the DSM IV. They also suggested that not all internet addicted individuals are disabled, problematic and clinically dependent to it.

In order to test for the non-pathological use of internet among adolescents, the researchers decided to use Young's model given its identified structure to be used as foundation for item generation. A focus group discussion among 25 college students provided behavioral themes to support and refute the diagnostic items of Young. Encoded themes formed as basis for the item pool subjected to item evaluation.

Item Evaluation

The initial items were evaluated by a certified clinical psychologist who is also a college professor in a College. The expert identified which item is valid by choosing from the accepted and rejected check boxes. Spaces for suggestions were also provided for items that need revisions and for the items that were either accepted or rejected. Ninety eight items were retained. Another group of psychology students taking a test development subject evaluated the items.

Item Response Format of Preliminary Form

The researchers used a five-point Likert scale to capture the degree of the participants' responses. The options are: 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree and 5 for strongly agree.

Pilot Testing and Participants

The revised 98-item scale was administered to one hundred twenty college students gathered from fifteen colleges and universities around Metro Manila. Convenient sampling was used to collect the participants ($N= 320$). The age ranges from sixteen to twenty three and the mean age is 18.74.

Data Analysis

Exploratory factor analysis (EFA) was used to test whether our items correlate to our construct and if there are other dimensions revealed or sub-factors to eliminate other than those set by Young (1996). Eigenvalue is set to one (1) and the factor loading is set to .30. Varimax raw was used to rotate the items; to maximize the loading of each variable. Cronbach's alpha was used to check the inter-item correlation for each factor to know the reliability of the scale. Confirmatory factor analysis (CFA) was also used to test the measurement model given by the EFA; to test the goodness of fit of the measurement model.

Final Testing and Participants

The 53-item form of the scale was administered to eight hundred three ($N = 803$) college students from forty two colleges and universities (i. e., Mapua Institute of Technology, Far Eastern University, De Los Santos-STI, Informatics International College, and

Polytechnic University of the Philippines). Convenient sampling was again used to identify the participants (N= 803). The age ranges from sixteen to twenty four and the mean age is 18.74.

Item Response Format for Final Testing

The response format was changed to a four point Likert scale. The options are: 1- strongly disagree, 2 - disagree, 3 - agree and 4 - strongly agree. It was changed to easily identify if the items load under the correct factor. Also, for data analysis, confirmatory factor analysis and Cronbach's alpha were used to evaluate the inter-item correlation.

Results

Based on the scree plot, five factors remained out of the initial seven factors. The dimensionality of the scale was supported by the Kaiser-Meyer-Olkin for sampling adequacy (.882) and a significant value for the Bartlett's test of sphericity. The new five factors are time control, detachment from primary social group; escapism, neglecting personal tasks, and preoccupation (see Table 1). Eigenvalues showed that Factor 1 with 25.20, Factor 2 with 4.98, Factor 3 with 4.72, Factor 4 with 3.37, and Factor 5 with 2.75.

Table 1
Definition of Cyber Dependency five Sub Factors

Sub factor	Definition
Time Control	Time is not being properly managed when online and cannot stop oneself from using the internet.
Detachment from primary social group	Being alone while using the internet is being preferred rather than spending time with family and friends.
Escapism	Internet is used to forget problems and to cheer up Oneself.
Neglecting personal tasks	School work and household chores are being neglected or is not finished on time when online.
Preoccupation	Thinks about internet usage even if offline.

After running the EFA, thirteen items remained for factor one (see Table 2), twelve items for factor two, sixteen items for factor three, seven items for factor four and five items for factor five. From the 98-item scale, forty five items were eliminated and the scale was reduced to fifty three items. Another run of exploratory factor analysis identified three factors by strictly increasing the factor loading to .40 and above. It showed significant decrease of items from 53 to 41 with the aim of increasing the chance to meet the standards for validation.

Table 2
Item and Factor Loading

Factor 1	Loading	Factor 2	Loading	Factor 3	Loading
Item 1	0.61	Item 4	0.41	Item 3	0.46
Item 5	0.54	Item 12	0.62	Item 8	0.60
Item 6	0.51	Item 14	0.59	Item 17	0.46
Item 10	0.60	Item 20	0.56	Item 18	0.68
Item 11	0.65	Item 22	0.53	Item 28	0.52
Item 15	0.63	Item 24	0.54	Item 30	0.51
Item 16	0.56	Item 27	0.73	Item 32	0.60
Item 21	0.65	Item 29	0.69	Item 39	0.55
Item 23	0.42	Item 31	0.55	Item 42	0.52
Item 34	0.70	Item 33	0.66	Item 45	0.50
Item 37	0.54	Item 38	0.55	Item 48	0.73
Item 46	0.72	Item 41	0.62	Item 51	0.61
		Item 44	0.52	Item 52	0.69
		Item 47	0.70		
		Item 50	0.53		
		Item 53	0.44		

Note. F1 = Time control, F2 = Detachment from intrapersonal and interpersonal needs, and F3 = Escapism

Table 3
Inter-Item Reliability

	Cronbach's alpha	<i>M</i>	<i>SD</i>
Time Control	.88	31.62	7.22
Detachment	.90	26.67	7.31
Escapism	.88	31.26	6.59
<i>Combined Scale</i>	.94	86.99	17.11

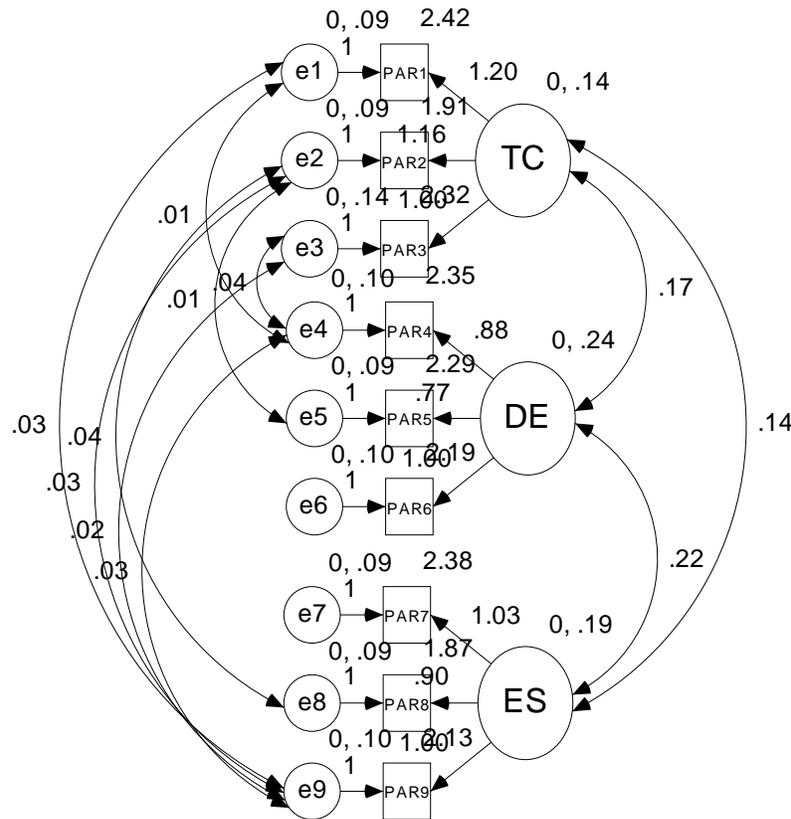
Table 3 shows the inter-item reliability of the scale and of each factor. The Cronbach's alpha of the 41-item scale is .94. All the three hundred twenty cases were valid. The mean is 86.99 and the standard deviation is 17.11. The Cyber Dependency scale has high reliability whose factors yield moderate to high reliabilities.

Table 4
Summary of the Goodness-Of-Fit Statistics

Index	Value
Chi Square	59
Degrees of freedom	17
<i>P</i> level	0.00
Chi square / degrees of freedom	3.5
RMS residual	0.01
Steigr Lind RMSEA	0.04
Non Centrality Fit Index	0.95
Population Gamma Index	0.97
Goodness of Fit Index	0.98
Adjusted Goodness of Fit Index	0.95
Normed Fit Index	0.98
Non Normed Fit Index	0.97
Comparative Fit Index	0.99
AIC	0.15
SBC	0.32

After running the first Confirmatory factor analysis, one item was deleted from factor 2 or detachment from primary social group, because it did not correlate based on the parameter of estimates. Table 4 shows the result of the second run of CFA. As suggested by Schreiber, Stage, King, Nora, and Barlow (2006), the cut off criteria for an absolute / predictive fit such as the ratio of chi square to degrees of freedom must be greater than or equal to 2 or 3. Item parceling was used to fit the number of items per factors identified. A 4-5:1 item and parcel ratio was observed consistently in the model.

Figure 1
Measurement Model



In the tested model the ratio of chi square to degrees of freedom is 3 which means the model provides an indicator of acceptable model fitness. The three-factor model of the scale fits in the final run of confirmatory factor analysis. The root mean square error of approximation that test the “bad fit” of a model shows that values ranging from 0.06 to 0.08 are acceptable model. While values below 0.05 shows model fit. The model structure of the scale is a good fit according to the RMSEA which is 0.04. Other indices (NNFI, GFI, CFI, PGI, and NFI) showed model fitness based on values closer to 1.00.

Discussion

The 41-item scale was designed to measure the cyber dependency and impact of internet misuse among adolescents. With exploratory factor analysis, the factors and the items were reduced because of its eigenvalues and factor loadings. The results of EFA showed the items that were retained and showed the new five factors from the original seven that were suggested from the study of Young (1996). The five factors were obtained after the data were rotated and got a .3 or higher factor loading. Factor 1 contained items about how to control and manage internet usage which is categorized as time control. Factor 2 is about preferring online friends than being with the person’s own family and friends. This was then categorized as detachment from primary social group. Factor 3 contained items that are about cheering up the self and using the internet as an escape to forget problems. This factor was

categorized as escapism. Factor 4 is about not doing household chores and school work due to excessive internet use and it is categorized as neglecting personal tasks. Factor 5 is about thinking of the next internet use even if already offline. It is categorized as preoccupation. Another EFA was used to increase the chance of achieving a desired fit for validation purposes. This run reduced the items further to 41, with only 3 remaining factors left. CFA and inter-item reliability results showed that the scale has a high reliability and the structure has a good model fit.

The dimensions of the Cyber Dependency scale are supported by the study of Young (1996) because the said dimensions are also present in her DQ (i. e., Numbers 1, 3, 5, 6, and 8). She said that people who agrees to five or more of the questions in her DQ is to be categorized or labeled as an internet addict. But on the other hand, caution was pointed out that this scale was used to identify features of cyber dependent adolescents and not totally exhibiting features of addiction.

Yellowlees and Marks (2007) also cited that syndrome of internet addicts are: extreme preoccupation with using the internet, too much amount of time spent online, uncontrollable use of the internet, difficulty in controlling the time spent on the internet, feeling that the world outside of the internet is boring, becoming irritated if bothered while online, decreased social interaction with “real” people, and increased isolation and depression.

Time Control

This factor is defined as a person who does not have an organized time management when he/she is online. The person seems to lose track of time and gets surprised when he/she finds out how long he/she was already online. According to Van den Eijnden, Meerkerk, Velmust, Spijkerman, and Engels (2008), internet excessive users use the internet longer than they should have to. The study of Shaffer, Hall and Vander Bilt (2000) also supports this factor. They said that excessive Internet use is related to the development of internet addiction and disorder. The problem of the users’ loss of control with internet usage and the failure to end the involvement has unpleasant consequences. The three sample items with their respective factor loadings are: “I don’t have time for bonding with my family and friends because I’m busy online.” (0.70), “I keep staying online even if there's nothing to do anymore.” (0.65) and “I have my online friends, I don’t need anybody else.” (0.72), this factor has an alpha of 0.88.

Detachment from Intrapersonal and Interpersonal Needs

The study of Kraut, Patterson, Lundmark, Kiesler, Mukopadhyay, and Scherlis (1998) supports the second new factor which is the detachment from primary social groups and neglect of one’s personal needs. According to Kraut et al., people that have internet access in their home become preoccupied of using it and tend to neglect social activities like attending gatherings and participating in events. The factor, detachment from primary social groups, means that people prefer to use the internet and spend less time with their families and friends since they can use the internet to chat with other people. Items 27, 29, and 47 have the highest factor loadings. Item 27 has a factor loading of 0.73. The item is “I’m not close to my friends and family anymore because am always busy online.” Item 29 “I forget to take care of my personal hygiene because am busy online” this item has a factor loading of

0.69. Item 47 pertains to “my negative feelings go away when I use internet.” This item has a loading of 0.70, this factor has an alpha of .85.

Escapism

The third factor is defined as the use of the internet to forget problems and to cheer oneself. The internet is considered as another form of entertainment like that of the television when it first came up. People who use the internet consider it as an outlet for them to at least forget their problems while they are online. Depression is a predictor of internet addiction based on the study of Ko, Yen, Chen, Yeh, and Yen (2009). It is also said in the study of Toronto (2009) that the internet is a way for people to reconstruct themselves since the internet is an unsecured human relatedness wherein only a few really knows who you are. That is, people build a sense of completeness that enables them to move on with life. Items 18, 48, and 52 obtained the highest factor loadings, 0.68 “going online makes everything okay.” and 0.73 “I go online first before doing my tasks or schoolwork.” While, 0.69 “I get anxious and depressed when I’m not online”, this factor has an alpha of 0.88.

Implications to Possible Interventions

To help manage internet use, it is suggested that the person should have a new routine when to go online in order to break the habit of excessive internet use. For example, instead of going straight to the computer after arriving from school, one could do a chore first or eat dinner before using the internet. Another is to have an “external stopper” or an alarm so that the person would be reminded that it is time to go offline. Setting goals could also help (i. e., a goal that the time spent online should be reduced). The person should refrain or withdraw from using applications or websites such as games, chat rooms and social networking sites that he/she finds addictive. To help the person attain his/her goals or abstain from the said applications, reminder cards could also be used as self-monitoring technique. On those cards, problems about internet use and benefits from minimal use could be listed. A “personal inventory” could also be made; list of activities that have been abandoned or ignored because of cyber dependency. Examples are playing sports, going to church or exercising (Young, 1999).

When addicted or preoccupied with online games, Young suggested that parents could set or have a schedule or a time limit for playing online. There are also softwares they could use to help them control the time. Another implication is to encourage educational online games. If there are academic or school problems, a tutor is suggested to help solve this. For family therapy, the Brief Strategic Family Therapy (BSFT) could be used. It is a short term therapy that focuses on interventions to improve behaviors of children and adolescents aged six to seventeen (Young, 2009).

Involvement of either parents or school counselors will not work unless the person with internet addiction or cyber dependency works with himself/herself, his/her family counselor, and his/her therapist to overcome the addiction or dependency. The person with internet addiction or cyber dependency should recognize that he has a problem. Setting realistic goals is a very helpful way to decrease internet usage. In addition, the person who has a cyber dependency problem should have someone or a therapist who will help him/her make decisions or choices that will help him/her overcome the problem. This will help him/her be trained again and re-learn the basics on how to have self-control. Also, it is suggested

that school counselors should have programs in school that allow them to have group discussions or peer counseling. In this way, Internet addiction or cyber dependency intervention may be easier since they can monitor each other's Internet activity with the guidance of the school counselor and with the participation of the parents as well. Another suggestion is, the students should have leadership trainings and workshops where they can divert their attention from excessive internet use. Aside from the students, the parents and the whole school staff especially the school counselors should also undergo seminars on how to deal and help students with Internet addiction or dependency. This will update and inform all stakeholders about the issue of Internet addiction and cyber dependency. Thus, it will make recoveries easier and prevention measure more extensive because this will make the whole environment and community of the person with internet addiction and cyber dependency involved in helping him/her overcome the problem (Caldwell & Cunningham, 2010).

In the study of Ko et al. (2009), results suggested that depression, attention-deficit/hyperactivity disorder, social phobia, and hostility were found to predict the occurrence of Internet addiction in the 2-year follow-up, and hostility and attention-deficit/hyperactivity disorder were the most significant predictors of Internet addiction in male and female adolescents, respectively. The results suggested that attention-deficit/hyperactivity disorder, hostility, depression, and social phobia should be detected early on and that the necessary intervention be carried out to prevent internet addiction among adolescents. Also, gender differences and psychiatric co morbidity should be taken into consideration when developing prevention and intervention strategies for internet addiction.

The editorial "Internet Addiction: Recognition and Interventions" written by Joyce Fitzpatrick, published in the Archives of Psychiatric Nursing (2008), contains some interventions for internet addiction. According to her, some treatment interventions may include attending boot camps, and having support groups. She also included that one key for intervention is the person's motivation to change, although it can be problematic to some because of their reliance to internet for work and leisure activities.

The researchers' schools could organize seminars or talks about internet usage to students, their parents as well as to the employees so that everyone can be educated about proper internet usage. Inside the school, certain websites (i. e., social networking sites) should be blocked. With this, the students and the employees will not get distracted from doing their work. Finally, cyber dependency could be prevented by encouraging students to consult guidance counselors when they have problems in order for them to have a support and for them to avoid using the internet to escape reality. Moreover, other unhealthy activities could also be prevented (i. e., taking prohibited drugs and drinking alcohol).

