
Education in Cross-Cultural Settings: Psychological Underpinnings of Achievement in Papua New Guinea

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Education and achievement in Papua New Guinea has received minimal attention in the psychological and educational literature. Although student motivation and achievement have been investigated in a large variety of cultures throughout the world, this has not been substantially extended to the developing world. The current study investigated a selection of psychological processes that contribute to student achievement in the context of a majority, indigenous and developing culture. Motivational goal orientations, learning and self-regulatory processes of 359 students from Papua New Guinea (PNG) were investigated. Structural equation modeling investigated the relations between the psychological variables. Results are discussed in the context of McInerney's (2007) model of student achievement in cross-cultural settings.

Education in Papua New Guinea has experienced a tumultuous and uneven history. The education system has had to battle the elements of reformation and restructure in the midst of widespread social and political instability hand in hand with the turmoil of health, employment and welfare crises. PNG education has had to battle with limited and poorly handled funding opportunities, an extreme lack of resources and supplies, and a limited number of qualified and appropriately paid and trained educators. Only 1.5% of students who begin elementary school in PNG will go on to complete Grade 12 in high school (Avalos, 1993) and approximately 80% of all Papua New Guineans continue to make their living in their home villages (Browne & Scott, 1989). Furthermore, the PNG education system has had to combat and ever-increasing attitude of ambivalence towards the utility of education in student and family lives, as well as an overwhelming number of the 'educated unemployed'. However despite the fluctuating and inconsistent attitudes towards the value of schooling and despite the societal hardships Papua New Guineans have had to deal with, some research has highlighted some promising findings concerning students' commitment to studies, goals they hold for their futures and motivation to achieve academically.

If, however, education is to play the effective and important role in Papua New Guineans lives that it has so often shown to in numerous other cultures, it is necessary for researchers, educators and policy designers alike, to gain a full understanding and appreciation of those factors which contribute to student achievement and engagement. The current study aimed to highlight the relations between two important psychological influences of student engagement and achievement-motivation and self-regulation. Furthermore, it aimed to investigate these relations of psychological processes in a unique cross-cultural setting –one characterized by being indigenous, majority and developing.

Model of Student Achievement

A large amount of research has looked into the characteristics and traits of students and how they relate to school achievement. Dennis McInerney (manuscript in preparation) has developed a model investigating the relations between students' future-oriented and immediate achievement goals and their relation to student self-regulation, self-concept and performance. The model emphasizes the importance of examining the validity of such a model within the cultural, familial, social and educational context of the student. The current study examined three of these psychological processes, motivation, self-regulation and future goal orientation, and a discussion of the research on this to date follows.

Motivation

One 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 (1984), McInerney, D., Yeung, and McInerney, V. (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 relation 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, & 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 & Schrauben, 1992; Graham & 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, whilst performance goals were associated with surface level learning strategies. Support however 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 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 & Garcia, 1991; Meece, 1991). The importance of including social goal orientations stemmed from the realization that the original

achievement goal theory gave little attention to goals and values that preserve group integrity, interdependence, relationships and affiliation, and wanting to succeed for the sake of family, friends or other group members (Watkins, McInerney, D., & Lee, 2002). These collectivist, rather than individualist, values are often salient in non-Western cultures, emphasizing the importance of including a third type of goal -social orientation (McInerney, D., Roche, McInerney, V., & Marsh, 1997).

Social orientation is characterized by social concern for others as well as social affiliation and acceptance (Anderman, L. & Anderman, E., 1999). Whilst 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; 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, D., Marsh, & Yeung, 2003).

Self-Regulated Learning

Another set of psychological factors that have been shown to influence student engagement and achievement are learning strategies and self regulation. The combined use of these has been shown to enhance learning which is defined as the “complex process of assimilating, structuring, and applying new knowledge and skills” (Phalet, Andriessen, & Lens, 2004, p. 76). Learning strategies are the cognitive strategies or ways of processing information, students’ use when studying (Pintrich, 1989). These cognitive strategies include techniques such as cognitive rehearsal, elaboration, organization and critical thinking.

In addition to these, students employ self-regulatory and resource management strategies to their learning. Self-regulation has been defined as “self-generated thoughts, feelings, and actions for attaining educational goals (Zimmerman, 2002, p. 139). It involves processes such as planning and managing time, attention and concentration, the organization, rehearsal and coding of information, establishing productive work environments, and the effective use of social resources. Self-regulatory processes have been positively linked with academic achievement when students capitalize on the following procedures: (a) task analysis and goal setting; (b) holding positive self-motivational beliefs; (c) employing self-control and self-observation strategies; and (d) monitoring their performance via self-judgment and self-reaction. Many studies have reported the greater use by high achievers of both personal and social self-regulatory strategies (Zimmerman & Martinez-Pons, 1990; Zimmerman, 2002; Purdie, Hattie, & Douglas, 1996).

