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Motivation in cross-cultural settings: A Papua New Guinea psychometric study

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There is a paucity of research on motivation and education in developing countries. Although psychological constructs relating to academic engagement and achievement have been identified and researched in a number of cross-cultural settings this body of research has rarely been extended to the developing world. The processes by which students from majority, indigenous and under-developed nations are motivated in school are unclear. The current research sought to identify what motivates students from such demographics by investigating the psychometric properties of two instruments measuring student motivation. Three-hundred and fifty-five students from Papua New Guinea completed the Inventory of School Motivation and the General Achievement and Goal Orientation Scale. These instruments measured students' endorsement of academic (mastery and performance) and social goal orientations. Results supported the a-priori factorial structure and reliability of the instruments and deemed them to be satisfactory and useful measures of motivation in Papua New Guinea. Results are discussed in the light of motivational goal theory.

Motivation, Papua New Guinea, confirmatory factor analysis, cross-cultural education

INTRODUCTION

Research investigating the psychological underpinnings of student engagement and achievement has been conducted in a large number of cultural settings throughout the world. Such settings include Western and non-Western developed countries, and a sample of minority groups within such cultures. This literature however, has not been extended to the developing world and a paucity of research exists that can explain the psychological predictors of achievement for students from such countries.

In particular, there is a need for research of this type to be conducted in cultures characterised as the following: Indigenous, majority and developing. An Indigenous culture refers to a group of people who compose the existing descendants of those who inhabited a territory or country and share a common language, culture, spiritual belief system and economic system (Sanders, 1989). A majority group occurs when the target group (of investigation) comprise the main cultural group of the country of study. Finally, a developing country is one in which its inhabitants live in poverty and lack access to basic public services (The World Bank, 2004).

Indigenous, Majority and Developing Cultures

The current study aimed to investigate some preliminary psychological influences of student achievement in one such Indigenous, majority and developing culture. The study also aimed to investigate the psychometric properties of two instruments that have been used in cross-cultural settings to measure student motivation – a major predictor of student engagement and achievement.

Papua New Guinea (PNG) is a country deeply immersed in and enriched by cultural, linguistic, environmental and historical diversity. There are over 850 languages spoken in PNG and the country's mountainous terrain makes communication and travel between areas difficult. Education in Papua New Guinea has experienced a long history of arduous challenges, dealing with low retention rates, poor literacy and ambivalent attitudes. Indeed, enrolment statistics in PNG have shown that only 1.5 per cent of students who begin Grade 1 go on to complete Grade 12 (Avalos, 1993) and approximately 80 per cent of all Papua New Guineans continue to make their living in their home villages (Browne and Scott, 1989). In order to address such issues, in both Papua New Guinea and developing countries alike, it is vital for us to gain a greater understanding of those factors influencing student engagement, achievement and progression.

Achievement and Social Motivation

One such psychological underpinning of student achievement is motivation and the goal orientations that students hold in the classroom environment. Motivational goal orientation has been shown to influence the learning strategies that students employ in the classroom, the metacognitive strategies that students adopt, engagement and academic achievement in addition to being related to the goals and aspirations that students hold for their future. Goal orientations are generally defined as integrated patterns of motivational beliefs that represent different ways of approaching, engaging in, and responding to achievement-related activities (Ames, 1992). Stemming from Achievement Goal Theory (Ames, 1992) and Maehr's Personal Investment Model, McInerney, Yeung and McInerney (2001) proposed a hierarchical, multidimensional model of motivation goal orientations that incorporates a wide range of goals assumed to be relevant in both Western and non-Western cultures. This model outlines the relationships between eight specific first-order goals - task, effort, praise, competition, social power, token, social concern and affiliation - at the base of the hierarchy, which can be grouped into three higher order factors - mastery, performance and social.

Mastery, performance and social goal orientations have been shown to influence achievement in a number of different ways. The majority of research that has been conducted has focused on mastery and performance orientations, synonymously called 'learning and ego goal orientations'. Students, who adopt a mastery goal orientation, focus on learning, understanding and mastering a task, and tend to have an intrinsic motivation for learning (Pintrich, Marx and Boyle, 1993). Such students believe that hard work and effort leads to success and base their achievement on self-referenced standards (Ames, 1992). Alternatively, students who adopt a performance goal orientation focus on their sense of self-worth and their ability to do better than others, surpass norms and achieve public recognition (Ames, 1992).