Implications for Future Research

In the tested construct of cyber dependency, the researchers hope that more research will come up to guide the community on the advantages and disadvantages of internet use. Specifically researches that will gather a variety of participants such as elementary school children, young professionals among the working population to shed light into the differences and pattern of behaviors when it comes to internet use. Potential research developments can also look into the use of other measures to correlate with the present scale development to provide a more valid and reliable scale (e. g., convergent, discriminant, and criterion). Lastly, the researchers believe that in the advent of cyber-related psychological researches more

empirical data and theoretical models can be tested in the future to help understand the complexity of the psychology of human-computer interactions.

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The Assessment of Academic Self-Regulation and Learning Strategies: Can they Predict School Ability?

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Abstract The present study assessed high school students' self-regulation and the use of learning strategies. The study also determined whether they can predict school ability. Based on the social cognitive theory, individuals' use of powerful learning strategies (i. e., self-regulation and learning strategies) can build on students' school ability. Three questionnaires that include the Academic Self-regulated Learning Scale (A-SRL-S), Learning Strategy Scale (LSC), and Otis Lennon School Ability Test (OLSAT) were administered to 350 high school students in Manila. Structural Equations Modeling (SEM) was used to test the effect of A-SRL-S and LSC on OLSAT. Contrary to our hypothesis both self-regulation as well as learning strategies did not have a significant effect on school ability. The overall model attained a good fit (RMSEA= .07; PGI= .94; GFI= .91; AGFI=.88). Results indicate that high self-regulation and usage of learning strategies do not predict school ability. However, the relationship between the A-SRL-S and LSC marked construct validity.

Keywords: self-regulation, learning strategies, school ability

Introduction

Assessing students' abilities is better understood by determining specific ways how individuals attain it. Over the past two decades, many studies have reported different assessment techniques to assess specific learning strategies and how it predicts specific outcomes such as performance. In the domain of educational psychology, learning strategies scales are administered to students determining how well they predict students' performance. Students performance is generally measured using students' grades at the end of a semester or quarter (Magno, 2011a; Zimmerman & Kitsantas, 2005, 2007). The assessment of students' use of learning strategies implies and advocates a more autonomous production of learning. This entails that the approach in teaching is scaffolding students not on content but rather on ways of acquiring and processing information better. It is an undeniable fact that many students pass through the educational systems without having an active role in their learning process (Magno, 2009a; Paris & Paris, 2001). Aside from looking at the benefits of such learning strategies on students' grades at the end of a semester or a school year, it is

about time to use other outcomes such as school ability (Magno, 2009b). Although it became a central topic of discussion among the educational researchers, the significance of both learning strategies and self-regulation in promoting students' school ability has not paid much attention in the existing educational patterns. Not all students are encouraged in pursuing specific academic tasks and learning methods especially if these are not espoused in the curriculum (Zimmerman, 2002). As a result, many students could not attain a better academic achievement (Güven, 2008). There are very few countries in Southeast Asia that make learning strategies and executive skills play a central role in their curriculum. For example, in the Singapore curriculum in learning mathematics, metacognition is one of the specific areas taught to students in all levels. The national curriculum explicitly explains how metacognition is beneficial especially in problem solving. The same is the case of Malaysia in their science curriculum where the use of learning strategies is mentioned in the production of science and technology. In the New South Wales curriculum, one of the skills in its language curriculum puts the acquisition of self-regulation and learning strategies. In the Philippines, the K to 12 policy report includes a recommendation in the integration of self-regulation across the subject areas but it was not emphasized in the new curriculum. The difference in the use of learning strategies are reflected in the inter country survey of mathematics and science ability such as the Third International Mathematics and Science Survey (TIMSS) and Programme for International Student Assessment (PISA). In these surveys of student abilities, the Philippines is one of the countries that are placed at the lowest ranks as compared to Singapore, Malaysia, and New South Wales. This reflects the lack of skills that students have acquired which made them less competitive with those coming from such countries.

Several researchers had shown consistent effects of self-regulation (Magno, 2009; Zimmerman, 2000; Kitsantas, Winsler, & Huie, 2008) and learning strategies (Lee, Lim, & Grabowski, 2010; Zumbunn, Tadlock, & Roberts, 2011) as predictors of academic achievement (Gettinger & Seibert, 2002; Soric & Palekcic, 2009). The present study mainly focuses on the direct influence of learning strategies and self-regulation on school ability.

The social cognitive theory explained the role of self-influence behind every human behavior (Bandura, 1991). The model of triadic reciprocal determinism describes the behavioral, cognitive, and environmental factors as interacting determinants which influences each other (Bandura, 1989). Cognitive factors such as self-regulation and learning strategies are both combined in the present study to assess their influence on students' school ability.

Learning Strategies

Learning strategies are learning behaviors that facilitate learners to process information. They are the techniques such as rehearsal, elaboration, comprehension, monitoring, etc. that students use in the learning process. Learning strategies help students monitor and adjust their learning strategies. It may include checking the content of the study, judging learning difficulties, assessing progress, and predicting learning outcomes (Cheng, 2011).

Learning strategies are the behaviors and thoughts of a learner in achieving their own learning goals. These strategies facilitate the learners encoding, storing, and retrieving of information (Weinstein & Mayer, 1986). Cheng (2011) explains learning strategies as 'learning to learn' process that involves effective management of time and information. Other learning strategies would involve effective note taking as a key to obtain maximum input in

the classrooms. Note taking resulted in the assimilations of one's prior knowledge and the current knowledge (Baldwin, 2010; Huxham, 2005). The practice of learning strategies can be integrated in making daily assignments and can further be developed starting from the primary schools. Once learning strategies are internalized, the student could 'fix-up' their own strategies and could practice it in appropriate situations. The students get ample chances in applying these strategies in the classroom curriculum (Gettinger & Seibert, 2002; Zimmerman, 2002).

According to Dembo and Eaton (2000), most of the students struggle without realizing a proper effective strategy. The students' attempt of choosing a learning strategy should be helped and facilitated by their teachers. Students that are successful and unsuccessful in accomplishing learning materials are greatly differentiated in their use organizational learning strategies (Soric & Palekic, 2009). Comparison between successful and unsuccessful students proved that reading comprehension rating is very high among successful students. Students who are successful in their reading comprehension were facilitated by teachers in the use of learning strategies.

The four phase model of Schunk (1995) and Zimmerman (1998) proposed the development of students' learning strategies. In this model, the first phase involves students being helped in developing certain skills such as writing and note taking strategies. The second phase mainly deals with making clear about the objectives and strength of having writing strategies. The third phase is the actual use of appropriate self-writing strategies. In the fourth phase, the student memorizes the steps of writing strategies and maintaining creative meanings.

Another perspective in developing learning strategies was proposed by Cheng (2011). The model uses a method of asking the students to demonstrate their own strategies to assess the mindfulness of each one of their learning strategies.

Zimmerman and Cleary (2004) on the other hand proposed that monitoring behaviors help the students identify the new learning strategies which can be used in the attainment of goals. Otherwise, there may have a tendency in continuing the same ineffective strategy.

Self-regulation

Self-regulation is a complex and multi-faceted process which assists students in regulating their own thoughts and behaviors which in turn helps them to be successful in their learning process (Zumbrunn, Tadlock, & Roberts, 2011; Zimmerman & Cleary, 2004; Lee, Lim, & Garbowski, 2010). It has several subsidiary cognitive processes such as self-monitoring, standard setting, evaluating judgment, self-appraisal, and affective self-reaction (Bandura, 1991). Zimmerman (2000) further explains that self-regulated learners are characterized to be "proactive in their efforts to learn because they are aware of their strengths and limitations and that they are guided by personally set goals and task-related strategies" (p. 66). Students who are self-regulated should be able to adapt their learning strategies by acquiring the necessary information. This helps them in tailoring several strategies in different context and in specific learning situations (Gettinger & Seibert, 2002). In other words, self-regulation is manifested by proactive learners who could regulate their behaviors and thoughts in three cyclical phases such as fore thought (before the learning efforts), performance control (during the learning efforts), and self-reflection (after the

performance) (Zimmerman, 2000). In the process of self-regulation, the students may sacrifice the short term outcomes when they aim at certain high achievement.

Previous studies have gradually showed that the students who are following the self-regulated learning strategies give more emphasis on the time management, learning environments, and the systematic use of behavioral strategies consistent with the social cognitive theory (Zimmerman, 1990; Kitsantas, Winsler, & Huie, 2008; Soric & Palekic, 2009; Corno & Boekernes, 2005).

Studies on self-regulation are consistent in some factors such as setting goals, monitoring the learning processes, evaluating the learning outcomes, and developing varied instructional methods in achieving the goals (Pintrich, 2000; Eaton, 2000; Zimmerman & Cleary 2004; Cheng, 2011; Schunk, 1995; Farsani, 2011; Lindlan, 2011; Magno, 2010). Zimmerman and Martinez-Pons (1987) started with 14 different strategies of self-regulation. Magno (2010) was able to extract seven self-regulation components in an academic setting: memory strategy, goal-setting, self-evaluation, seeking assistance, environmental structuring, learning responsibility, and organizing. These seven factors are used in the present study given that the participants are Filipino college students.

School ability is an important outcome in the study of self-regulation and learning strategies (Baird, 1982). The students who have high levels of school ability could implement and attain their academic goals more effectively (Magno, 2009). Majority of studies on self-regulation and learning strategies generally made use of academic achievement as the outcome (Baldwin, 2010; Hurk, 2006; Kitsantas, 2008; Seibert, 2002; Soric & Palekic, 2009). These studies were consistent in reporting that certain learning strategies such as organization-structuring materials, time planning, and rote learning are the significant predictors of academic achievement. The effective use of metacognitive learning strategies as opposed to ineffective use of it results in high achievement and the latter to low academic achievement. Several researches indicate the significance of adapting self-regulatory learning strategies both in traditional as well as web-based learning environments in order to attain a higher achievement (Boekaerts, 2005; Zimmerman, 1986; Zimmerman, 1990). Magno (2010, 2011) showed the predictive validity of the academic self-regulation scale on college students' GPA. He further explained the notion that these strategies help one to achieve better academic performance.

The Present Study

The present study combines both self-regulation and learning strategies in order to predict school ability. The idea of combining self-regulation and learning strategies will further support how powerful would the amalgamation be in predicting the desired outcomes. This supports the concept that covert self-regulation helps the learner enhance the learning outcome from their overt use of learning strategies (Lee, Lim, & Grabowski, 2010). Their combined effects clarify further how they interplay and appear similar with each other. Both the self-regulation and learning strategies conceptually share common characteristics such as goal attainment, monitoring, and organizing. These commonalities serves to construct validate each measure to prove the similarity in the components the two instruments used.

The most common outcome on the predictive studies of self-regulation and learning strategies is usually academic achievement as measured by students' grades. The studies are also consistent in reporting that the higher the use of self-regulation and learning strategies, the higher the students' achievement in school would also be. It is about time to consider

other measures for the outcome of self-regulation and learning strategies. The social cognitive framework allows a more general outcome for the effects of self-regulation. If self-regulation and learning strategies consistently predict academic achievement, they should be able to predict school ability which is a close measure of achievement. However, school ability is a more innate construct pertaining to students' ability in the areas of abstract thinking, logical reasoning, verbal, quantitative, and spatial skills (Beal, 1996). Students' achievement in school shapes their attained ability.

Assessing the effects of self-regulation and learning strategies on school ability would reflect how successful is schooling in developing students' use of such executive skills and whether these executive skills are able to translate into students' ability. Students who have properly developed self-regulation and learning strategies should not only reflect in what they can perform at the end of the course but rather how much internalization the strategies have been built as measured by their ability in school.

Self-regulation and learning strategies in the present study are correlated in order to determine their similarity and further prove their construct validity. Their prediction on school ability as measured by the Otis-Lennon School Ability Test (OLSAT) further supports their predictive validity on school ability outcomes. This prediction would also reflect how effective is the use of executive skills (self-regulation and learning strategies) for the sample selected.

Method

Research Design

The explanatory cross-sectional design was employed in the study (Johnson, 2001). The self-regulation and learning strategies are hypothesized to produce change in the explained variance for OLSAT. It is cross-sectional because the data were collected from the participants at a single point in time.

Participants

The participants in the study were 350 high school students from three private schools in Manila. The participants included students from first to fourth year (years 7 to 10). The sample consisted of 196 males and 154 females. The age of the participants ranged from 13 to 17 years.

Instruments

Learning Strategy Scale. Learning strategy Scale was developed by Guven (2008) based on Weinstein and Mayer's Learning Attitude and Study Strategies Inventory. The five factors of this scale cover elaboration, comprehension monitoring, organizational, affective, and rehearsal strategies. The internal consistency value between the main scale and subscale was found as acceptable. The item-total correlations coefficients range from .20 to .56. As a result of validity analysis, 35-item Learning Strategies Scale with five factors was developed and these five factors were consistent with the aspects of the learning strategies explained in previous studies. The variance value explained with five factors was calculated as 42.97% (Guyen, 2008).

Academic Self-regulated Learning Scale (A-SRL-S). The A-SRL-S was developed by Magno (2010) to measure self-regulation of students applicable for the high school to college level. Participants are instructed to indicate their level of agreement or disagreement with each statement on a four-point Lickert scale (strongly agree, agree, disagree, and strongly disagree). The seven factors of this scale include memory, goal setting, self-evaluation, seeking assistance, environmental structuring, learning responsibility, and organizing. The seven factor structure was confirmed using Confirmatory Factor Analysis (CFA) using both high school and college students. The internal consistencies for the seven factors range from .73 to .87. The seven factors also showed convergent validity where all the seven factors were highly intercorrelated (Magno, 2010). Using a polytomous Rasch model, the scale step functions were appropriate and all items showed to have appropriate MNSQ values that are within range. The predictive validity of the seven factors on students' grades at the end of a semester was also established (Magno, 2011a). The scale's construct validity was also established where the seven factors were significantly correlated with the LASSI and MSLQ (Magno, 2011b).

Otis Lennon School Ability Test (OLSAT). The OLSAT, one of the most widely used general school ability tests. It is designed to assess the cognitive abilities of a student's ability with levels for primary through college. The total score of the OLSAT is called the School Ability Index (SAI) which comprises the verbal and nonverbal scores. The main areas of assessment contain recalling, defining, classifying, solving arithmetic problems, and logical thinking. It is a structured test and difficult questions are followed by easier ones. The internal consistency of this test using the Kuder-Richardson gained coefficients between 0.90 and 0.94. Comparing the OLSAT scores and achievement scores also indicated the validity (Beal, 1996; Magno, 2009).

Procedure

Permissions were sought from the schools prior to the test administration schedule. The three questionnaires: Learning Strategies Scale, Academic Self-regulated Learning Scale (A-SRL-S), and Otis Lennon School Ability Test (OLSAT) were administered to the students during their class time. They were debriefed about the purpose of the study and were instructed as to how to answer each measure. They were told to answer all the questions without leaving any items blank. On completion, the questionnaires were gathered and the students were thanked for their cooperation.

In the analysis, the means and the standard deviations were used to determine the levels of the factors. The factors were intercorrelated to establish the relationship among the variables.

The Structural Equation Modeling (SEM) was used to test the model. In the SEM, learning strategies and self-regulation were the latent exogenous variables and Otis Lennon School Ability Test (OLSAT) was the endogenous latent variable. Rehearsal strategies (RS), elaboration strategies (ES), organizing strategies (OS), comprehension monitoring strategies (CM), affective strategies (AS) are used as the manifest variables of the learning strategy. The memory strategy, goal-setting, self-evaluation, seeking assistance, environmental structuring, learning responsibility, planning and organizing made up the manifest variables for self-regulation. Three parcels were created to serve as the manifest variables for the OLSAT. The

SEM was used as modeling technique where the effects of both LS and A-SRL-S on OLSAT were investigated. The goodness of fit was tested. The fit indices that were used were Chi-square, Root Mean Square Error Approximation (RMSEA), GFI (Goodness of Fit Index), Adjusted Goodness of Fit Index (AGFI), and Adjusted Population Gamma Index (APGI).

Results

Descriptive statistics for the measures of learning strategy, self-regulation, and school ability were obtained. Intercorrelations of the subscales were computed and the proposed model was tested using structural equation modelling.

Table 1
Means and Standard Deviations of LS, A-SRL-S and OLSAT

Variables	<i>N</i>	<i>M</i>	<i>SD</i>	Cronbach's alpha
Learning Strategies (LS)				
Elaboration (ES)	350	3.99	0.47	.78
Comprehension Monitoring CM	350	3.60	0.71	.77
Organising (OS)	350	3.32	0.58	.77
Affective (AS)	350	4.05	0.63	.79
Rehersal (RS)	350	3.94	0.78	.82
Self-Regulation (SR)				
Memory (MS)	350	3.03	0.39	.84
Goal-setting (GS)	350	3.19	0.57	.85
self-evaluation (SE)	350	3.24	0.39	.90
Seeking assistance (SA)	350	3.15	0.39	.91
Environmental structuring (NS)	350	3.15	0.54	.92
Learning Responsibility (LR)	350	3.13	0.51	.84
Planning and organising (PO)	350	3.22	0.48	.88
School Ability (OLSAT)				
Parcel 1	350	0.72	0.08	
Parcel 2	350	0.76	0.09	
Parcel 3	350	0.75	0.08	

Table 1 shows the means and standard deviations obtained for the subscales of learning strategy, self-regulation, and school ability. The means of the scores for the subscales of learning strategy range from 3.32 to 3.99. For self-regulation, the mean scores range from 3.03 to 3.22. The average score per item on the OLSAT is 0.77.