Marsh, Hau, Artelt, and Baumert (2006) in their review of the literature on self-regulation highlighted three main cognitive strategies and three main metacognitive strategies available for learners. The cognitive learning strategies include memorization strategies (e.g., reading material aloud and repeating vital facts and terms), elaboration strategies (e.g., construction and integration of ideas), and transformation strategies (e.g., transferring information from one form to another). In addition to these, the metacognitive strategies generally cover techniques involved in examining and controlling one’s learning patterns. The three main metacognitive strategies are planning strategies (e.g., outlining goals and learning targets), monitoring strategies (e.g., ensuring material is understood) and regulation strategies (e.g., adapting learning activity to given tasks and seeking appropriate support). Motivational goal orientation and self-regulation have rarely been studied in indigenous, majority and developing cultures such as PNG.

Instruments measuring students’ motivation goal orientation and self-regulation have been developed and used across a wide variety of cross-cultural settings. Two such instruments have been adopted for use in Papua New Guinea and their psychometric properties (validity and reliability) have been confirmed for use with Papua New Guinean students. The current study investigated the relations between the components of motivational goal orientation and self-regulation as measured by these two instruments, namely the Inventory of School Motivation and the Goal Orientation and Learning Strategies Survey.

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 was Grade 9. Due to outliers and listwise deletion of cases with missing data not missing at random, 21 cases were deleted resulting in a sample size of 338.

Materials

Three instruments were administered and analyzed to measure students' motivational goal orientations, future goal orientations and use of self-regulatory learning strategies. The first of these, 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, D. & Sinclair, 1992; McInerney, D. et al., 1997). This model proposes that several goals serve as a cause of motivated action and provides a useful framework in which achievement goals are conceptualized as being multidimensional and hierarchical. The ISM defines eight first-order factors, three second-order factors and one higher-order factor. The higher-order factor is a general motivation factor and the three second-order factors consist of mastery, performance and social motivational orientations. Mastery orientation is defined by two first-order factors, task and effort. Performance orientation is defined by four first-order factors, praise, extrinsic/token, competition, and social power. Social orientation is defined by the two first-order factors, affiliation and social concern. All 34 items of the ISM are scored on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Hence responses are coded so that higher scores reflect stronger endorsement of high levels of motivation.

The Goal Orientation and Learning Strategies Survey (GOALS-S) was designed to measure the cognitive and metacognitive learning strategies that students employ to learn (Dowson & McInerney, D., 2004). Cognitive strategies are measured by three subscales: elaboration, organization and rehearsal. The elaboration subscale is measured by 6 items which measure the extent to which students make connections between present and previously learned information. An example elaboration is "I try to understand how what I learn in school is related to other things I know". The organization subscale is measured by 6 items which refer to the selection, sequencing and summarizing of important information, for example, "I reorganize my schoolwork so that I can understand it better". The rehearsal subscale was also measured by 6 items and targets behaviors such as listing, memorizing and reciting information to aid learning. An example item is "I repeat things to myself when learning things for school."

Metacognitive strategies are also measured by three subscales: monitoring, planning and regulating. Monitoring involves self-checking for understanding, self-testing, and organizing reviews of learned material, and is measured by 6 items such as "I often ask myself questions to see if I understand what I am learning". Planning was measured by 6 items which measure prioritizing, time-management, scheduling and goal-setting. An example item is "I often try to decide first what are the most important parts of what I have to learn for school". The final subscale, regulating, is measured by 6 items such as "If I don't understand something in school, I go back and try to learn it again." Such items target the strategies that someone adopts to rectify any deficits they identify. Such strategies include seeking different ways to learn material, seeking explanations from teachers, and identifying mistakes in reasoning. All 36 items of the GOALS-S are scored on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'.

Procedures

In the PNG schools, a mediator and a translator participated in the administration of the questionnaire. The mediator was a village elder, who was briefed on the intentions and purposes of the research and ensured that participants understood that their participation was not compulsory.

Although English is taught primarily in PNG schools, students were also well educated in or exposed to their village (native) language and perhaps other local dialects. Therefore, a translator was present at all times to assist with any language barriers.

With the exception of some cases (which were excluded using listwise deletion), missing data appeared to be non-systematic and was dealt with using the EM-algorithm. The analyses performed employed structural equation modeling (SEM) and confirmatory factor analyses (CFAs) which compare the goodness of fit between a sample covariance matrix and an a priori hypothesized model. CFAs were conducted on the ISM and GOALS-S which confirmed the factor structure and validity of the instruments for use in PNG.

Structural Equation Modeling (SEM) was also employed to determine how motivation, self-regulation and future-goal orientation were related to each other according to McInerney's model of student achievement. SEM examines the causal relationships between the latent factors that are generated through CFAs. These relations are tested through multiple regression analyses and incorporate the structural relationships between latent variables as well as observed variables (Byrne, 1998). These processes allow for the detection of associations between these variables by obtaining parameter estimates close to their population values and by isolating the variables via their uniqueness and unreliability of their indicators (Hoyle, 1995).