Research has linked mastery and performance goal orientations to individuals' learning strategies and differing ways of thinking (Dweck, 1986; Nolen, 1988; Pintrich and Schrauben, 1992; Graham and Golan, 1991; Covington, 2000). Biggs (1987) demonstrated that students who adopt deep learning strategies such as obtaining a broad sophisticated understanding, reading widely and relating new material into an existing context, are motivated by mastery oriented goals. He also proposed that students who adopt surface level learning strategies are motivated by pass-only aspirations and hence develop minimum effort learning strategies, often dictated by rote learning

only what is necessary (Biggs, 1987; Tickle, 2001). Covington (2000) reinforced the notion that mastery goals tend to be associated with deep level strategies for learning, while performance goals were associated with surface level learning strategies. However, support for the relations between performance goal orientations and surface level learning processes has not been as conclusive as it has for the relation between mastery goal orientations and deep learning processes (Covington, 2000; Nolen, 1988).

Past research, however, has not exclusively focused on mastery and performance goals alone and that recently the importance of social goal orientation has been investigated and research has been extended to a number of non-Western and minority cultures as well as mainstream Western culture. It is important to note that research has shown that students may hold all three goal orientations simultaneously, depending on the nature of the task, school environment, and the broader social and educational context of the institution (Blumenfeld, 1992; Pintrich and Garcia, 1991; Meece, 1991). The importance of including social goal orientations stemmed from the realisation that the original achievement goal theory gave little attention to goals and values that preserved group integrity, interdependence, relationships and affiliation, and wanting to succeed for the sake of family, friends or other group members (Watkins, McInerney and Lee, 2002). These collectivist, rather than individualist, values are often salient in non-Western cultures, emphasising the importance of including a third type of goal, namely, social orientation (McInerney, Roche, McInerney and Marsh, 1997).

Social orientation is characterised by social concern for others as well as social affiliation and acceptance (Anderman and Anderman, 1999). While many studies have found strong relations between mastery goal orientations, deep learning processes and high academic achievement, some studies have found a similar relation for social goal orientation. However, paradoxical results are also apparent in the literature (Wentzel, 1996), giving rise to the suggestion that it is the interaction between mastery and social goals that positively affects achievement (Covington, 2000; McInerney, Marsh and Yeung, 2003).

The Present Investigation

Examination of the three-factor multi-dimensional model of motivation in a culture that exemplifies cultural diversity and social interdependence may provide some insight into how goal orientations relate to student outcomes for students from environments that do not typify Western cultures. The current status of research does not allow researchers to translate findings from Western and non-Western cultures to majority, developing, Indigenous settings. PNG is a particularly interesting setting within which to investigate motivation and the structure of motivation due to the immense discrepancies between Western settings and its schooling structures and socio-cultural influences.

In order for this body of literature to be extended to cultures characterised as Indigenous, majority and developing (such as PNG), it is important to utilise valid and reliable instrumentation to measure the psychological underpinnings of achievement. Hence the current study aimed to examine the psychometric properties of two motivational instruments for use in PNG, that have previously been used to measure student motivational achievement and social goal orientations in cross-cultural settings.

METHOD

Participants

Three-hundred and fifty-nine students from Papua New Guinea participated in the current study. Students came from a K-12 co-educational school in Port Moresby and were invited to participate

after informed consent was received. There were 205 males and 151 females (3 cases missing) participating in the study and the age range was from 10 to 23 years of age. The average age was 15 years and the average grade level Grade 9.

Instrumentation

Two instruments were administered and analysed to measure students' motivational goal orientations. The *Inventory of School Motivation* (ISM) was initially developed to reflect the dimensions of Maehr's (1984) Personal Investment Model and in particular to investigate the nature of student motivation in cross-cultural settings (McInerney, 1992; McInerney and Sinclair, 1991, 1992; McInerney et al., 1997). This model proposed that several goals serve as a cause of motivated action and provided a useful framework in which achievement goals were conceptualised as being multidimensional and hierarchical. The ISM defined eight first-order factors, three second-order factors and one higher-order factor. The higher-order factor was a general motivation factor and the three second-order factors consisted of mastery, performance and social motivational orientations. Mastery orientation was defined by two first-order factors, 'task' and 'effort'. Performance orientation was defined by four first-order factors, 'praise', 'extrinsic/token', 'competition', and 'social power'. Social orientation was defined by the two first-order factors, 'affiliation' and 'social concern'.