The obtained Cronbach's alpha for all the items of learning strategies is .76, for self-regulation is .86, and for OLSAT is .66. All Cronbach's alpha coefficients indicate a good internal consistency among the items.

Intercorrelation among the variables was also computed to establish the relationship of the variables. It helped to determine the variance accounted for by the variables comprising learning strategies, self-regulation, and school ability.

Table 2
Zero Order Correlation among Learning Strategy, Self-regulation, and School Ability

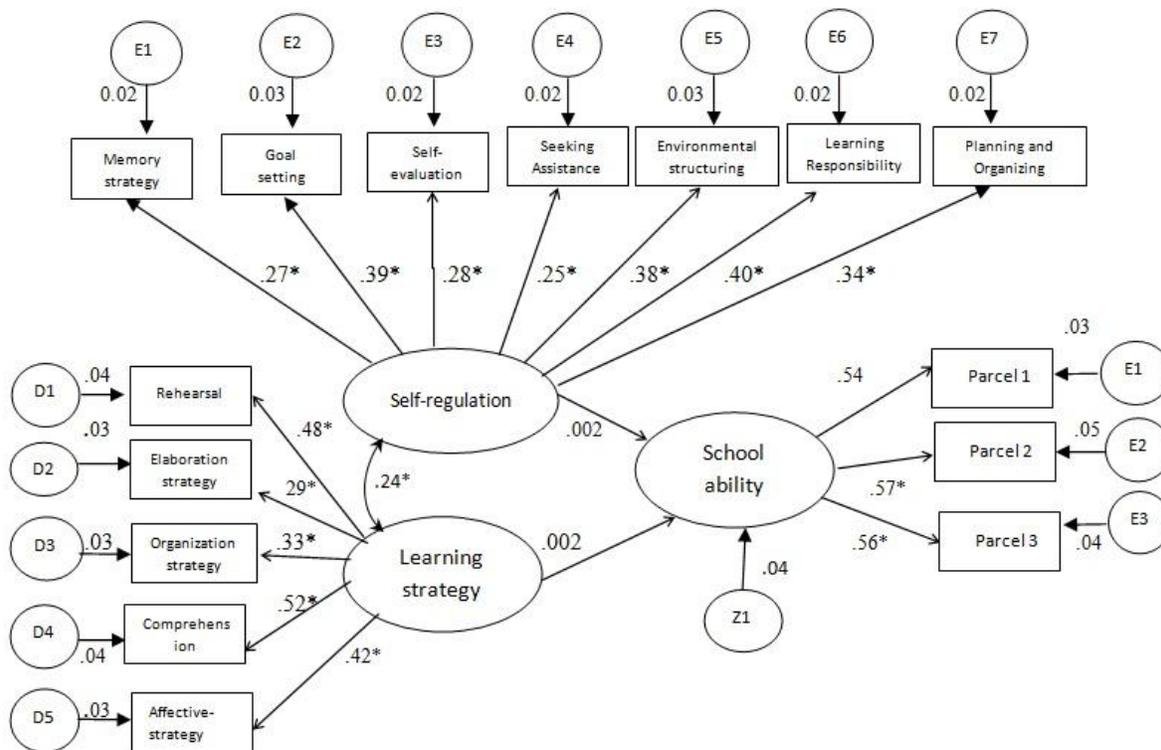
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Learning Strategies															
1 Elaboration															
2 Comprehension Monitoring	.43*														
3 Organizing	.44*	.41*													
4 Affective	.36*	.51*	.33*												
5 Rehearsal	.38*	.44*	.29*	.45*											
Self-regulation															
6 Memory strategy	.41*	.33*	.21*	.28*	.28*										
7 Goal-setting	.35*	.35*	.13*	.28*	.28*	.54*									
8 Self-evaluation	.37*	.29*	.17*	.32*	.29*	.52*	.55*								
9 Seeking Assistance	.30*	.27*	.14*	.31*	.18*	.43*	.37*	.50*							
10 Environmental Structuring	.28*	.31*	.39*	.26*	.21*	.47*	.48*	.45*	.41*						
11 Learning Responsibility	.36*	.32*	.16*	.26*	.26*	.53*	.53*	.49*	.44*	.60*					
12 Planning and Organizing	.34*	.26*	.27*	.25*	.25*	.52*	.38*	.49*	.51*	.49*	.62*				
OLSAT															
13 Parcel 1	.05	.01	.30	.01	.04	.02	.05	.02	.04	.07	.01	.01			
14 Parcel 2	.02	.02	.03	.02	.06	.01	.03	.03	.08	.03	.04	.03	.51*		
15 Parcel 3	.08	.07	.02	.08	.07	.06	.07	.08	.02	.01	.02	.01	.55*	.57*	

* $p < .05$

All correlation coefficients between learning strategy and self-regulation were found significant. School ability did not significantly correlate with the factors of learning strategy and self-regulation. Moderate to strong correlations were found among the subscales of learning strategies ($r=.29$ to $r=.51$) and self-regulation ($r=.13$ to $r=.60$). The intercorrelations within OLSAT was high for all three parcels ($r=.75$ to $r=.77$).

A model where both learning strategies and self-regulation were used to predict school ability was tested using SEM. In the analysis, all parameters of the learning strategy, self-regulation, and school ability were significant. All the manifest variables contributed significantly their respective latent variable.

Figure 1
Structural Equations Model Showing the Effect of Learning Strategies and Self-regulation on School ability



The results showed that the effect of learning strategy (0.002, $p = 0.758$) and self-regulation on school ability (0.002, $p = .628$) are not significant. However, the relationship between learning strategy and self-regulation are significant. The significant relationship between the self-regulation and learning strategies indicates further the construct validity of each scale.

The goodness of fit was obtained as follows: RMSEA= .07; PGI= .92; GFI= .91; AGFI=.88. Overall, the model attained adequate fit. The values demonstrate that the indices are within the required estimates. The χ^2 (269.21, df=88) value was significant. The χ^2 test is very sensitive to large sample sizes which indicate bad fit (Hu & Bentler, 1995). However, the other absolute fit indices indicate that the model is a good fit.

Discussion

The present study assessed self-regulation and learning strategies to find if they can affect high school students' school ability. The results of the present study demonstrated that both self-regulation and learning strategies have no significant effect on school ability. The zero order correlation also showed that the two factors are not related to school ability. This results were not consistent as hypothesized (Dembo & Eaton, 2000; Magno, 2011; Soric & Palekic, 2009) explaining the effectiveness of both learning strategies and self-regulation to build student ability as an outcome. However, it was found in the study that both learning

strategies and self-regulation are significantly related both in the zero order correlation and Structural Equations Modeling.

The inability of the findings to support the predicted effects of both self-regulation and learning strategies could be attributed to the differences in the outcomes measured used. Previous studies commonly use achievement results such as performance on a specific task, grades, and other achievement indicators. In the present study, the outcome used is ability based which is more innate to the individual. The kind of outcome selected to study the effects of self-regulation and learning strategies can make a difference. This indicates that both self-regulation and learning strategies are meant to build on achievement skills of students and this becomes effective even at a short period of time. However, in such cross-sectional studies, ability would not become too sensitive in its change of variance. There is an indication that when self-regulation and learning strategies are sequentially assessed overtime and ability in school is the outcome perhaps the change in variance can be observed.

The lack of significant effect of both learning strategies and self-regulation on school ability is an indication that most of the students are not recognizing the need for varied approaches of studying and learning. There are specific strategies for different study tasks and the study tactics for each one is varied according to it. Students need to pay more attention in modifying and personalizing their own strategies in order for them to have a change in their abilities (Gettinger & Seibert, 2002).

The non-significant relationship between self-regulation and school ability may indicate the lack of proper instructions and modeling by parents, teachers, coaches and peers. Rather depending on socially isolated methods of learning, the self-regulated students will be more active in adopting the specific learning practices in social to improve their learning. They will be dynamic in social as well as solitary contexts with their perseverance, and adoptive skill. This results points out the need for teaching self-regulated learning processes.

Pedagogically speaking, the teachers have to focus on creating awareness among the students with regard to the need of having self-regulation and effective strategies which in turn promote not only academic achievement but the internalization of the strategies to make a difference in one's ability. Developing goal-oriented learning among the learners should be an object in the present education settings. This will increase the current level of academic ability among the students (see Zumbrunn, Tadlock, & Roberts, 2011).

The findings of the present study call for effective study strategy training and instructions that need to be introduced. The curriculum should make explicit that students should be encouraged to think and be organized in their thinking process to better perform in higher order tasks. Developing their own strategies and effective processing will enhance better ability among students.

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High School Students' Use of Digital Technology as a Predictor of Measures of Academic Progress

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Abstract Digital technology is widely used by tech-savvy 'digital native' students in their learning. Research shows that this can have both positive effects, no effects and also negative effects on academic attainment. This study investigated whether high school students' use of digital technology in their learning positively predicted their academic attainment. Students use of digital technology was measured using the Tech-savvy Scale ($\alpha=.91$) which consists of three factors, connection, adaptation and control. Academic attainment was measured using students Measures of Academic Progress (MAP) scores in math, language and reading ($\alpha=.74$). Participants were 218 international school students of mixed gender and ethnicity aged between 15 and 17 years. The data were analyzed using structural equation modeling (SEM) and the proposed model had a fair fit ($RMSEA .08$; $CFI .97$). When taken as one factor, Tech-savvy scale score did not predict academic attainment ($p>0.05$). However, the connection factor of the Tech-savvy Scale positively predicted academic attainment in language ($p<0.05$) and the control factor negatively predicted academic attainment in language and reading ($p<0.05$). Results are discussed in light of the conflicting previous research, and have implications in understanding the complex of the relationship between students' use of digital technology and their academic attainment.

Keywords: technology, education, academic attainment, digital natives

Today's high school students have grown up with the use of digital technology permeating their social and academic lives. The use of digital technology is now central to the teaching and learning process, therefore research is needed to understand how students use of digital technology influences their academic attainment. Digital technology is defined as the use of hardware such as desktop and laptop computers, tablets, mobile phones, calculators and also the software students' use on these.

First, we must conceptualize what it means to be a tech-savvy high school student. These students are the 'digital natives', a generation of tech-savvy young people who are 'native speakers' in the language of computers are used to receiving and manipulating information using digital technology (Prensky, 2001). These students use digital technologies to communicate, do class work, and multitask (Dolezalek, 2003). They like being connected and are interactive in their use of digital technology (Sherry & Fielden, 2005). They also have

high levels of computer knowledge and literacy and they use digital technology fluently both inside and outside the academic contexts (Bennet & Maton, 2010; Craig & Stein, 2000).

The literature identifies several characteristics of tech-savvy students but does not clearly define and classify the construct. This study defines tech-savvy as a multi-dimensional construct consisting of three factors. The dimensions of the construct are *connection*, which is the use of digital technology to connect with information and other people when learning, *adaptation* is the ability to adapt digital technology to suit one's own learning needs and *control* is the ability to exercise control or self-regulation in ones use of digital technologies in learning.

Prensky (2001) suggested that there was a mismatch and division between the 'digital native' students and their 'digital immigrant' teachers who have not grown up with digital technology. Prensky argues that in order to educate this tech-savvy generation, digital technology must be increasingly integrated into teaching and learning. However, Bennet, and Maton (2010) believe that this is an overly simplistic portrayal of a complex situation, and a more nuanced understanding of exactly how students use digital technology in their learning is required, and this study aims to do this.

The findings of research in this area are contradictory results with positive, negative and no effects of students' use of digital technology on academic attainment. Research has identified several factors that play a role in whether students are successful in their use of digital technology. Students' computer self-efficacy and attitude towards computers are closely related to academic attainment because self-efficacy is a significant positive predictor of attitudes towards computers and academic attainment in a computer literacy course (Yalcinlap, 2005).

Self-regulation is an important factor in predicting success and satisfaction with the use of digital technology in an e-learning course (Lee, 2008). This may be because students who are more controlled in their use of digital technology are able to avoid its distractions. The quality of digital technology use is also a factor in academic attainment because spending quality time engaged in knowledge construction raises academic attainment, but too much time using digital technology has a negative impact (Lei & Zhao, 2007).

Digital technology can enhance academic attainment in reading, writing and math. Reading, language and math are core competencies that are widely used as benchmark measures of academic progress (Northwest Evaluation Association, 2012). Reading and writing achievement showed a consistent increase when students used digital technologies in their learning (Conyers, Kappel, & Rooney, 1999). Spellchecking, cutting and pasting tools increase academic attainment in writing. Using digital technology in learning develops students reading and language skills as they have to locate and extract information from the Internet (Jackson et al., 2006). Students who are less anxious using digital technologies have better language abilities because computer literacy is related to oral and written literacy (Rahimi & Yadollahi, 2010). Digital technology use by students has also been found to have positive effects on academic attainment in math, because scientific calculators and graphics software amplify students' cognitive abilities (Demir & Kilic, 2009).

Research also shows that students' use of digital technology has no effect or a negative effect on academic attainment. Learning oriented digital technology use may be unrelated to academic attainment, because the educational content of the internet is not used effectively by high school students (Young, 2006). A longitudinal study found that the use of digital technology had no effect on mathematics standardized attainment in students, this is because using the internet does not generally require mathematical skills (Jackson et al., 2006).

Furthermore, research has found no correlations among digital technology usage, self-regulation and academic attainment in students (YangKim, 2009). Students' attitude towards digital technologies has been found to be independent of their cognitive style and not a predictor of academic attainment (Altun & Cakan, 2006). Research has also shown that excessive use of digital technology in learning actually lowers grades because heavy use of digital technology isolates students from face to face social communication with their peers and they are susceptible to the many distractions present online (Austin & Totaro, 2011).

There are contradictory findings on students' use of digital technology and its relation to their academic attainment and a lack of clarity about the definition of tech-savvy as a construct. In light of this, the purpose of this study is to conduct a structural analysis to examine whether students' use of digital technology in their learning predicts their academic attainment. Despite some contradictory research, it is hypothesized that the effective use of digital technologies in learning, measured through the connection, adaptation and control factors of the Tech-savvy Scale positively predicts students Measures of Academic Progress (MAP) scores in math, reading and language.

Method

Participants

The participants were an opportunity sample of 218 high school students from an international school in Metro Manila, Philippines. There were 113 females and 105 males aged 15-17. Participants were from varied ethnic backgrounds, with 65 nationalities represented in the school. All had high socio-economic status, with the majority of students owning their own laptops and the school has a high level of digital technology resources.

Instruments

Students' use of digital technology in their learning. The Tech-savvy Scale was developed for this study to measure students' use of digital technology in their learning. Exploratory factor analysis (EFA) was used to determine the factor structure of the tech-savvy construct. Three hundred and thirty six high school students completed the 30 item; four-point forced choice Likert type Tech-savvy Scale. Students circled their answers to corresponding statements ranging from 'Strongly agree' (4) to 'Strongly disagree' (1).

Three factors were extracted using principal components analysis explaining 44% of the variance in the data ($\alpha=.91$). Seven cross-loaded items were removed as well as two items that did not fit the factor labels, so the final scale had 21 items, 8 items for *adaptation*, 7 items for *connection* and 5 items for *control*. See Appendix A for factor loadings and communalities and Appendix B for the Tech-Savvy Scale.

Confirmatory factor analysis (CFA) was carried out to check the reliability and validity of the three factor Tech-savvy Scale. Three measures of goodness of fit were used, the Root Mean Squared Error of Approximation (*RMSEA*) which is a measure of the discrepancy per degree of freedom for the model, values below .05 indicate good fit. The Goodness of Fit Index (*GFI*) which accounts for the relative amount of variance in the model, and the Comparative Fit Index (*CFI*) compares fit to an independent model, for *GFI* and *CFI* values greater than .09 indicate good fit (Hooper, Coughlan, & Mullen, 2006). The three factor Tech-savvy Scale had a very good fit, with a *RMSEA* of .045, a *GFI* .916 and a *CFI* of .928

($df=186$). This shows that the instrument is reliable and valid. See Appendix C for CFA path diagram.

Academic attainment. Academic attainment was measured using the Northwest Evaluation Association's (2012) Measures of Academic Progress (MAP) tests in math, reading and language. This is a widely used and reliable measure of academic attainment in international schools and North America. The theoretical framework for the scale construction is the Rasch Model (Rasch, 1961). MAP is a computerized adaptive assessment, this means that as student responds to questions, the test responds to the student, and the next question is either more or less difficult than the previous one. MAP produces an RIT Score (Rasch Unit) for the student in math, reading and language. The RIT Scale is an equal interval scale from high to low, and average scores all have the same meaning regardless of grade level (Northwest Evaluation Association, 2012). High reliability was established for students MAP RIT Scores in math, reading and language ($\alpha=.74$).

Procedure

Data was gathered in high school classes on the 12th and 13th March 2012. Social studies teachers were contacted by the researcher to ask if they were willing to allow their students to take part in the study. The researcher then printed out the Tech-savvy Scale and distributed it among the teachers (see Appendix B). Teachers gathered data during regular class hours (7.30 am-2.30 pm) as a whole class, over the two days. Students were informed by the teacher that the scale was examining their use of digital technology in learning, and that all their answers were confidential. Teachers instructed students to read the instructions at the top of the Tech-savvy Scale and then fill out the items on the scale in pen. This was carried out in silence. After 5 minutes teachers collected the completed Tech-savvy scales and students were thanked for taking part. Teachers returned completed Tech-savvy scales to the researcher. Students MAP RIT Scores were provided by the high schools Assistant Principal, and had been gathered in testing three months earlier. Students MAP RIT Scores for math reading, and language were matched with their Tech-savvy Scores. Structural equations modeling analysis was carried out using PASW and AMOS data analysis software.

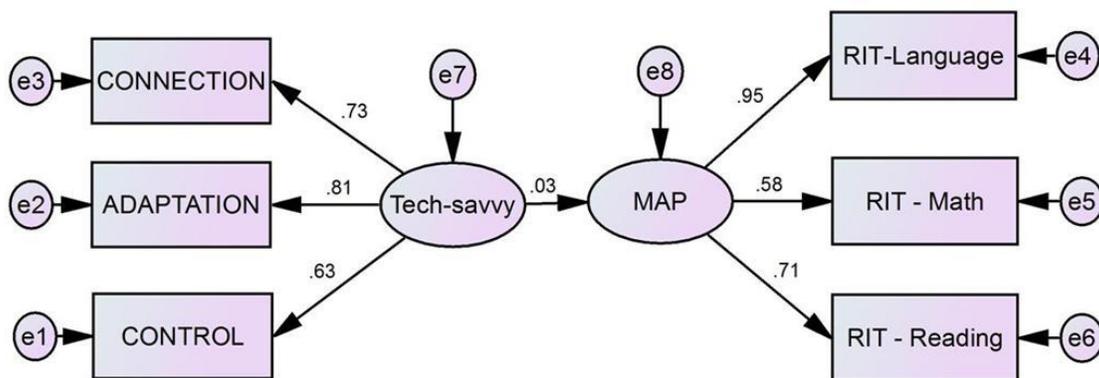
Results

The purpose of the study is to examine whether students' use of digital technologies in their learning predicts their academic attainment. Structural equation modeling (SEM) that examines causal relations between latent and manifest variables in a structural model, these are uncovered using regression equations and can be depicted pictorially (Byrne, 1998). Descriptive statistics for are presented in Table 1. Figure 1 is the SEM diagram and Table 2 is a summary of the regression equations between Tech-Savvy Scale scores and MAP RIT scores.

Table 1
Descriptive Statistics for Tech-savvy Scores and MAP RIT scores

	<u>Tech-savvy Scores</u>			<u>MAP RIT Scores</u>		
	Connection	Adaptation	Control	Math	Reading	Language
Mean	3.50	3.43	2.99	254.94	234.74	233.39
SD	.39	.52	.37	15.93	10.93	9.39

Figure 1
SEM diagram of Tech-savvy Scores and MAP Scores



Model fit was tested using Root Mean Squared Error of Approximation (*RMSEA*) and Comparative Fit Index (*CFI*) (for a description of these measures see Instruments section). The *RMSEA* was .08 and the *CFI* .97 indicating fair model fit ($df=8$). The regression equation of .03 between Tech-savvy and MAP was not significant ($p>0.05$).

Regression equations were then examined between the individual factors of Tech-savvy and MAP. The results are shown in Table 2 below.

Table 2
Standardized Regression Equations for Tech-savvy Scores and MAP RIT Scores

	Math	Reading	Language
Connection	.03	.12	.17*
Adaptation	-.08	.08	.03
Control	-.15	-.21*	-.18*

* $p<0.05$

The significant negative regression equations between control and reading and language shown in Table 2 do not support the hypotheses. However, the significant positive regression equation between connection and language supports the hypothesis.

Discussion

The hypothesis is partially supported. When examined as a one factor, Tech-savvy does not significantly predict academic attainment. This reflects the contradictory nature of previous research where positive, negative and no relationships between students use of digital technology and academic attainment. Examining the regression equations for the connection, adaptation and control factors of the Tech-savvy Scale and MAP RIT Scores for math, reading and language offers more insight into the predictive relationships between the variables.

Students' Tech-savvy Scores for connection significantly positively predicts their MAP RIT Scores for language. Students who rate themselves highly on their ability to connect with information and others using digital technology have higher academic attainment in language. The result of connection predicting academic attainment in language is consistent with previous research findings (Conyers et al., 1999; Rahimi & Yadollahi, 2010). Students who are tech-savvy or 'computer literate' in terms of connecting with information and others in their learning, also perform better in academic attainment tests of language. This suggests that literacy might be general ability that crosses contexts from language use in a traditional academic context and also in a digital context. These students are fluent in both of these domains, hence the positive regression equation between these two factors. Furthermore, using software such as word processors and carrying out internet based research does help students develop their academic attainment in language (Jackson et al., 2006).

The other significant result is the negative regression equations for Tech-savvy Scores for control and MAP RIT Scores for reading and language, which does not support the hypothesis. Unexpectedly, as students who rate their ability to control their use of digital technology highly have lower academic attainment in reading and language.

However, this finding supports Bennet and Maton's (2010) calling for a more nuanced understanding of students' use of technology in their learning. The control factor of the Tech-savvy Scale looks at how controlled or self-regulated students are in their use of digital technologies.

Students who score highly in reading and language tests have an increased awareness of the distractions of digital technology, hence they rate themselves lower on control. They have an accurate perception the limitations of digital technology and how it can potentially have negative effects on their academic attainment. This awareness in turn enables them to use technology more effectively in their learning, which is reflected in their higher academic attainment scores in language and reading.

This contrasts with Yalcinlap's (2005) and Lee's (2008) findings, because this study shows that high self-efficacy in terms of controlled self-regulated use of digital technology in students does not predict higher academic attainment. It also may be that the students who rate themselves lower on the control factor of the Tech-savvy Scale have a clearer understanding of intricacies of shifting between academic and non-academic contexts when using digital technology. It also may be that the academic attainment measure in this differs from those in the previous studies which focused on computer literacy and e-learning tasks.

The finding is also consistent with previous research showing how excessive use of digital technology in learning can have a negative impact on academic attainment (Lei & Zhao, 2007). The overuse of digital technology isolates students from connecting with other students and learning methodologies (Austin & Totoro, 2011). Similar to what Young (2009) proposes who rate themselves highly on control may over reliant on digital technology or not

using it in an effective manner. These students perform less well on tests of academic attainment that require them to be disconnected to their usual digital technology.

However, there are some limitations to this study, the fair model fit suggests that the predictive relations between the variables are not yet clearly established. The insignificant regression equation between tech-savvy and academic attainment as one factor suggest that tech-savvy and academic attainment may be independent of each other, particularly in relation to academic attainment in math, which is what Jackson et al. (2006) also found. There may be other significant mediating factors that connect tech-savvy to academic attainment and these should be investigated.

The use of the self-report Tech-Savvy Scale meant that social desirability bias may have affected students' responses. The sample size of this study was limited to students who are from high socio-economic status and a school where digital technology use is highly integrated into their learning. Further research is required to see whether similar findings are observed in other contexts, for example with students who have less experience of the use of digital technology in learning.

In conclusion, the findings suggest that there is a need to move beyond viewing students as tech-savvy 'digital natives' who are extremely effective in their use of digital technology to enhance their learning. Students still need to be taught to be more self-regulated when learning using technology. Educators need to understand that even though students might have high self-efficacy in terms of being controlled users of digital technology, a continued effort is needed to improve the quality of their use of digital technology in learning. Students need to be encouraged to develop accurate perceptions of the strengths and limitations of digital technology in their learning and this will help their academic attainment.

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Appendix A

Factor loadings and communalities based on a principle components analysis with promax rotation for 21 items from the Tech-savvy Scale (N = 336)

	Connection	Adaptation	Control	Communality
I communicate using digital technology in order to enhance my learning.	.76			.34
I use digital technology to connect and collaborate with others when learning.	.72			.45
I prefer to learn using digital technologies than without them.	.71			.39
I find that using digital technology makes learning easier and more efficient.	.67			.52
I am eager to use new digital technologies in my learning.	.65			.35
I know that digital technology enables me to understand the topics I learn better.	.60			.26
I see digital technology as a useful tool to help me with my learning.	.53			.58
I ensure that digital technology allows me to be creative in my learning.	.38			.43
I navigate digital technology swiftly and easily when learning.		.87		.40
I understand that digital technology is constantly developing and I easily adapt to the changes.		.75		.39
I customize digital technology to suit my own learning needs.		.72		.35
I understand how to use the appropriate digital technology for different learning tasks.		.62		.55
I manipulate the format of the information using digital technology when learning.		.52		.44
I use digital technology to manage several tasks at once when learning.		.46		.34
I know how to find my own solutions to the problems I encounter using digital technology in my learning.			.81	.46
I ensure that digital technology does not distract me from my learning.			.68	.38
I know how to use digital technology in my learning without being distracted.			.68	.63
I think carefully about the most efficient way to use digital technology before engaging in a learning task.			.55	.36
I make decisions about which digital technologies are useful or not useful to me in my learning.			.54	.53
I conduct myself in an ethical and responsible manner when using digital technology in my learning.			.49	.57
I use digital technology to help me stay organized and monitor my learning.			.42	.52

Note. Factor loadings < .3 are suppressed

Appendix B
Tech-savvy Scale

Name:.....Grade:.....Gender: M / F

Instructions: The following items assess how you use digital technology in your learning. Read each item carefully and respond using the scale provided. Circle the number that most closely describes your use of digital technology.

While answering questions think about how you generally use digital technology in your day-to-day learning (PCs, laptops, tablets, etc).

ALL YOUR ANSWERS ARE CONFIDENTIAL

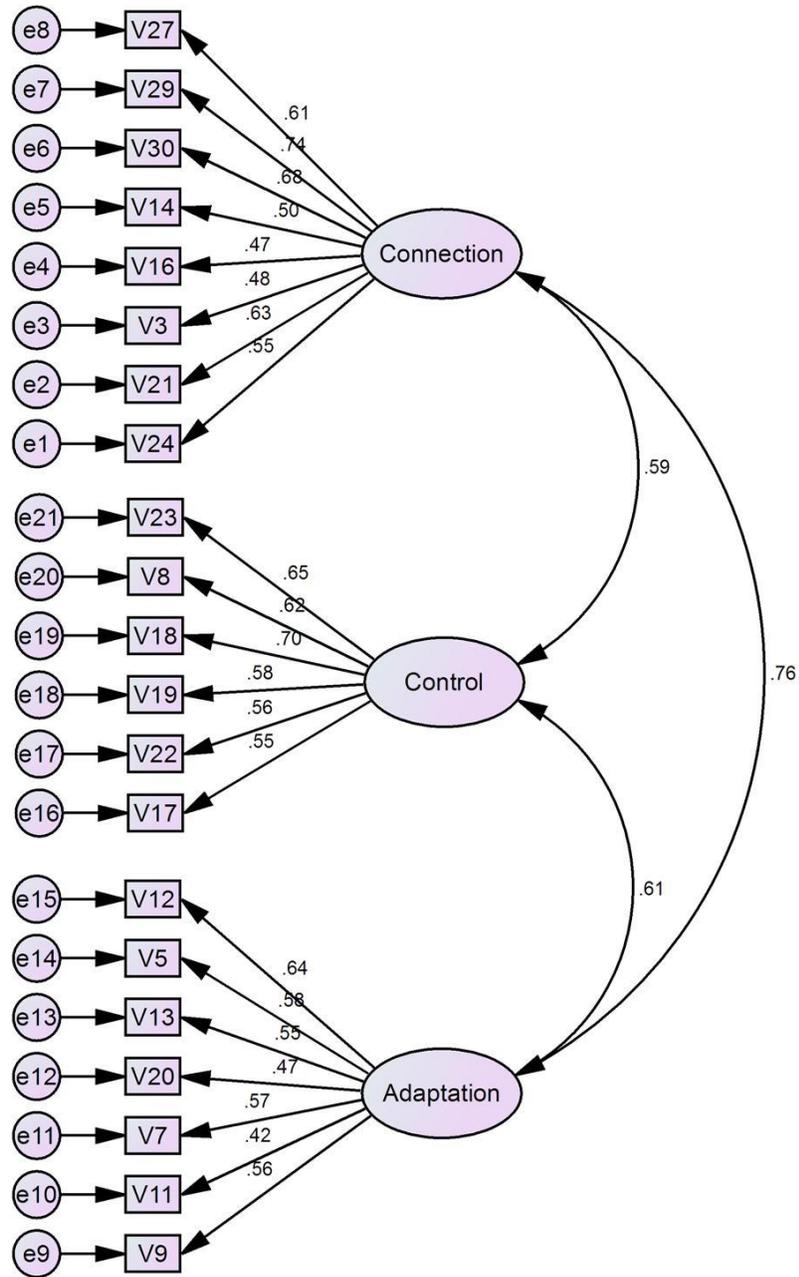
	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1. I communicate using digital technology in order to enhance my learning.	4	3	2	1
2. I use digital technology to connect and collaborate with others when learning.	4	3	2	1
3. I prefer to learn using digital technologies than without them.	4	3	2	1
4. I find that using digital technology makes learning easier and more efficient.	4	3	2	1
5. I am eager to use new digital technologies in my learning.	4	3	2	1
6. I know that digital technology enables me to understand the topics I learn better.	4	3	2	1
7. I see digital technology as a useful tool to help me with my learning.	4	3	2	1
8. I ensure that digital technology allows me to be creative in my learning.	4	3	2	1
9. I navigate digital technology swiftly and easily when learning.	4	3	2	1
10. I understand that digital technology is constantly developing and I easily adapt to the changes.	4	3	2	1
11. I customize digital technology to suit my own learning needs.	4	3	2	1

Cont. Appendix B

12. I understand how to use the appropriate digital technology for different learning tasks.	4	3	2	1
13. I manipulate the format of the information using digital technology when learning.	4	3	2	1
14. I use digital technology to manage several tasks at once when learning.	4	3	2	1
15. I know how to find my own solutions to the problems I encounter using digital technology in my learning.	4	3	2	1
16. I ensure that digital technology does not distract me from my learning.	4	3	2	1
17. I know how to use digital technology in my learning without being distracted.	4	3	2	1
18. I think carefully about the most efficient way to use digital technology before engaging in a learning task.	4	3	2	1
19. I make decisions about which digital technologies are useful or not useful to me in my learning.	4	3	2	1
20. I conduct myself in an ethical and responsible manner when using digital technology in my learning.	4	3	2	1
21. I use digital technology to help me stay organized and monitor my learning.	4	3	2	1

Appendix C

Path Diagram for Standardized Estimates for the 21 Items of the Tech-savvy Scale (N=336)



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What do Graduate Students in Theology Feel in School?

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Abstract This study explored two domains of academic emotions—positive emotions (enjoyment, hope and pride) and negative emotions (anger, anxiety, shame, hopelessness, and boredom) and their relations to academic control and achievement. The Academic Emotion Questionnaire AEQ (Pekrun et al., 2005) was given to ($N=100$) graduate students in theology (Loyola School of Theology of Ateneo de Manila University, Maryhill School of Theology and Theology and Religious Education Department of De La Salle University). There was a goodness of fit. Hopelessness, boredom, anger and anxiety loaded. Positive emotion and negative emotion were negatively correlated. At the end, some suggestions were given on how to help students increase their sense of academic control vis-à-vis their academic goal and promote positive academic emotions resulting to better score performance.

Keywords: academic control, positive and negative academic emotions, academic goal

Introduction

In counseling, counselors try their very best to determine what the client feels but it is seldom asked how students feel in school. This is also true with educational research (Pekrun & Frese, 1992; Schutz & Lanehart, 2002), students' emotions are seldom considered. In fact, emotions can facilitate or impede students' self-regulation of learning and performance (Pekrun, Goetz, Titz, & Perry, 2002). The question is: which emotions are facilitative in the teaching and learning situation and which ones tend to impede?

This study explored how graduate students in theology feel in school and its relation to their performance. Linnenbrink and Pintrich (2002) said that there is a relationship between students' goals and emotions. Mastery goals are positively related to students' positive affect (Linnenbrink, 2005; Wolters, Yu, & Pintrich, 1996). When students have positive emotions, they tend to perform better while when they have negative emotions, they tend to perform poorly. Performance-avoidance goals are positively related to students' test anxiety (Elliot & McGregor, 1999; McGregor & Elliot, 2002). The results of the study can be helpful on how to enhance the students' performance.

Emotions

Moods unlike *emotions* have lower intensity and have no specific referent (Pekrun, 2006; Rosenberg, 1998). Emotions, on the other hand, have specific affective, cognitive,

physiological and behavioral elements (Scherer, 2000). For example, anxiety can include feelings like tense and uneasy (affective), worries (cognitive), impulses to escape from the situation (motivational), and peripheral activation (physiological) [Scherer, 2009]. The motivational component was added in 2009, to which Scherer (2009) said that anxiety test instruments had neglected.

Having knowledge about these aspects of emotions can help improve the teaching and learning situation. As a result, students can be motivated to achieve more.

Achievement Emotions

Studies on emotions related to achievement outcomes are called achievement emotions. They are emotions like fear of failure, or pride and shame following performance feedback (Folkman & Lazarus, 1985; Weiner, 1985; Zeidner, 1998). Achievement emotions are both related to achievement activities and/or outcomes (Pekrun, 2006). Some examples are enjoyment or boredom during teaching and learning, and anger due to demands of teaching and learning process (Pekrun, 2006; Pekrun et al., 2010). The achievement emotions help the students perform better. It is important that teachers return the papers, projects and other outputs of students so that they get feedback on their performance.