All 34 items of the ISM were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Hence responses were coded so that higher scores reflected stronger endorsement of high levels of motivation. See Appendix A for a selection of example items.

The second instrument, the General Achievement Goal Orientation Scale (GAGOS; McInerney, et al., 2003) varied from the motivational items in the ISM. Items from the ISM did not directly mention 'motivation'. Rather the types of motivation were inferred from the scales. The GAGOS, however, specifically asked students to indicate which academic situations (mastery, performance or social) they were most motivated in. Hence the scales from the GAGOS could be used to confirm the inferences made by the eight first-order scales and three second-order scales of the ISM.

The GAGOS measures three motivational orientations: General Mastery (for example, "I am most motivated when I see my work improving"), General Performance (for example, "I am most motivated when I am praised"), and General Social (for example, "I am most motivated when I am helping others"). Four items measure Mastery, four items measure Performance and three items measure Social goal orientations. Students respond to items written as declarative sentences on a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. Results to date for the ISM and the GAGOS demonstrate good psychometric properties and factor structure.

Statistical Procedures

The majority of missing data appeared to be non-systematic and was dealt with using the EM-algorithm (except for four cases which were excluded using listwise deletion). Preliminary analyses were conducted including reliability analyses, and estimations of scale means and standard deviations. Confirmatory Factor Analyses (CFAs) were performed using PRELIS and LISREL 8.54 (Joreskog and Sorbom, 2005) and were based upon a 34 x 34 and an 11 x 11 correlational matrix for the ISM and GAGOS respectively. Detailed procedures concerning the conduct of CFAs can be obtained elsewhere (Bollen, 1989; Byrne, 1998; Joreskog and Sorbom, 1993; Pedhazur and Schmelkin, 1991). CFA models were performed for the entire sample and a number of goodness of fit indices were examined to determine the model fit. In accordance with recommendations from Holmes-Smith (in press), the following goodness-of-fit indices were

emphasised in the current study: the Root Mean-Square Error of Approximation (RMSEA), the Tucker-Lewis Index (TLI) and the Comparative Fit Index (CFI). According to Holmes-Smith a good fit was indicated by an RMSEA lower than 0.05 and a TLI and CFI greater than 0.95. In addition to these, the χ^2 test statistic and degrees of freedom were calculated and reported.

RESULTS

Preliminary Analyses

Reliability analyses were conducted on the subscales of the ISM and GAGOS. Cronbach's alphas above 0.70 were considered to be good estimates of a scale's internal consistency and alphas above 0.50 were deemed acceptable (Nunnally, 1978). Furthermore, Tabachnick and Fidell (2001) emphasised the need to take into account that the smaller the number of items in a scale, the lower the reliability estimate, when interpreting Cronbach's alpha. The ISM Cronbachs' alphas ranged from 0.53 to 0.85 while the GAGOS alphas were 0.63, 0.61 and 0.70 for the mastery, performance and social scales respectively. All alphas were displayed in Table 1. While the majority of the reliability estimates were acceptable results from the task and social concern scales from the ISM need to be interpreted with caution.

Table 1. Reliability estimates for individual ISM and GAGOS scales

		ISM	GAGOS
Mastery		0.75	0.63
	Task	0.53	
	Effort	0.74	
Performance		0.85	0.61
	Competition	0.64	
	Power	0.79	
	Praise	0.75	
	Token	0.72	
Social		0.68	0.70
	Affiliation	0.71	
	Concern	0.58	

Confirmatory Factor Analyses

First-Order ISM

A first-order confirmatory factor analysis was performed on the data from the PNG sample students. The results of this CFA indicated that the hypothesised model demonstrated a good fit with the data. This good fit was indicated by an RMSEA of 0.048 and a CFI and TLI of 0.94 and 0.93. Furthermore, the ratio of Chi-square to degrees of freedom was lower than two with a non-significant *p* value, indicating a well-fitting model.

It was not considered sufficient however simply to examine the fit of the overall model. One had also to examine the individual parameter estimates. First, the factor loadings for the individual items were examined and they indicated that the eight factors (task, effort, competition, power, praise, token, affiliation and concern) were well-defined by the items (see Table 2). The factor loadings ranged from 0.36 to 0.81 and all were significant indicators of the factors ($p<0.01$).