As already stated, there are two types of achievement emotions: *activity emotions* (ongoing achievement-related activities) and *outcome emotions* (outcomes of these activities) [Pekrun et al., 2002; Pekrun, Elliot, & Maier, 2006a]. Enjoyment, boredom, frustration, and/or anger as a result of teaching and learning situation, are examples of activity-related achievement emotions (Pekrun et al., 2002, 2010). Pekrun (2006) also included anticipatory emotions (e. g., hope for success, anxiety of failure) and retrospective emotions (e.g., pride or shame experienced after achievement feedback).

The positive emotions like pleasant/enjoyment were also differentiated from negative emotions like unpleasant/anxiety (Pekrun, 2006; Feldman, Barrett, & Russell, 1998; Pekrun et al., 2002; Linnenbrink, 2007). These positive and negative academic emotions motivate the students to achieve more.

Control-value Theory of Achievement Emotions

Pekrun (2006; Pekrun et al., 2007) used control-value theory as a framework for defining emotions, constructing scales, and validating the instrument. The theory says that achievement emotions and goals happen when the person feels (appraisal) in control or extinguished when the person feels out of control [Skinner, 1996]. “Value appraisals” (Pekrun, 2006) relate to the subjective importance of achievement-related activities and outcomes. When the value appraisal is high, the person strives harder resulting to high grades (outcome) and when value appraisal is low, there is less efforts resulting to low grades. Another word for this is “academic control” (Perry, Hladkyj, Pekrun, & Pelletier, 2001). If the students perceive that they have more control then they perform better. They can be positively influenced giving the assessment rubrics earlier will help the students have academic control and can result to better performance. However, there are also mediating mechanisms responsible for these effects, including students’ motivation, strategy used, and regulation of learning (Pekrun, 1992b, 2006).

Attributional Theories of Achievement Emotions

The attributional analysis of achievement motivation states that persons who are high in achievement motivation: (1) have high achievement related activities, (2) persist despite of failure and continue goal activities, and (3) choose difficult tasks more frequently (Weiner & Kukla, 1970; Weiner et al., 1971). Every success achieved is a source of pride and increase self-confidence. The feedback and encouragement given to the students are valuable. Weiner (1980) said that thoughts determine what we feel and feelings determine what we do.

Process Model of Perceived Control

The perceived control model distinguishes three different sets of beliefs: (a) certain potential causes can produce outcomes, (b) one has access to potential causes, and (c) one can produce desired outcomes (Skinner, Chapman, & Baltes, 1988). The learning environment and the teachers' behavior are determinants of student's perceived control in school performance (Crandall & Crandall, 1983; Deri, Schwartz, Sheinman, & Ryan, 1981; Lamb & Skinner, 1991; Connell & Wellborn, 1991). Teachers can enhance students' motivation in school and can bring about better performance.

Effects of Emotions on Learning and Performance

Pekrun (2006) further stated that positive emotions like enjoyment, hope, and pride promote motivation with positive effects on performance. On the other hand, negative emotions such as hopelessness and boredom have negative effects on performance. Consequently, teaching and learning should promote positive emotions (Pekrun, 2006; Pekrun et al., 2002b). Classrooms that are characterized by enjoyment of teaching and learning can promote positive development and achievement (Frenzel, Goetz, Lu, Pekrun, & Sutton, 2009). On the other hand, emotions like anger, anxiety, and shame results to avoidance of failure and have beneficial consequences for most students (Boekaerts, 1993; Hembree, 1988; Pekrun, 2006). Needless to say that a right amount of anger, anxiety and shame can also promote performance.

Pleasant emotions are positively related with learning related motivation, self-regulatory efforts, activation of cognitive resources, and performance (Ashby, Isen, & Turken, 1999; Pekrun, 2006; Pekrun et al., 2002a). Thus, a desirable goal of teaching is to enhance students' positive achievement emotion that is balanced by the negative achievement emotion.

Achievement Emotions in Culture

Culture is usually ignored in studies. Zang and Cross (2011) observed that Americans tend take a positive view of successes, and a common adage is "If it feels good, do it," which reflects the tendency to persist on those things one does well. On the other hand, the Chinese tend to take a positive view of failures, and personal losses. They need not mean the end of one's dreams. For Filipinos, the common adage is, "Nasa tao ang gawa, nasa Diyos ang awa" (Effort is on people; mercy is on God.). The control-value theory of achievement emotion seems to be embedded even in the Philippine culture.

In the theology of grace, it says: “God loves us first.” This brings us to the perceived control model, where the three sets of beliefs are all satisfied: (a) certain potential causes can produce outcomes, (b) one has access to potential causes, and (c) one can produce desired outcomes (Skinner, Chapman, & Baltes, 1988).

Achievement Emotion Questionnaire (AEQ)

There had been different versions of the original Achievement Emotion Questionnaire (AEQ). Some had been specific for a particular subject like Mathematics (Frenzel, Thrash, Pekrun, & Goetz, 2007; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011). It was also tried for cross-cultural usability and produced similar findings (Frenzel, Thrash, et al., 2007; Pekrun et al., 2010; Titz, 2001). Even with younger students, the instrument was also successful (Frenzel, Pekrun, et al., 2007; Frenzel, Thrash, et al., 2007; Lichtenfeld, Pekrun, Stupnisky, Reiss, & Murayama, 2010).

Present Study

This study focused on what graduate students in theology feel in school. The original version of AEQ was used. It was hypothesized that since most of them just go through the motion of studying theology (case of seminarians) to become priests, many of them will have negative emotions in school. However, the right amount of negative emotions (beneficial consequence) will also be helpful for students. This study will be helpful to determine how to improve the teaching and learning situation for the graduate school students in theology.

Method

Research Design

The descriptive cross-sectional design was used in this confirmatory factor analysis (CFA). The data were collected from the participants at a single point in time. Data were compared and analyzed across the variables of interest in a relatively brief period of time (Johnson, 2001). It is exploratory because it tested a model (see figure 1) where there are two latent variables (positive emotions and negative emotions) and eight academic emotions were investigated (manifest variables—positive: enjoyment, hope, pride; and negative: anger, anxiety, shame, hopelessness, boredom).

Participants and Procedure

The participants were 100 graduate students in theology ($N=93$ males and $N=7$ females). A further breakdown resulted to ($N= 89$ seminarians, $N=2$ priests, $N=3$ religious sisters, $N=2$ ex-seminarians, and $N=4$ lay persons). They are from 3 theological schools in Metro Manila (Loyola School of Theology\LST of Ateneo de Manila University; Maryhill School of Theology\ MST; and Theology & Religious Education\TRED of De La Salle University) where the researcher is teaching. In terms of nationality ($N=20$ foreigners, and $N=80$ Filipinos). They are all students in (pastoral) counseling. Their ages varies ($M= 31.87$ years; $Mode=33$, $SD= 5.76$) with the youngest at 24 and the oldest at 49.

Measure

The Academic Emotion Questionnaire AEQ (Pekrun et al., 2005) was administered to graduate students in theology. This instrument is comprised of 75 items that is designed to measure each of the eight academic emotions. This instrument measured three positive or pleasant academic emotions (enjoyment, hope, pride) and five negative or unpleasant academic emotions (anger, anxiety, shame, hopelessness, boredom). The participants responded to a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The model's CFIs are above .95 and RMSEAs below .05 are thought to indicate good fit.

Statistical Analysis

To examine the reliability and constructive validity of this instrument to graduate students in theology, a descriptive statistics and reliability coefficients were computed.

To test for construct validity of the scale, a confirmatory factor analysis (CFA) was used. More specifically, two-factor (CFA) latent constructs of positive academic emotions and negative academic emotions were computed. Under the positive academic emotion were three manifest constructs: enjoyment, hope, and pride. Under the negative academic emotion were five manifest constructs: anger, anxiety, hopelessness, boredom, and shame. For additional test construct validity, zero-order correlations among the manifest variables were computed. Evidence for construct validity would be shown if the positive academic emotions are positively correlated with each other and the negative academic emotions are also positively correlated with each other.

Results

The Cronbach's alpha values for each scale of AEQ were calculated. Each reliability estimate ranges from 0.84 to 0.94. They were all acceptable and were presented in Table 1. The last column showed the original version Cronbach's alphas (from 0.77 to 0.92) of AEQ (Pekrun et al., 2005). It is noticeable that the present study had higher values. Both had the original 75-item test. The overall Cronbach's alpha for the academic emotions of this study is high at 0.94.

Table 1
Descriptive Statistics and Reliability Coefficients

Academic Emotion	Mean	Standard deviation	Cronbach's alpha	Cronbach's alpha for original version ^a
Enjoyment	1.87	4.59	0.84	0.77
Hope	1.90	2.84	0.84	0.77
Pride	2.32	3.38	0.84	0.75
Anger	3.86	5.29	0.91	0.86
Anxiety	3.42	7.51	0.92	0.84
Shame	3.42	7.53	0.91	0.86
Hopelessness	3.86	6.61	0.93	0.90
Boredom	3.76	7.02	0.94	0.92

^aFrom Pekrun, Goerts, and Perry (2005)

Establishing Construct Validity through Confirmatory Factor Analysis

In Table 2, the fit indices of the study met the baseline criteria for best fit ($\chi^2=314$, RMSEA= 0.09, MDFI= 0.93, PGI= 0.96, APCI, BCFI= 0.940). All are within acceptable range (Byrne, 2001).

Table 2
Goodness of Fit Indices

RMSEA	MDFI	PGI	APCI	χ^2	BCFI
0.088	0.929	0.965	0.933	314.62	0.940

A zero-order correlation was obtained between the eight manifest variables (see Table 3). The construct validity would be supported if the three kinds of positive academic emotions are positively correlated with each other, and if the five kinds of negative academic emotions are positively correlated with each other. The zero-order correlations supported this assumption.

Table 3
Zero-order Correlations among the Eight Manifest Variables

		Inter-Item Correlation Matrix							
		2	3	4	5	6	7	8	
Positive	1. Enjoyment	---							
Academic	2. Hope	.617***	---						
Emotions	3. Pride	.375***	.453***	---					
Negative	4. Anger	-.406***	-.392***	-.129***	---				
Academic	5. Anxiety	-.278***	-.324***	-.027	.644***	---			
Emotions	6. Shame	-.115***	-.193***	-.090	.545***	.682***	---		
	7. Hopelessness	-.206***	-.318***	-.164***	.639***	.583***	.691***	---	
	8. Boredom	-.352***	-.361***	-.229***	.620***	.651***	.589***	.737***	---

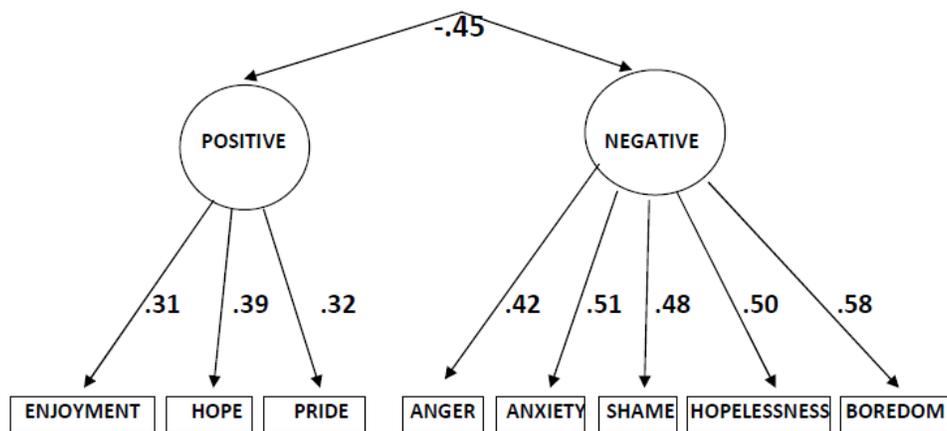
*** $p < .001$

In terms of factor loading (see Table 4), none of the positive academic emotions loaded. However, four of the negative academic emotions loaded (anger= 2 of 9, anxiety= 2 of 11, hopelessness= 4 of 11, boredom= 3 of 11). This showed that for the graduate students in theology, the negative academic emotions are more felt. The academic emotions of hopelessness and boredom top the negative academic emotions

Table 4
Factor Loading

5A. I get annoyed about having to study.	.71
9A. After extended studying, I'm so angry that I get tense.	.70
Anxiety (2 out of 11)	
2AX. I get tense and nervous while studying.	.71
9AX. When I have to study, I start to feel queasy.	.71
Hopelessness (4 out of 11)	
1HL. I feel hopeless when I think about studying.	.71
2HL. I feel helpless.	.73
3HL. I feel resigned.	.75
4HL. I'm resigned to the fact that I don't have the capacity to master this material.	.73
Boredom (3 out of 11)	
1B. The material bores me.	.73
2B. Studying for my courses bores me.	.77
10B. The material bores me so much that I fell depleted.	.74

Figure 1
Confirmatory Factor Analysis



The positive academic emotions are negatively correlated to negative academic emotions.

Discussion

It was hypothesized that since most of the graduate students in theology just go through the motion of studying theology (case of seminarians) to become priests, many of them will have negative feelings in school. It was confirmed in the study that the graduate students in theology generally have the negative academic emotions of anger, anxiety,

hopelessness, and boredom. Their achievement goal (Maehr, 1989) is priesthood and not necessarily on getting high grades. Although many of them do get high grades probably due to their appraised control value or academic control (Perry, Hladkyj, Pekrun, & Pelletier, 2001).

There are four formation areas for future priests: community life, prayer life, apostolic life, and academic life. Looking at attributional analysis of achievement motivation (Weiner, & Kukla, 1970; Weiner et al., 1971), their source of motivation is more on the achievement goal of priesthood that motivate them to continue in spite of formation-linked difficulties/challenges, being academic as one of them.

Knowing that academic life is just one aspect of formation, those who teach them in the schools of theology can continue to motivate them to produce desired outcomes (Skinner, Chapman, & Baltes, 1988). Since the learning environment and the teachers' behavior are determinants of student's perceived control in school performance (Crandall & Crandall, 1983; Deri, Schwartz, Sheinman, & Ryan, 1981; Lamb & Skinner, 1991; Connell & Wellborn, 1991), the school community relations can be improved. A better environment can be created where the school can really become a second home. Second, teachers can also effect motivation in school by witnessing to what they are teaching. Since many of them are also priests, they can make Christ incarnate. A priest is an "Alter Christus" (another Christ). Lastly, teachers should emphasize student responsibility and autonomy via homework assignment (Trautwein, Niggli, Schnyder, & Lu, 2009).

There are some recommendations to help graduate theology students have more positive academic emotions and improve their performance:

1. The quality of instruction can be improved for clarity, structure and presentation. This will increase their sense of control and consequently their positive academic emotions.
2. It is important that the academic materials are matched according to the capability of the students. In this way, their perceived academic control is improved that will result to an increase in positive academic emotions and better performance. A good screening process will help process.
3. More classroom interactions (Krapp, 2005), intra-school and interschool interactions that can meet the students' need for social relatedness can increase positive academic emotions and decrease academic boredom.
4. Giving students more autonomy and cooperative learning will help students have self-regulation and will increase their perception of academic control resulting to positive academic emotions.
5. Frequent and immediate feedback can have attributional impact on their control appraisals and outcome emotions. Feedback can center on how the students can improve to boost their sense of control rather than contributing to academic anxiety and hopelessness.

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Appendix
Academic Emotions Questionnaire (AEQ)

___ Male or ___ Female Age: ___

School: _____

Direction: Pls. indicate how you typically feel, after having studied. Encircle the number of your choice.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1E. I look forward to studying.	1	2	3	4	5
2E. I enjoy the challenge of learning the material.	1	2	3	4	5
3E. I enjoy acquiring new knowledge.	1	2	3	4	5
4E. I enjoy dealing with the course material.	1	2	3	4	5
5E. Reflecting on my progress in coursework makes me happy.	1	2	3	4	5
6E. I study more than required because I enjoy it so much.	1	2	3	4	5
7E. I am happy about the progress I made that I am motivated to continue studying.	1	2	3	4	5
8E. Certain subjects are so enjoyable that I am motivated to do extra readings about them.	1	2	3	4	5
9E. When my studies are going well, it gives me a rush.	1	2	3	4	5
10E. I get physically excited when my studies are going well.	1	2	3	4	5
1H. I have optimistic view toward studying.	1	2	3	4	5
2H. I feel confident when studying.	1	2	3	4	5
3H. I feel confident that I will be able to master the material.	1	2	3	4	5
4H. I feel optimistic that I will make good progress at studying.	1	2	3	4	5
5H. The thought of achieving my learning objectives inspires me.	1	2	3	4	5
6H. My sense of confidence motivates me.	1	2	3	4	5
1P. I'm proud of myself.	1	2	3	4	5
2P. I'm proud of my capacity.	1	2	3	4	5
3P. I think I can be proud of my accomplishments, I am very motivated.	1	2	3	4	5

Cont. Appendix

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4P. Because I want to be proud of my accomplishments, I am very motivated.	1	2	3	4	5
5P. When I solve a difficult problem in my studying, my heart beats with pride.	1	2	3	4	5
6P. When I excel at my work, I swell with pride.	1	2	3	4	5
1A. I get angry when I have to study.	1	2	3	4	5
2A. Studying makes me irritated.	1	2	3	4	5
3A. I get angry while studying.	1	2	3	4	5
4A. I'm annoyed that I have to study so much.	1	2	3	4	5
5A. I get annoyed about having to study.	1	2	3	4	5
6A. Because I get so upset over the amount of material, I don't even want to begin studying.	1	2	3	4	5
7A. I get so angry I feel like throwing textbook out of the window.	1	2	3	4	5
8A. When I sit at my desk for a long time, my irritation makes me restless.	1	2	3	4	5
9A. After extended studying, I'm so angry that I get tense.	1	2	3	4	5
1AX. When I look at the books I still have to read, I get anxious.	1	2	3	4	5
2AX. I get tense and nervous while studying.	1	2	3	4	5
3AX. When I can't keep up with my studies, it makes me fearful.	1	2	3	4	5
4AX. I worry whether I'm able to cope with all my work.	1	2	3	4	5
5AX. The subject scares me since I don't fully understand it.	1	2	3	4	5
6AX. I worry whether I have properly understood the material.	1	2	3	4	5
7AX. I get so nervous that I don't even want to begin to study.	1	2	3	4	5
8AX. While studying, I feel like distracting myself in order to reduce anxiety.	1	2	3	4	5
9AX. When I have to study, I start to feel queasy. (ill)	1	2	3	4	5
10AX. As time runs out, my heart begins to race.	1	2	3	4	5

Cont. Appendix

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11AX. Worry about not completing the material makes me sweat.	1	2	3	4	5
1S. I feel ashamed.	1	2	3	4	5
2S. I feel ashamed about my constant procrastination.	1	2	3	4	5
3S. I feel ashamed that I can't absorb the simplest of details.	1	2	3	4	5
4S. I feel ashamed because I am not as adept as others in studying.	1	2	3	4	5
5S. I feel embarrassed. About not being able to fully explain the material to others.	1	2	3	4	5
6S. I feel ashamed when I realize that I lack ability.	1	2	3	4	5
7S. My memory gaps embarrass me.	1	2	3	4	5
8S. Because I have had so much troubles with the course material, I avoid discussing it.	1	2	3	4	5
9S. I don't want anybody to know when I haven't been able to understand something.	1	2	3	4	5
10S. When somebody notices how little I understand, I avoid eye contact.	1	2	3	4	5
11S. I turn red when I don't know the answer to a question relating to the course material.	1	2	3	4	5
1HL. I feel hopeless when I think about studying.	1	2	3	4	5
2HL. I feel helpless.	1	2	3	4	5
3HL. I feel resigned.	1	2	3	4	5
4HL. I'm resigned to the fact that I don't have the capacity to master this material.	1	2	3	4	5
5HL. After studying, I'm resigned to the fact that I haven't got the ability.	1	2	3	4	5
6HL. I'm discouraged about the fact that I'll never learn the material.	1	2	3	4	5
7HL. I worry because my abilities are not sufficient for my program of studies.	1	2	3	4	5
8HL. I fell so helpless that I can't give my studies my full efforts.	1	2	3	4	5
9HL. I wish I could quit because I can't cope with it.	1	2	3	4	5

Cont. Appendix

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
10HL. My lack of confidence makes me exhausted before even I start.	1	2	3	4	5
11HL. My hopelessness undermines all my energy.	1	2	3	4	5
1B. The material bores me.	1	2	3	4	5
2B. Studying for my courses bores me.	1	2	3	4	5
3B. Studying is dull and monotonous.	1	2	3	4	5
4B. While studying this boring material, I spend my time thinking of how time stands still.	1	2	3	4	5
5B. The material is so boring that I find myself daydreaming.	1	2	3	4	5
6B. I find my mind wandering while I study.	1	2	3	4	5
7B. Because I'm bored, I have no desire to learn.	1	2	3	4	5
8B. I would rather put off this boring work till tomorrow.	1	2	3	4	5
9B. Because I'm bored, I get tired sitting at my desk.	1	2	3	4	5
10B. The material bores me so much that I fell depleted.	1	2	3	4	5
11B. While studying, I seem to drift off because it's so boring.	1	2	3	4	5



Determining the Content Validity of a Linear Pattern Test

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Abstract Determining the content validity of a measure a very important process. It ensures that the test constructed is able to represent the content domain to be assessed accurately and meaningfully. In this study, there are three key aspects in determining the content validity of a linear pattern test, namely (a) table of specification, (b) item relevance, and (3) content coverage. The linear pattern test consists of eight interview tasks covering four content domains of linear equation topic based on Malaysian Form Two, Form Three, and Form Four syllabus namely, linear pattern (pictorial), direct variation, concepts of function and arithmetic sequence. Two tasks were constructed for each content domain assessed. The mean value of panel judgment will also be discussed in detail. Based on the responses given by the three panels in reviewing aspects of the item relevance and the content coverage, the measurement tool of this study has been found to possess an acceptable degree of content validity.

Keywords: content validity, linear pattern test, item relevance, content coverage

Introduction

Determining the validity is a very important process for all types of achievement test. Without this process, the test results may fail to outline the right conclusion. As a result, the test can be considered invalid. Gay and Airasian (2009) stated that content validity is the degree to which a test measures an intended content area. It is important to ensure that the test is able to represent the content domain to be assessed accurately and meaningfully. According to Popham (1999), content validity demonstrates the degree to which the sample of items or questions on a test representative of some defined universe or domain of content. He claimed that there are three key aspects in determining the validity of content, namely: (a) table of specification (b) item relevance, and (c) content coverage. Each of this aspect will be discussed in detail. In this study, content validity of linear pattern test had been determined based on Popham's three key aspects, to ensure that the eight interview tasks constructed were covering four content domains of linear equation topic based on Malaysian Form Two, Form Three and Form Four syllabus.

Table of Specifications

Table of Specifications (TOS) is an important 'tool' to clarify the content domain of a test. Normally, the Table of Specification is built in the form of tables consisting of two main dimensions. The first dimension is the topics or subtopics to be assessed. The second dimension describes the mental processes to be assessed for each of the subtopic or topics. Table 1 shows a Table of Specification for a linear pattern test, which is one of the algebra topics in Mathematics. It was developed based on the Mathematics Curriculum Specifications of Form Two, Form Three and Form Four (Ministry of Education, 2003). Eight interview tasks were constructed to assess the linear equation solving ability among Form Four students. The content of the table had been divided into four domains, namely linear pattern (pictorial), direct variation, concepts of function and arithmetic sequence. Two tasks were constructed for each content domain to be assessed (see an example of task in Appendix A). A total of 101 questions were prepared to evaluate the four content domains of this topic. Each content domain was measured by three categories of skills or three cognitive complexity (Kubiszyn and Borich, 2003), namely investigating the patterns, generalizing of patterns and applying linear equations. The descriptions of each content domain are as follows:

a) Linear pattern (pictorial)

In mathematical definition, linear pattern is said to exist when the coordinates of two variables (dependent variable and independent variable) have the same relationship and connected by a certain rule. For example, a relationship between variables x and y is called linear if the graph of related (x, y) value is a straight line. This graph pattern occurs when there is a constant difference between successive y values as x values change uniformly. In this study, linear pattern is expected to be a pivotal component which would drive student's solving ability in algebra, initially in recognizing the pattern and later forming and applying the algebraic expression and linear equation to solve the related and new problem situation. Based on the syllabus, the important formulas exist for working the linear pattern (pictorial) are $y = x + a$, and $y = mx + a$ where x and y are variables and a and m are constant.

b) Direct variation

Direct variation is a situation in which two quantities such as hours and pay, distance and time, increase or decrease at the same rate. It means the ratio between the quantities is constant; as one quantity doubles, the other quantity also doubles. In mathematical definition, direct variation means two variables quantities have a constant (unchanged) ratio. It is said that one quantity is directly proportional to another when the ratio of the two quantities is constant. The constant is the constant of proportionality and the ratio is a direct proportion (Lee, 2003; Key Curriculum Press, 2003; The Annenberg/CPB, 2005). In this study, direct variation is described by an equation of the form: $y=kx$ where x and y are variables and k is called the constant of variation. Student's cognitive ability in direct variation tasks had been studied (e.g. Swafford and Langrall, 2000; Lee, 2003). Swafford and Langrall observed that, although majority of 6th grade students were often able to write equation to represent the direct variation situation but they tended to use mental mathematics strategies to solve the problem. In other words, most of students showed

a remarkable ability to generalize the direct variation situation but they rarely to apply it in solving the related problem. In constructing the tasks with respect to direct variation, the findings of previous studies were recognized by establishing linear equation solving ability expectations involving with representation and application of direct variation equation.

c) Concept of function

Function is the relationship of two variables which are associated with each other according to some given condition or rule. For instance, y is a function of x ; represents that for each value of x , there is only one value of y . (ThinkQuest, 1998). Function is also defined as a process that receives input and returns a unique value of output. In general, function is a rule of correspondence connecting the element of one set (the domain of the function) with the element of another set (the range of the function). For example, the perimeter of a square is completely determined by the length of its side (Cathcart, Pothier, Vance & Bezuk, 2000). According to Edwards (2000), Sheffield and Cruikshank (2000), understanding of functional concept can be investigated through the function machine and guess my rule method. It is the excellent method that focuses on the input-output nature of functions, which is the most important property of functions. Thus, In this study, the formulas exist for working the concept of function is $y = mx + a$ where x is the input value, y is the output value, a and m are constant.

d) Arithmetic sequence

An arithmetic sequence is a sequence of numbers in which the difference of any two consecutive terms is constant. This difference is called common difference. For example, 3, 6, 9, 12 is an arithmetic sequence because to progress from one term to the next, like 6 to 9, it must be added a constant number 3 to the previous term. In this example, 3 is called common difference. Common difference is denoted by d . If the difference in consecutive terms is not constant, then the sequence is not arithmetic. To produce the next term d , may be positive or negative; so, a sequence can increase or decrease. An important formula exists for working with an arithmetic sequence... $a_n = a_1 + (n-1)d$, where a_n represents the n^{th} term, a_1 represents the first term, n represents the total numbers, and d represents the common difference.

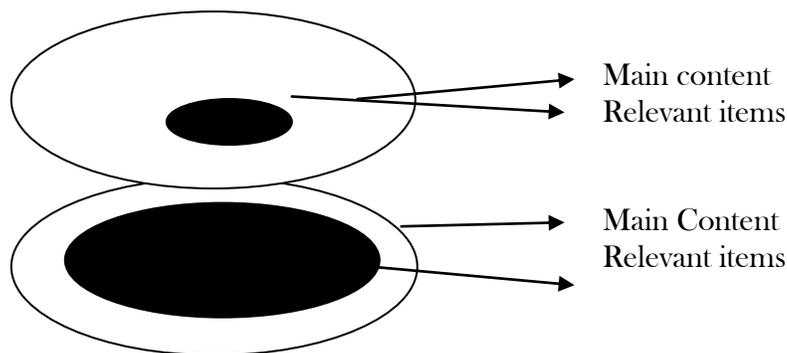
Some story problems of this study were adapted from previous studies and mathematics projects in order to suit the Malaysian Secondary School Mathematics Syllabus and objectives of this study. For example, a story problem for a second, fifth and sixth interview have been adapted from MathPARTNERS Project (Education Development Center, 2004). Story problems for third and seventh interview were adapted from the study of Langrall & Swafford (2000) concerning the use of equations to describe and represent problem situations. Construction of the questions in each interview was made according to table of specification that represents the the relevance of the item and content coverage which have been specified. Thus, content validity can be proved. The next sections discuss the specification of the interview tasks in terms of item relevance and content coverage.

Item Relevance

Item relevance is to ensure that all the questions of each task are relevant or closely related to the content domain of a topic to be assessed. Nitko (1996) and McMillan (2001) stated that the key measure in determining the item relevance is built by the construction of the Table of Specifications.

Content Coverage

Content coverage is to ensure that all the tasks are able to represent the main content of each topic to be assessed. The following diagram describes the relationship between the item relevance and the content coverage of a topic assessed. Based on Figure A, although all of the questions or tasks that are relevant to the main content of the topic to be assessed, but it only covers a small part of the main content. While Figure B shows the questions or tasks cover the main content more representatively and thoroughly.



Process of Determining Item Relevance and Content Coverage of Linear Pattern Test

In our study, the process of determining item relevance and content coverage of linear pattern test had been done systematically. Three panels who are knowledgeable regarding the topic of algebra for secondary school level had been asked to review independently the relevance of each question in the eight tasks and the content coverage based on a given scale. Thus, there are two aspects of judgment determined by the panels. The first is the relevant of items for each task. The second is the coverage of the main content of the linear equation topic that has been represented by all the tasks. The second question is important to identify whether all the tasks are able to represent the overall main content or only a small part of the main content.

Three panels who are experts in the related areas were invited to ensure the content validity of the interview questions, namely a university lecturer who specialized in the field of psychometrics, a university lecturer who specialized in the field of mathematics education, and a secondary school mathematics teacher with teaching experiences in Mathematics over ten years had agreed to determine the content validity in terms of item relevance and content coverage. Two judgment forms were provided to each panel in reviewing the content validity based on a given Likert Scale (Sax, 1997). Judgment Form A had been used to judge the item relevance of the interview questions for each task while Judgment Form B was used to

judge the content coverage of each task for the topic of linear equation (see Appendix B and C).

Table 2 depicts the judgment value for each panel and the mean value of judgment for each interview question. Based on this table, all the judgment values given by the three panels were at least 3 and the mean value of judgment for all the interview questions were more than 3. It can be concluded that all the interview questions are relevant to the content domain assessed. It also reflects the clarity levels of the interview questions are high.

Table 3 demonstrates the mean value of the three appraisal judgments for the aspects of content coverage. The mean value of all the judgments is greater than 3. This means that all the tasks had covered the main content of the linear equations with fairly comprehensive.

Based on the responses given by the three panels in reviewing aspects of the item relevance and the scope of content, it can be concluded that the measurement tool of this study has an acceptable degree of content validity.

Conclusion

Although the key ingredient in securing content validity is human judgment, the judgment procedures to gather the evidence are particularly appealing because such evidence can be gathered quantitatively and systematically. The generally high ratings of item relevance and the content coverage are not only supportive of the content validity of the instrument but also bode well for its broad acceptance when it is implemented (Guba & Lincoln, 1989). As a consequence of the quantitative results of this study, all the questions in each task are: (a) relevant to the content domain assessed; (b) covered the main content of the linear equations with fairly comprehensive. Our investigation suggests that greater clarity about content validity in three key aspects is needed. Future studies will have to address the generalizability of results to determine the universal agreement among experts.

Content validity is an important factor in identifying the content of measuring tests. However, it is not a sufficient indication that the instrument actually measures what is intended to measure. According to Yaghmaie (2003), the finding from content validity could contribute to support the construct validity of an instrument. Thus, a single approach is insufficient and a variety of approaches should be tested.

Table 1
Table of Test Specification

Category Content Domain	Number task	Investiga- ting pattern (finding terms)	Generalizing of pattern		Applying of linear equation	Total number of question
			algebraic expression	linear equation		
Linear pattern (pictorial)	1	5	1	2	7	15
	2	5	1	2	6	14
Direct variation	3	3	1	2	4	10
	4	3	1	2	4	10
Concept of function	5	5	1	2	7	15
	6	5	1	2	5	13
Arithmetic sequence	7	3	1	2	6	12
	8	3	1	2	6	12
Total		32	8	16	45	101

Table 2
Judgment of Item Relevance

Number task	Panel	Number question														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	4	5	4	3	4	4	4	4	5	4	4	3	4	4	3
	2	5	5	4	4	4	3	5	5	4	3	4	4	5	5	5
	3	4	4	5	5	5	4	5	5	4	4	4	5	5	5	4
	mean	4.33	4.67	4.33	4	4.33	3.67	4.67	4.67	4.33	3.67	4	4	4.67	4.67	4
2	1	4	4	3	5	4	4	4	5	4	4	4	4	4	3	
	2	4	4	4	4	4	3	4	5	4	4	4	4	5	5	
	3	5	5	4	5	4	5	5	5	4	4	4	5	5	4	
	mean	4.33	4.33	3.67	4.67	4	4	4.33	5	4	4	4	4.33	4.67	4	
3	1	4	4	5	4	3	4	4	4	3	4					
	2	5	5	5	4	4	4	3	4	4	3					
	3	4	5	5	5	4	4	5	5	4	4					
	mean	4.33	4.67	5	4.33	3.67	4	4	4.33	3.67	3.67					
4	1	4	5	4	3	4	5	4	4	4	4					
	2	5	5	5	4	4	4	3	4	4	3					
	3	5	5	5	4	4	5	5	5	4	4					
	mean	4.67	5	4.67	3.67	4	4.67	4	4.33	4	3.67					
5	1	4	4	5	4	3	5	4	4	5	4	3	5	4	4	5
	2	5	5	5	4	4	3	4	4	5	4	4	5	4	5	4
	3	5	5	4	4	5	5	4	4	4	5	5	5	4	4	4
	mean	4.67	4.67	4.67	4	4	4.33	4	4	4.67	4.33	4	5	4	4.33	4.33
6	1	4	4	4	5	4	4	4	4	5	4	4	5	4		
	2	5	5	4	4	4	3	4	4	5	5	4	5	4		
	3	5	4	4	5	4	5	4	4	4	4	5	4	4		
	mean	4.67	4.33	4	4.67	4	4	4	4	4.67	4.33	4.33	4.67	4		

Cont. Table 2

7	1	4	4	5	4	3	5	4	4	4	3	4	4
	2	5	5	4	4	4	3	5	4	4	4	5	5
	3	5	5	5	4	5	4	5	5	5	4	5	5
	mean	4.67	4.67	4.67	4	4	4	4.67	4.33	4.33	3.67	4.67	4.67
8	1	4	4	4	5	3	5	4	4	5	4	5	5
	2	5	5	4	4	4	3	4	5	5	4	5	5
	3	5	5	5	5	5	4	5	5	5	4	4	5
	mean	4.67	4.67	4.33	4.67	4	4	4.33	4.67	5	4	4.67	5

Scales used:

- 5 - very appropriate
- 4 - quite appropriate
- 3 - appropriate
- 2 - less appropriate
- 1 - not appropriate

Table 3

Judgment of Content Coverage

Panel	Response (mean)
First panel	3.8
Second panel	4.5
Third panel	4.8

Scales used:

- 5 - very comprehensive
- 4 - quite comprehensive
- 3 - comprehensive
- 2 - less comprehensive
- 1 - not comprehensive

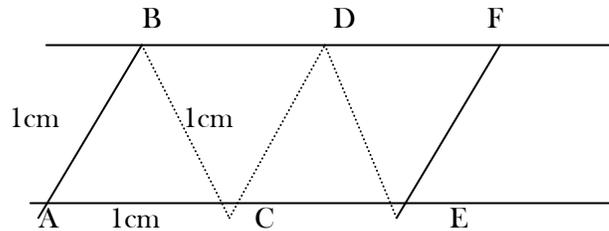
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Appendix A
Sample of Interview Task

Task Two: Triangle Train (Linear pattern pictorial)

Look at the triangle train below. The length of triangle train is determined by the number of equilateral triangles with the side 1cm. If the length of the train is 3, the perimeter is 5.