Higher-Order ISM

Due to the hierarchical nature of the model, a higher-order confirmatory factor analysis was preformed on the data. This model also yielded an acceptable to good fit with the data, indicated

by an RMSEA of 0.055, and CFI of 0.92 and a TLI of 0.92. Furthermore, the Chi-square to degrees of freedom ratio was 2.02.

Table 2. Factor Loadings for the subscales of the ISM

Item	Task	Effort	Competition	Power	Praise	Token	Affiliation	Concern
T1	0.63							
T2	0.50							
T3	0.44							
T4	0.42							
E1		0.58						
E2		0.47						
E3		0.68						
E4		0.7						
E5		0.60						
C1			0.47					
C2			0.58					
C3			0.67					
C4			0.55					
SP1				0.69				
SP2				0.67				
SP3				0.81				
SP4				0.64				
P1					0.54			
P2					0.66			
P3					0.70			
P4					0.67			
P5					0.53			
TO1						0.68		
TO2						0.54		
TO3						0.68		
TO4						0.65		
A1							0.68	
A2							0.74	
A3							0.62	
SC1								0.42
SC2								0.36
SC3								0.43
SC4								0.68
SC5								0.48

The second-order factor loadings for the higher-order model were the same as for the first-order model. The interest in this model, however, was in the loadings of the second-order factors on the first-order factors. These factor loadings ranged from 0.57 to 0.89 and are displayed in Table 3.

Table 3. Factor loadings for the ISM Mastery, Performance and Social scales

ISM Scale	Mastery	Performance	Social
Task	0.78		
Effort	0.87		
Competition		0.67	
Social Power		0.67	
Praise		0.73	
Token		0.85	
Affiliation			0.57
Social Concern			0.89

Furthermore, the second-order factor correlations were all positive, but distinct, with the strongest correlations occurring among the appropriate clusters of first-order items (see Table 4). That is, the mastery items (task and effort) were highly correlated among each other, as were the

performance items (competition, power, praise and token) and the social items (affiliation and concern).

Table 4. Intercorrelations between ISM subscales

	Task	Effort	Competition	Power	Praise	Token	Affiliation	Concern
Task	1							
Effort	**0.68**	1						
Competition	0.28	0.31	1					
Power	0.28	0.31	**0.45**	1				
Praise	0.31	0.34	0.**49**	0.**49**	1			
Token	0.36	0.40	0.**57**	0.**57**	0.**62**	1		
Affiliation	0.31	0.34	0.15	0.15	0.16	0.19	1	
Concern	0.48	0.53	0.23	0.23	0.25	0.30	0.**50**	1

*Figures in bold indicate mastery, performance and social correlation clusters

Finally, the correlations between the three first-order factors were all positive yielding an *r* value of 0.54 for the correlation between mastery and performance, 0.69 for mastery and social, and 0.39 for performance and social.

One advantage of including higher-order factors was that models might be simplified by their inclusion, that is, a smaller number of higher-order factors might be shown to account for variations in, and between, individual items and first-order factors (Lance, Teachout, and Donnelly, 1992). In the current case of the two models, both the higher-order and first order models were equally parsimonious in terms of their degrees of freedom.

GAGOS

Finally, a confirmatory factor analysis was performed on the items of the GAGOS and the results also demonstrated that the model fitted the data well. This was indicated by an RMSEA of 0.045, a CFI of 0.97, and TLI of 0.96 and a Chi-square to degrees of freedom ratio of 1.76. Furthermore, the factor loadings ranged from 0.45 to 0.82 and are displayed in Table 5. In addition the *r* value for the correlation between mastery and performance was 0.67, 0.31 for mastery and social, and 0.41 for performance and social.

Table 5. Factor Loadings for the subscales of the GAGOS

Item	Mastery	Performance	Social
M1	0.51		
M2	0.59		
M3	0.54		
M4	0.59		
P1		0.48	
P2		0.52	
P3		0.57	
P4		0.55	
S1			0.45
S2			0.76
S3			0.82

DISCUSSION

The results of the current study indicate that the ISM and GAGOS are appropriate instruments for use in Papua New Guinea and may be applicable for generalisation to other majority, Indigenous and developing countries. Confirmatory factor analyses reveals that the first order models of both the ISM and GAGOS fit the PNG data well. Furthermore, the higher-order ISM model also provide an acceptable fit with the data. Thus, the hypothesised factor structure of students'

motivational goal orientations is well-supported and is evident in PNG culture. Thus, there are two main implications that can be drawn from the results of the confirmatory factor analyses.