Questions 1.2:

1. What is the perimeter of the triangle train if the length is 4 ? (interior lines don't count as part of perimeter)
2. What is the perimeter of the triangle train if the length is 5 ? (interior lines don't count as part of perimeter)
3. (If subject says the perimeter of triangle train is a). Why is that? Can you think of another way to find the perimeter? Why?
4. [Repeat the step (2) and (3) for the length of triangle train is 8, 15 and 120.]
5. [Repeat the step (2) and (3) for the length of triangle train is h (state the answer in terms of h).]
6. (If subject unable to respond to the length of triangle train is h , interviewer asks the **questions 1.2a**).
7. Can you try to write a linear equation to find the perimeter of the triangle train. Let r represents the perimeter of the triangle train and s represents the length of the train.
8. Why is that? Explain it.
9. If the triangle train has a perimeter of 50 cm, what is the length? Try to apply the linear equation to solve this problem.
10. Try to explain how is the way of solving it.
11. Can you try to draw a new pattern of train?
12. Try to explain the relationship between the length and the perimeter of the new train.
13. Can you try to write a linear equation to find the perimeter of the new train?
14. Why is that? Explain it.

Cont. Appendix A

Questions 1.2a:

(If subject unable to respond to step 6 in questions 1.2, interviewer asks the questions as below).

What is the perimeter if the length of the term is . shape height presents a certain value.

(If subject successfully responds to interviewer asks again the questions 1.2. If subject unable to respond, interviewer asks questions as below).

1. What is the perimeter if the length of the train is 150?
2. Try to explain how did you find the perimeter for the length of the train is 150?
3. Try to describe the relationship between the length of the triangle train and the perimeter.

Appendix B
Judgment Form A
(Item Relevance)

Number Task: _____

<u>Number question</u>	<u>Judgment scale</u>
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Scales used:

- 5 - very appropriate
- 4 - quite appropriate
- 3 - appropriate
- 2 - less appropriate
- 1 - not appropriate

Appendix C
Judgment Form B
 (Content Coverage)

Question: Are the tasks have covered the content for the topics of linear equation?

a) Task 1

JudgementScale :_____

b) Task 2

Judgement Scale :_____

c) Task 3

Judgement Scale :_____

d) Task 4

Judgement Scale :_____

e) Task 5

Judgement Scale :_____

f) Task 6

Judgement Scale :_____

g) Task 7

Judgement Scale :_____

h) Task 8

Judgement Scale :_____

Scales used:

5 - very comprehensive

4 - quite comprehensive

3 - Comprehensive

2 - less comprehensive

1 - not comprehensive



The Anatomy of a World-Class University: Lessons from a Hong Kong-Based Research University (A Case Study)

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Abstract There is a widespread desire among universities to achieve a world-class status. But what does it mean to be a world-class university? This study examined the administrative and academic system of one university in Hong Kong to determine what makes it a world-class university based on Salmi's (2009) framework on complementary set of attributes of a world-class university. The study made use of a case study design, with data coming from multiple sources, including interviews with University administrators. Results indicate that this Hong Kong-based university gets much of its funding from government that supports its teaching and research and the establishment of its research centers and laboratories. It has an excellent faculty roster, attracts and accepts the best and the brightest students, links with foreign institutions, has student exchange programs with over 200 institutions, and has produced important research outputs. It receives abundant donations and endowments and has extensive facilities and resources. It has strong leadership, a bold vision of its mission and goals, clearly articulated strategic plans, and quality assurance systems and procedures. There are lessons that can be learned from this university by other universities that also aspire to become world-class.

Keywords: world class universities, Hong Kong universities, academic system

There has been a widespread push toward world-class status for universities around the world. Many universities aspire to be included in the top tier of the world university rankings. But what does it mean to be a world-class university?

Becoming a member of the exclusive group of world-class universities is not achieved by self-declaration; rather, elite status is conferred by the outside world on the basis of international recognition (Salmi, 2009). Until recently, the process involved a subjective qualification, mostly that of reputation, such as in the case of Ivy League universities in the US, wherein no direct and rigorous measure was available to substantiate their superior status. At present, there are a number of award-giving agencies and institutions, such as the QS World University Rankings, Academic Ranking of World Universities (ARWU), the Times Higher Education World University Rankings (THES), and Shanghai Jiao Tong University (SJTU) that recognize the top universities, however, each using different criteria.

There are conflicting views as to how to assess the quality of education offered by a college or university. Award giving agencies and institutions make use of different criteria to

rank universities. For example, the U. S. News and World Report (USNWR) approach to rankings makes use of data about inputs (e.g., financial resources, faculty resources, student selectivity), outcomes (retention and graduation rates), and reputation (peer-rating) (Bennett, 2001). The QS World University Rankings considers six academic criteria: (1) academic peer review - 40%, (2) employer review - 10%, (3) citations per faculty - 20%, (4) student faculty ratio - 20%, (5) international faculty ratio - 5%, and (6) international students - 5%. The Academic Ranking of World Universities (ARWU) uses six objective indicators, including (1) number of alumni winning Nobel Prizes and Fields Medals - 10%, (2) number of staff winning Nobel Prizes and Fields Medals - 20%, (3) number of highly cited researchers in 21 broad subject categories - 20%, (4) number of articles published in journals of *Nature* and *Science* - 20%, (5) number of articles indexed in Science Citation Index Expanded and Social Sciences Citation Index - 20%, and (6) per capita performance with respect to the size of an institution - 10%. The Times Higher Education World University Rankings (THES) uses five overall indicators: (1) industry income- innovation - 2.5%, (2) international diversity - 7.5%, (3) teaching-learning environment - 30%, (4) research: volume, income and reputation - 30%, and (5) and citations- research influence - 30%.

While the award-giving bodies have different set of criteria, there are commonalities in terms of factors that make a university world-class. The key attributes of world-class universities include highly qualified faculty and students, excellence in research, international diversity, academic peer review/reputation, and teaching-learning environment.

According to Salmi (2009), the highest-ranked universities are the ones that make significant contributions to the advancement of knowledge through research, teach with the most innovative curricula and pedagogical methods under the most conducive circumstances, make research an integral component of undergraduate teaching, and produce graduates who stand out because of their success in intensely competitive arenas during their education and (more importantly) after graduation. It is these concrete accomplishments and the international reputation associated with these sustained achievements that make these institutions world-class. He stressed that the dynamic interaction among the three groups of factors is the distinguishing characteristic of high-ranking universities. These three attributes include: (a) a high concentration of talent (faculty and students), (b) abundant resources, and (c) favorable governance.

This study examined the administrative and academic system of one university in Hong Kong Special Administrative Region based on three complementary set of attributes of a world-class university as identified by Salmi (2009) to determine what makes it a world-class university and to see how other universities can learn from it. This Hong Kong-based university has consistently ranked in the upper tier of the world university rankings. It ranked top 50 in the 2010 QS World University rankings, top three in Hong Kong, and top 10 in Asia. In the 2010 QS Asian University rankings which employ a different methodology, it came among the top five. It was ranked top 50 worldwide in the World's Best University: Top 200 by U.S. News & World Report. This study made use of a case study design, with data coming from multiple sources, including interviews with University administrators.

Concentration of Talents

According to Salmi (2009), the first and perhaps foremost determinant of excellence is the presence of a critical mass of top students and outstanding faculty. World-class universities are able to select the best students and attract the most qualified professors and

researchers. He indicated that this has always been the hallmark of Ivy League universities in the US or Oxford and Cambridge in the UK. This is also a feature of the newer world-class universities, such as the National University of Singapore or Tsing Hua University in China.

Having a faculty roster with high academic qualifications is true for this Hong Kong-based university. Majority of their teaching faculty are professors. Its faculty roster also includes academic honorees and awardees, such as Nobel Laureates and fellows. It also invites Nobel Laureates to their university to share their insights and present their theories and findings in a series of public lectures. In fact, it has invited at least 20 Nobel Laureates to the university from SY 2004-2008.

Another important factor for becoming a world-class university is the ability and the privilege to select the most academically qualified students. For example, this Hong Kong-based university sets high standards for the acceptance of their freshman applicants. The applicants' results in the Hong Kong Certificate of Education Examination (HKCEE) and in the Hong Kong Advanced Level Examination (HKALE), and academic and extra-curricular achievements in school are the main bases for acceptance. Its applicants are also required to satisfy the additional requirements of the program they are applying for. Similarly, it attracts high caliber students from different geographical regions, admitting mostly Band A JUPAS applicants whose top choice is this University. It also admits close to 200 Secondary Six students in Hong Kong through the Early Admissions Scheme (AS). Most of its non-JUPAS entrants are also top scorers in the GCE A-Level and in International Baccalaureate Diploma Programme. Furthermore, it has a good mix of graduate students, having carefully selected graduate students, whose credentials include sound research background, high academic distinctions, and English language proficiency.

Internationalization has always come out as one of the criteria for world-class university status. According to Salmi (2009), world-class universities have students and faculty who are not exclusively from the country where the university operates. They are able to attract the most talented people, no matter where they come from.

This Hong Kong-based university adheres to this belief. As such, it has in its place a unit that formulates policies for academic linkages to ensure that its academic priorities are supported through the linkage partnerships and programs. Its academic linkages and programs are managed by two offices: one office being responsible for the coordination of student exchange programs and for the University's relations on the international front, and the other office, for mainland and cross-strait relations. It believes in "education without borders", and is home to an increasingly multinational campus community - its faculty and students hail from some 45 countries and regions (Sung, 2011). Over the years, it has established and maintained partnerships with a large number of institutions around the world, including universities, research institutes, centers of learning, governmental agencies, and regional and international associations of higher learning. It is also a member of a number of international education bodies for academic partnerships. Furthermore, it hosts over 150 visiting delegations from abroad each year, many such visits leading to collaborative teaching and research projects. Lastly, it has established student exchange programs with over 200 institutions all over the world. For SY 2009-2010 alone, around 700 students participated in student exchange programs for one term or one academic year. In addition to this, around 2,400 students undertook short-term study, research or internship opportunities outside Hong Kong. In return, the University welcomed 700 international and non-local Chinese students as exchange students during the regular term-time, and more than 500 students in the summer.

Abundant Resources

According to Salmi (2009), abundance of resources is the second element that characterizes most world-class universities, in response to the huge costs involved in running a complex, research-intensive university. These universities have four main sources of financing: government funding for operational expenditures and advanced research, research contract from public organizations and private firms, financial returns from endowments and gifts, and tuition fees.

Being one of the eight statutory universities in Hong Kong, this university gets its funding from the government through the University Grants Committee. In fact, the government is the main source of its income and constitutes three-fourths of its revenue for capital and recurrent expenses. Income from tuition, programme and other fees, being the next important source of revenue, accounts for a quarter of its total income. In addition, together with its constituent Colleges, it has endowment funds at their disposal. They also receive financial support from private donors for research and other designated purposes. For example, during SY 2008-2009, the annual total income was about HK\$4.4 billion: HK\$ 2,916M of which came from the government, HK\$1,207M from tuition and fees, HK\$279M from donations and benefactions, HK\$161M from ancillary services, and HK\$322M from other income.

One of the requirements to be included in the upper tier of the world-class stature is abundant resources and funds for research. This has not been a major concern for this Hong Kong-based university. About a quarter of the government's annual allocation in the form of block grants actually goes directly or indirectly to its research. It also relies heavily on different external funding sources to support research activities. For example, during SY 2008-2009, it was granted a total of HK\$525million for research projects. A bulk of this research fund came from the Research Grants Council/University Grants Committee and the rest from external funding agencies, such as industry, government departments and agencies, charitable, trust and individual donations, Information and Technology Fund, and Quality Education Fund. During SY 2009-2010, the Research Grants Council allotted a total of HK\$127.47M for 184 research projects in the form of competitive grants.

World-class universities also have the state-of-the-art facilities and resources to support their teaching and learning environment. This is also true for this Hong Kong-based university. For one, it is housed in a 137-hectare campus, with over 150 buildings. Its University Library System comprises seven libraries. It has almost 2.5 million holdings (volumes), 13,00 periodical titles, 100,000 electronic journals, 600 electronic database, 500 public computers, 200 classnet connection points, and 50 Wi-Fi access points. It has a seating capacity of around 2,500. It caters to almost 50,000 registered library users. Its campus network is also impressive, providing on-campus and off campus network outlets and Wi-Fi access in all major lecture theaters, student canteens, libraries, and public areas. It also houses museums and galleries and cultural facilities, meeting and outdoor venues, and sports facilities. Furthermore, it provides several types of accommodation for its staff members, academic visitors, and students: flats for senior staff and housing quarters for junior staff, guest houses for visitors, hostels for undergraduate students, and postgraduate halls and international houses for graduate and exchange students.

Favorable Governance

According to Salmi (2009), the third dimension of a world-class university concerns the overall regulatory framework, the competitive environment, and the degree of academic and managerial autonomy the universities enjoy. This entails an environment that fosters competitiveness, unrestrained scientific inquiry, critical thinking, innovation, and creativity and that are not bound by cumbersome bureaucracies and externally imposed standards. In fact, this what made the tertiary educational system in the US to be referred by The Economist as the best in the world, not only because of its wealth but due to its relative independence from the state, the competitive spirit that encompasses every aspect of it, and its ability to make academic work and product relevant and useful to society.

Governance and administration of higher education holds two perspectives: the external governance and control as exemplified by outside policy and decision making bodies, which carry out oversight operations on the system of higher educational institutions over which it has purview; and the internal governance and control as exemplified by the individuals within the university who carry out the operations of a single institution (Bradford, Hägglund, and Lancashire, 2008). In the case of this Hong Kong-based university, since it is one of the eight statutory higher education institutions in Hong Kong, it gets government funding primarily through the University Grants Committee (UGC). As such, external governance and control is well manifested in the appointment of the Chief Executive of the HKSAR as the University Chancellor. As Chancellor, the Chief Executive presides at the Congregations of the University and is entitled to call for information in regard to any matter relating to the welfare of the University. It chairs the Council, which is the governing and executive body of the University and is responsible for the management and control of the affairs, purposes and functions of the University. However, while he is the Chancellor and the thus the head of the University, it is the Vice-Chancellor who is the chief academic and administrative officer of the University and is responsible for the maintenance of the efficiency and good of the University and for ensuring the proper enforcement of the Statutes, decrees, and regulations. Furthermore, while the government (UGC) provides financing, it gives the University autonomy in how it uses the funding and allows the universities to implement its own curricula and academic standards.

World-class universities provide academic community an environment that fosters competitiveness, unrestrained scientific inquiry, critical thinking, innovation, and creativity. This is true for this Hong Kong-based university. For one, a rich research culture is in place. It has established a Research Committee which is responsible for studying research policy issues and making recommendations, creating conditions conducive to quality research, setting up mechanisms for research project selection, funding and monitoring, and fostering the development of multi-disciplinary research at the University. Administratively, there is a Research Administration Office (RAO), which is responsible for research administration as well as for implementation of policies for the enhancement of the University's research portfolio. As such, it was also granted by the University Grants Committee (UGC) to serve as research centers for five of the 16 selected Areas of Excellence. It also has 27 research institutes, 4 state key laboratories, and 32 joint research units. Apart from the major institutes for interdisciplinary research, there are many smaller research/consultancy units set up under the auspices of individual faculties and departments to promote research in various subject disciplines.

Summary

The path towards becoming a world-class university is long and arduous. Becoming a world-class university means that the university makes significant contributions to the advancement of knowledge through research, teaches with the most innovative curricula and pedagogical methods, makes research an integral component of undergraduate teaching, and produces graduates who stand out because of their success during their college education and more importantly, after graduation.

Salmi (2009) stressed that it is the combination of these three sets of features—concentration of talent, abundant funding, and appropriate governance—that makes the difference. He said that the dynamic interaction among these three groups of factors is the distinguishing characteristic of high-ranking universities. Having an appropriate governance framework without sufficient resources or the ability to attract top talent does not work either. Similarly, just investing money in an institution or making it very selective in terms of student admission is not sufficient to build a world-class university.

He further indicated that there are two critical factors that should be present to facilitate becoming a world-class university. First is the external factor, particularly, the role of the government and the resources that it provides to the university. Second is the internal factor, specifically the institution itself and the steps it takes to make itself into a world-class university.

This University, being one of the statutory universities of Hong Kong gets much of its funding from government. The funding it gets greatly support research activities of the University as well as the establishment of research centers, laboratories, and other facilities. However, past research has shown that money is not a guarantee of excellence in teaching and research and that having an extensive government funding does not necessarily result to higher world university ranking. In fact, some US universities with high spending levels achieve significantly lower results in world ranking (Salmi, 2009). As in the case of this University, its stature is achieved not only because of the money it gets from the government. It is also because of what it has established and has achieved in the institutional level.

At the institutional level, it has set its goal to be a first-class comprehensive research university locally, nationally and, internationally. It has strong leadership, a bold vision of the institution's mission and goals, and a clearly articulated strategic plan. For the last ten years, it has expanded its curricular offerings by setting up more schools and colleges. It has an excellent faculty roster, whose expertise is both in research and teaching. It has the capacity to attract and accept the best and the brightest among the students in the region. It also gets enough donations and endowments from private individuals and companies to help with its physical expansion and development, student scholarship, faculty research, and facility and resources development.

Now, what lessons can be learned from this University by others that also aspire to become a world-class university? This question is very relevant especially for higher educational institutions that do not get funding from their government.

Salmi (2009) identified the strategic dimensions necessary at the institutional level. The first and perhaps most important aspect is the quality of leadership and the strategic vision developed by the would-be world-class university. The establishment of a world-class university requires, above all, strong leadership, a bold vision of the institution's mission and goals, and a clearly articulated strategic plan to translate the vision into concrete programs and targets. The University president, chancellor or rector needs to fully understand the core

agenda of the institution to be able to develop an appropriate vision for the future of the university and to implement this vision in an effective manner. Furthermore, he should be able to relate the university's goals with the overall economic and social developments in the outside world.

The second element is the proper sequencing of plans and activities envisaged to reach the proposed goal. Time is an important dimension and vision development and strategic planning are not one-time exercises. To become one among the best, the university should be in constant replenishment of intellectual capital, they should not be contented with relying on past accomplishments, they should always aspire to be among the best in the world, and they should continuously create a supportive atmosphere that encourages everyone to define and pursue such goals. Achieving the goals of creating a culture of excellence and achieving high-quality outputs take many years and sustained commitment on the part of the entire constituency of the institution, internal and external is required

Related to this is the need to develop a culture of quality in the university. Lanarès (2011) argued that going towards excellence means not only creating and operating a rigorous quality assurance system but also developing a culture of quality. Citing the experience of the University of Lausanne, he cited three steps needed to achieve this: identifying core values and creating an adhesion to these values, translating the values into both concepts and practices of the quality system, and influencing collective and individual practices. He argued that the development of a culture of quality is a long term process and requires critical evaluation.

Furthermore, particular attention needs to be given to the internationalization strategy of the university. International collaboration is a strategy which many universities are using both to engage fully in internationalization and globalization and as part of their strategies for raising themselves increasingly to a world-class status. An influx of top foreign students can be instrumental in upgrading the academic level of the student population and enriching the quality of the learning experience through the multicultural dimension. The presence of top caliber faculty and researchers, on the other hand, can help upgrade existing departments or establish graduate programs and research centers in new areas of competitive advantage.

According to Markwell (2008), there are various forms of multilateral and bilateral collaborations that an aspiring world-class university can pursue. These include regional harmonization programs such as the Bologna process, regional groupings of universities such as ASEAN University Network, wider international alliances or grouping of universities such as Universitas 21, benchmarking activities, and other collaborative initiatives in the areas of quality assurance, research supervision, coursework teaching programs, student extra-curricular activities, service activities, money-making ventures, and advocacy. These international collaborations are important for building capacity, broadening perspectives, and raising profile and status.

Finally, it is important for universities, especially those that are not called a research university, to note that there are also world-class tertiary education institutions around the world that are neither research focused nor operate as universities in the strictest interpretation of the term. What is important is for these universities to consider the need to create, besides research culture, a learning environment that will meet the wide range of education and training needs of the increasingly diverse student population.

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Strategies in Teaching Assessment of Student Learning Courses

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Abstract The article is a discussion on the different strategies that a teacher can employ when teaching Assessment of Student Learning courses. A description of the nature of Assessment of learning 1 and Assessment of Learning 2 is provided along with the typical requirements that students need to produce for each course. The different skills and learning competencies involved in teaching the course is complemented by the P21 Framework Definition of the Partnership of 21st Century Skills. Providing appropriate feedback, modeling good assessment practices, encouraging cooperation, field activities, demonstrations, and utilizing technology are highlighted as effective strategies in teaching Assessment of Student Learning courses. Since being a good assessor is one of the keys to becoming a good educator, other teaching competencies are discussed using the National Competency-Based Teacher Standards by the Department of Education as a guide.

Keywords: Student assessment, P21 Framework, teaching assessment

Assessment of student learning has been recognized to play a vital role in the teaching and learning process. Not only do teachers need to know the different strategies and methods in teaching students, but they also have to be well-versed with assessing the students' knowledge, skills, and attitudes in order to make educational decisions. Such task or obligation requires more attention, time, and critical work for teachers; this is the reason why students who are training to become educators go through two undergraduate courses that involve teaching them different assessment strategies – a course called, Assessment of Student Learning.

Assessment of Learning: Course Description

The course, Assessment of Student Learning is divided into two: Assessment of Student Learning 1 (ASESLE1) and Assessment of Student Learning 2 (ASESLE2). Both courses equip future educators with conceptual and technical skills that will enable them to effectively assess student learning. ASESLE1 in particular, focuses on the development and utilization of written assessment tools to improve the teaching-learning process. This also aims to guide students in analyzing test data through reliability and validity measures. On the other hand, ASESLE2 is a course designed to train future educators to properly evaluate educational outcomes using alternative and authentic assessment tools. Moreover, both

ASESLE courses allow students to incorporate concepts, theories, and current researches discussed in class in their development and evaluation of classroom assessment tools and interpretation of assessment data.

Teaching these courses has always been a challenge for teachers. As teachers strive to employ best assessment practices in the classroom, they are also challenged to encourage the students to be more meticulous in planning their own assessment activities – whether they may be the traditional pen and paper tests or alternative forms of assessment. Certain special competencies have to be brought across to the students in order to become good assessors.

Skills and Competencies Involved in Assessment Courses

According to the Framework for 21st Century Learning (2009), a unified, collective vision for learning, students must learn the essential skills for success in today's world, such as critical thinking, problem solving, communication and collaboration. Learning and innovation skills increasingly are being recognized as those that separate students who are prepared for a more and more complex life and work environments in the 21st century, and those who are not. Students taking up assessment courses must think of creative ways to make assessment activities more appealing and effective. They are taught to veer away from traditional approaches to assessment and teach their students to become more engaged in the assessment process. These future educators have to effectively analyze and evaluate the test items that they will construct and match these items to their instructional goals. Making educational decisions based on the results of the assessments they will conduct to their students is also very valuable to the teaching-learning process.

Students learning how to conduct assessment activities are also needed to become information literate. Such information may involve accuracy of the content to be used in a test, the paradigm shifts to assessment practices and its effects, and some ethical issues in assessment.

In addition to this, students must be able to understand and apply technology as they undergo assessment courses. The use of technology is at present, one of the ways to assess student learning. Some examples include online portfolios, online examinations, and online surveys. Even test data analyses are done using programs that can test reliability, validity, and item analysis of a certain measurement. Truly, to be effective in the 21st century, students must be able to exhibit a range of functional and critical thinking skills related to information and technology.

The Partnership for 21st Century Skills also emphasized life and career skills. Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills. Students going through assessment of learning courses must be able to incorporate feedback effectively in order to improve their assessment tools. Such flexibility will also help students develop their ability to self-assess as they get to process the different compliments and criticisms given to them. Monitoring their own progress is also an effective assessment practice on its own, for which will guide the students to be more self-directed learners.

Requirements for an Assessment of Learning Course

Classroom assessment is a systematic process of determining educational objectives and gathering, using, and analyzing information about student learning outcomes to make decisions about programs, individual students' progress, or accountability. For students to understand the assessment process, they are tasked to complete certain requirements for their assessment courses. Assessment begins with an analysis of criterion, which includes expectations and demands and other forms of learning targets. This is the reason why in ASESLE1, students are expected to formulate learning objectives for a specific subject task / skill, level, and subject area. This also includes writing objectives for each of the domains - cognitive, affective, and psychomotor domains. Since ASESLE1 focuses on test construction and test data analysis, students also need to produce a test development report which includes background, objectives, table of specifications, and an assessment tool based on selected- and constructed-response test items. Moreover, students are expected to analyze and interpret data through item analysis, reliability and validity measures.

ASESLE2 emphasizes authentic and alternative forms of assessment. As such, students are expected to design performance-based assessment tools that are process-oriented and product-oriented. A rubric will be constructed by the students given a particular task or skill in a subject area. In addition to this, they are to construct an assessment tool for the affective domain that is appropriate for a specific group of students. Finally, they need to develop a student portfolio which includes a reflective self-evaluation to assess learning.

Teaching Assessment of Student Learning to Future Educators

Both assessment courses aim for students to reflect on the value of assessment to one's own understanding of teaching and educational processes. In light of this, teaching the course can be truly a challenging task for teachers. *"When our interest is aroused in something, whether it is an academic subject or a hobby, we enjoy working hard at it. We come to feel that we can in some way own it and use it to make sense of the world around us"* (cited in Weimer, 2009). As it may already be obvious, genuine concern and respect for students and student learning is always considered as one of the effective strategies in teaching assessment courses (or any other courses for that matter). As such course can usually scare or intimidate students at the beginning; a teacher must let them feel that the subject can be mastered and that they can quickly succeed in learning them.

Since teachers are guiding students to become future educators, they first need to establish the relevance of the content of what they are teaching. They need to craft explanations that enable students to understand the material. This involves knowing what students understand and then forging connections between what is known and what is new. Particularly, an assessment before instruction has to be done to discover what students already know about assessment and work towards clarifying their knowledge on it. Teachers have to make students aware of the value of assessment in the teaching and learning process and explain the paradigm shifts in the practice of assessment from more traditional approaches to more progressive and modern approaches. Such changes encompass the following: an approach towards alternative assessment, formative assessment as opposed to summative assessment, being more task-based than skill-focused, and an emphasis on performance-based assessments more than pen and pencil tests (Magno & Ouano, 2010).

Teaching assessment also requires for the teachers to mirror appropriate assessment practices in the classroom. This involves using a variety of assessment techniques and allowing students to demonstrate their mastery of the material in different ways. Apart from giving pen and paper tests, it also recognizes the power of feedback to motivate more effort to learn. Since assessment courses require students to work on tasks that involve constructing their own test items, affective scales, and performance assessment plans, the drafts of these are to be checked and rechecked for further revisions. This can be done by either a teacher evaluating the drafts, peer evaluation or even self-evaluation. This will also enable them to be more aware of their own learning progress. Furthermore, critical thinking skills will be more enhanced as they come up with the best output possible.

An application of the theories, concepts, and techniques learned in class is needed as a follow-through for the students. By implementing their assessment plans (e.g. product-oriented or process-oriented performance-based assessment plans) to a group of individuals, students are able to experience how actual teachers conduct assessment activities. Through their experience, they realize which aspect of the assessment process they have to further work on. They also come to a realization of which forms of assessment is more effective depending on the task, level of the students, and subject matter. The students will not only construct their own scales and test items, but also administer them and then analyze the data after. This will enable the students to discover whether or not they have constructed are reliable and valid. This process of allowing the students to experience actual application of different assessment activities is considered more active learning on their part. It is recommended that after the entire process, a self-evaluation and reflection is done, wherein the students can write about their experiences, reflect on how they can further improve themselves in terms of becoming assessors, and how can they utilize their skills and knowledge in their future careers as teachers. Through this, they make what they learn part of themselves.

With the rise of technology, students have become more and more dependent on computers. Such development can be used as an advantage for teachers. Allowing the students some flexibility in the ways they would want to conduct assessments will provide them with more room for creativity. As mentioned earlier, students nowadays opt to make use of online resources as a way of learning. Teachers can guide them in creating online examinations, e-portfolios, and may even administer survey questionnaires online. There are various programs that they may use such as multiply, googledocs, survey monkeys, etc. Data analyses can also be taught using Statistica, Microsoft excel, and SPSS. In becoming a more effective teacher, it has always been a challenge to continuously spark up the interest of the students on the content being taught. Such use of technology has shown to be very appealing to them and is, therefore something that teachers can utilize in teaching assessment.

Transforming current teaching-centered practice to learning-centered practice, using the technologies of today has been evident (Batson, 2010). Structured exercises, fieldworks, challenging discussions, group projects, and self-evaluations are some methods that are used in teaching assessment courses. A move from teaching to learning has been adopted recently as well. Nevertheless, do not discard the lecture or class discussion approach when appropriate, but use it primarily for the purpose of helping students address the essential problems of the course. Lectures and discussions can be used to help students make progress in their projects and, therefore, build their course portfolios.

Monitoring students' progress and giving immediate and appropriate descriptive feedback show how attuned teachers are with the students' learning process. At the end of the

period allotted for the assessment course, group presentations can be done in order for their experiences to be understood and due feedback from both teacher and peers can be given. Challenging as it may be, but students do need to be guided by their teachers as they work on the tasks that they are processing. Encouraging cooperation among peers is also a key for the students to be more engaged with their tasks.

Teaching Competencies Based on NCBTS

“Teaching involves the reflective acquisition and application of complex and problematic technical knowledge to facilitating student learning in actual contexts.” This expresses the theme of the new paradigm of teaching as stated by the National Competency-Based Teacher Standards by the Department of Education in 2006. The teaching strategies presented earlier may aid teachers in teaching assessment of learning courses; however, this is just part of a bigger picture. This is part of our obligation to guide students towards certain competencies they need to develop as future educators.

In the NCBTS, good teaching is being defined in terms of those practices that help students learn better. Primarily, this is concerned with whether teachers are competent in helping students learn. To address this, seven domains were developed. The seven domains are: (1) social regard for learning, (2) learning environment, (3) diversity of learners, (4) curriculum, (5) planning, assessing, and reporting, (6) community linkages, (7) personal growth and development. Domains 2, 3, 4, 5, and 6 represent standards referring to “The Teacher as Facilitator of Learning”, whereas domains 1 and 7 represent standards referring to “The Teacher as Learner”.

The domain of Social Regard for Learning focuses on the ideal that teachers serve as positive and powerful role models of the values of the pursuit of learning and of the effort to learn, and that the teacher’s actions, statements, and different types of social interaction with students exemplify this ideal. The domain of Learning Environment focuses on the importance of providing for a social and physical environment within which all students, regardless of their individual differences in learning, can engage the different learning activities and work towards attaining high standards of learning. The domain of Diversity of Learners emphasizes the ideal that teachers can facilitate the learning process in diverse types of learners, by first recognizing and respecting individual differences, then using knowledge about students’ differences to design diverse sets of learning activities to ensure that all students can attain appropriate learning goals. The domain of Curriculum refers to all elements of the teaching-learning process that work in convergence to help students attain high standards of learning and understanding of curricular goals and objectives. These elements include the teacher’s knowledge of subject matter, teaching-learning approaches and activities, instructional materials and learning resources. The domain of Planning, Assessing and Reporting refers to the aligned use of assessment and planning activities to ensure that the teaching-learning activities are maximally appropriate to the students’ current knowledge and learning levels. In particular, the domain focuses on the use of assessment data to plan and revise teaching-learning plans, as well as the integration of formative assessment procedures in the plan and implementation of teaching-learning activities. The domain of Community Linkages focuses on the ideal that school activities are meaningfully linked to the experiences and aspirations of the students in their homes and communities. Thus, the domain focuses on teachers’ efforts directed at strengthening the links between school and community activities, particularly as these links help in the attainment of the curricular

objectives. Finally, the domain of Personal Growth and Professional Development emphasizes the ideal that teachers value having a high personal regard, concern for professional development, and continuous improvement as teachers.

These domains can guide future educators on what teaching competencies they need to develop to become more effective in their profession. For teachers handling assessment courses, these standards do incorporate values and skills unto the students and help drive them towards becoming efficient and effective assessors of student learning.

Conclusion

Assessment of Student Learning (ASESLE) courses are valuable to the programs of students majoring in education. Both teaching strategies and assessment strategies are important aspects in becoming an effective educator. Particularly, for a teacher teaching assessment courses, it is best to showcase good assessment practices to their students in order for them to visualize what assessment truly means. Moving from teaching to learning has also become a central idea in identifying best practices in teaching assessment. Sustaining the interest of the students is often done through group activities, structured exercises, class demonstrations, and field work. Being more task-based will enable the students to gain insights on their own progress and will in turn, develop their self-evaluation skills. The use of technology has been emphasized as one of the ways to teach assessment of student learning courses.

An effective teacher not only employs these teaching strategies, but they also maintain a mindset (that it is equally important) of aiming to develop the students' skills, knowledge and expertise in order for them to succeed in work and life - skills that were stated by the Partnership for 21st Century Skills (2009). Teachers are reminded that they are training these future educators to become effective teachers on all aspects and meet the expectations that the National Competency-based Teacher Standards (2006) have set. With these, the students' learning of assessment will become clearer to them, thus will keep them immensely interested and focus on various assessment tasks.

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