First, due to the support of the factor structure of motivational goal orientations in PNG, profiles of students' goal patterns can be compared across cultures. A profile analysis can be conducted to compare extent to which PNG students are adopting certain goal orientations to the extent that students from other cultures claim to endorse them. Such profile analyses have already examined the similarities and differences in motivation profiles between students from mainstream Western cultures, non-Western cultures and minority groups (see McInerney et al., 1997) but research is limited in the cultural groups that are the focus of the current study. Particularly, future research will benefit by comparing motivation profiles across PNG, Anglo-Australian and Aboriginal Australian groups due to the similarities in the cultures' education systems and the cultural and physical proximity of the groups.

Second, validating the factor structure of the GAGOS and ISM instrumentation for use in PNG gives rise to opportunities to examine the relations between PNG students' motivational goal orientations and other learning outcomes. Again, models examining the relations between a number of psychological variables have been examined across a number of cultures but have rarely been extended to majority, Indigenous and developing countries. Such models have examined the relations between motivation, future goal orientation, perceived instrumental value of schooling, learning strategies, self-regulatory strategies and self-concept and how they predict student engagement and achievement. Future research needs to continue to examine and validate the use of further instrumentation in PNG so that such achievement models can be examined in majority, Indigenous, developing countries. The current study has done so for motivational goal orientations.

In addition to the promising findings presented so far in the paper, the current study also has some associated limitations. First, some of the reliability estimates are lower than desirable and the results of these scales hence need to be interpreted with caution. In particular, the task and social concern scales have lower reliabilities. However, as advised in Tabachnik and Fidell (2001), Cronbach alphas are naturally be lower with smaller numbers of items in scales. Hence due to the small number of items in all of the scales of the ISM and GAGOS, and due to the cross-cultural nature of the study, the reliability of the instruments is still acceptable.

Second, the current study does not examine the relations between the congruent scales of the ISM and the GAGOS. While the GAGOS directly refers to and measures mastery, performance and social goals, the ISM simply infers students' endorsement of the goals. Hence, research will be strengthened by examining the relations between the mastery, performance and social scales of the two instruments.

Furthermore, the confirmatory factor analyses reveal that the relations between the mastery and performance and social goals for the ISM are synonymous with the corresponding relations for the GAGOS. For example, the strongest correlation between subscales for the ISM is between mastery and social goals, whereas this is the weakest correlation for the GAGOS. These phenomena need to be investigated further.

Motivational goal orientations are an influential predictor of other educational psychological variables as well as of learning outcomes such as engagement and achievement. The current study has validated the use of two instruments that measure motivational goal orientations for use in Papua New Guinea. Future research should extend this research to other majority, Indigenous and developing settings and should examine the relations between a broader extent of predictor variables and achievement in such settings.

REFERENCES

Ames, C. (1992). Classrooms: goals, structures, and student motivation. *Journal of Educational Psychology*, 84 (3), 261-271.

Anderman, L.H., and Anderman, E.M. (1999). Social predictors of changes in students' achievement goal orientations. *Contemporary Educational Psychology, 24*(1), 21-37.

Avalos, B. (1993). Ideology, policy and educational change in Papua New Guinea. *Comparative Education, 29*(3), 275-292.

Biggs, J.B. (1987). *Student Approaches to Learning and Studying.* Melbourne: Australian Council for Educational Research.

Blumenfeld, P. (1992). Classroom learning and motivation: Clarifying and expanding goal theory. *Journal of Educational Psychology, 84,* 272-281.

Bollen, K. A. (1989). *Structural Equations with Latent Variables*. New York: Wiley.

Browne, C., and Scott, D.A. (1989). *Economic Development in Seven Pacific Island Countries.* Washington, D.C.: International Monetary Fund.

Byrne, B. M. (1998). *Structural Equation Modelling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications, and programming*. Mahwah, NJ: Erlbaum.

Covington, M.V. (2000). Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Psychology, 51,* 171-200.

Dweck, C.S. (1986). Motivational processes affecting learning. *American Psychologist, 41*(10), 1040-1048.

Graham, S., and Golan, S. (1991). Motivational influences on cognition: Task involvement, ego involvement, and depth of information processing. *Journal of Educational Psychology, 83*(2), 187-194.

Holmes-Smith, P. (in press). *Applied Structural Equation Modelling.* School Research, Evaluation and Measurement Services.

Joreskog, K. G., and Sorbom, D. (1993). *LISREL 8: Structural Equation Modelling with the SIMPLIS Command Language*. Chicago: Scientific Software International.

Joreskog, K. G., and Sorbom, D. (2005). *LISREL 8.54: Structural Equation Modelling with the SIMPLIS Command Language.* Chicago: Scientific Software International.

Lance, C. E., Teachout, M. S., and Donnelly, T. M. (1992). Specification of the criterion construct space: An application of hierarchical confirmatory factor analysis. *Journal of Applied Psychology, 77,* 437-452.

Maehr, M. L. (1984). Meaning and motivation toward a theory of personal investment. In R. Ames and C. Ames (Eds.), *Research on Motivation in Education: Vol. 1. Student Motivation (pp. 115-144)*. Orlando, Florida: Academic Press.

McInerney, D. M. (1992). Cross-cultural insights into school motivation and decision making. *Journal of Intercultural Studies, 13*, 53-74.

McInerney, D.M., and Sinclair, K.E. (1992). Dimensions of school motivation: A cross-cultural validation study. *Journal of Cross-cultural Psychology, 23*(3), 389-406.

McInerney. D. M. and Sinclair, K. E. (1991). Cross cultural model testing: Inventory of school motivation. *Educational and Psychological measurement, 51*, 123-133.

McInerney, D. M., Marsh, H. W., and Yeung, A.S. (2003). Toward a hierarchical goal theory model of school motivation. *Journal of Applied Measurement, 4*(4), 1-23.

McInerney, D. M., Yeung, A. S., and McInerney, V. (2001). Cross-cultural validation of the inventory of school motivation (ISM): Motivation orientations of Navajo and Anglo students. *Journal of Applied Measurement, 2*(2), 135-153.

McInerney, D. M., Roche, L. A., McInerney, V., and Marsh, H.W. (1997). Cultural perspectives on school motivation: The relevance and application of goal theory. *American Educational Research Journal, 34*(1), 207-236.

Meece, J. (1991). The classroom context and children's motivational goals. In M. Maehr and P. Pintrich (Eds.), *Advances in Achievement Motivation Research* (Vol. 7, pp. 261-286). Greenwich, CT: JAI Press.

Nolen, S. B. (1988). Reasons for studying: Motivational orientations and study strategies. *Cognition and Instruction, 5,* 269-287.

Nunally, J. O. (1978). *Psychometric Theory.* New York, NY: McGraw-Hill.

Pedhazur, E. J., and Schmelkin, L. P. (1991). *Measurement, Design, and Analysis: An Integrated Approach.* Hillsdale, NJ: Erlbaum.

Pintrich, P.R., and Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. *Advances in Motivation and Achievement, 7,* 371-402.

Pintrich, P.R., and Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom academic tasks. In D.H. Schunk and J.L. Meece (Eds.), *Students' Perceptions in the Classroom* (pp. 149-183). Hillsdale, NJ: Lawrence Erlbaum Associates.

Pintrich, P.R., Marx, R.W., and Boyle, R.A. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research, 63*(2), 167-199.

Sanders, D. (1987). Cultural conflicts: an important factor in the academic failures of American Indian students. *Journal of Multicultural Counseling and Development, 15,* 81-90.

Tabachnik, B. G., and Fidell, L. S. (2001). *Using Multivariate Statistics*. Fourth edition. Toronto: Allyn and Bacon.

The World Bank. (2004). *World Development Indicators.* Washington DC": The World Bank Group.

Tickle, S. (2001). What have we learnt about student learning? A review of the research on study approach and style. *Kybernetes, 30*(7/8), 955-969.

Watkins, D., McInerney, D.M., and Lee, C. (2002). Assessing the school motivation of Hong Kong students. *Psychologia: An International Journal of Psychology in the Orient, 45*(3), 144-154.

Wentzel, K.R. (1996). Social and academic motivation in middle school: Concurrent and long-term relations to academic effort. *Journal of Early Adolescence, 16*(4), 390-406.