In accordance with recommendations from Holmes-Smith (in press), the following goodness-of-fit indices were emphasized 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 an acceptable fit is indicated by an RMSEA lower than .08 and a TLI and CFI greater than .90 whilst a good fit is indicated by the RMSEA, TLI and CFI values of .05, .95 and .95. In addition to these, the chi-square test statistic and degrees of freedom were calculated and reported.

Results

A structural equation model was performed on the motivation and self-regulation items with mastery, performance and social factors predicting self-regulation. Cognitive and metacognitive learning strategies were combined into a single factor called self-regulation. Previous analyses showed that PNG students were not distinguishing between the cognitive and metacognitive factors and that they instead perceived of a general higher-order self-regulation factor being comprised of the five first-order learning strategy subscales. The hypothesized and tested model is depicted in Figure 1.

The individual item factor loadings of the first order factors were all positive and significant predictors of the first order motivation (task, effort, competition, praise, social power, token, affiliation and concern) and self-regulation (rehearsal, elaboration, organization, preparation and regulation) subscales. These factor loadings ranged from .35 to .81. The factor loadings of the first order factors on the second order motivation and self-regulation factors were also all positive and significant and ranged from .45 to .98. These factor loadings are displayed in Table 1.

The correlations between the first order factors were all positive and are displayed in Table 2. These correlations ranged from .12 to .98. The correlations between the three second order motivation scales, mastery, performance and social, and the higher order self-regulation scale were .87, .56 and .53.

However, although these correlations were positive and significant, when the combined variance was accounted for in the structural equation model, only one of the motivation factors was positively and significantly related to self-regulation. Mastery orientation was the only goal orientation that positively predicted self-regulation with a standardized beta (path) coefficient of .91 ($p<.001$). Whilst performance orientation positively predicted self-regulation, its standardized beta coefficient of .15 was not significant. Similarly, although social orientation negatively predicted self-regulation, its standardized beta coefficient of -.17 was also not significant. Thus 82.8% of the variance in self-regulation was explained by mastery orientation.

Finally the goodness-of-fit indices indicated that the hypothesized model (in contrast to the null model) provided a good fit to the data. This was indicated by an RMSEA of .05, a CFI of .93 and a TLI of .93.

Table 1. First-Order Factor Loadings on Mastery, Performance, Social and Self-regulation Scales

First-Order Factor	Mastery	Performance	Social	Self-Regulation
Task	.84			
Effort	.84			
Competition		.71		
Praise		.71		
Social Power		.70		
Token		.84		
Affiliation			.51	
Social Concern			.91	
Rehearsal				.93
Elaboration				.83
Organisation				.96
Preparation				.98
Regulation				.45

Table 2. Correlations between First Order Motivation and Self-Regulation Factors

	T	E	C	P	SP	T	A	SC	R	E	O	P	R
T	1												
E	.71	1											
C	.31	.31	1										
P	.31	.31	.51	1									
SP	.30	.30	.50	.49	1								
T	.37	.37	.60	.59	.59	1							
A	.31	.31	.13	.13	.13	.15	1						
SC	.55	.55	.23	.23	.22	.27	.47	1					
R	.67	.67	.37	.37	.36	.43	.25	.45	1				
E	.61	.61	.33	.33	.33	.39	.23	.40	.77	1			
O	.70	.70	.38	.38	.37	.45	.26	.46	.89	.80	1		
P	.71	.71	.39	.39	.38	.46	.26	.47	.90	.82	.94	1	
R	.32	.32	.18	.18	.17	.21	.12	.22	.41	.37	.43	.44	1

Discussion

The current study examined the relations between motivational goal orientations and self-regulation for students in Papua New Guinea. The study found that there were relations between mastery, performance and social goal orientations and self-regulation but that it was only mastery orientation that positively and significantly predicted self-regulation, accounting for most of the variance in self-regulation. Neither performance nor social orientation significantly predicted student's use of self-regulatory learning strategies.

These findings share both similarities and differences from those of past studies. A large amount of research and literature has found a positive link between mastery goal orientation and

use of self-regulatory strategies, including deep learning processes and metacognition. This is supported by the results of the current study whereby mastery orientation was not only positive and significant but an extremely strong predictor of self-regulation. Furthermore, studies in Papua New Guinea also exhibited a relation between mastery orientation and deep learning strategies (Nelson, McInerney, D., & Craven, 2004). The current study, the first to use structural equation modeling in Papua New Guinea also supported this relationship.

However, these studies in Papua New Guinea and other non-Western settings also found that social goal orientations are linked to positive use of self-regulatory strategies and deep learning processes. This was not supported by the current study, and although non-significant, in fact a negative relation was found between social orientation and self-regulation. Despite Papua New Guinea's emphases on collectivism, group learning and social interaction, students' endorsement of social goals did not impact upon the techniques they use to learn in and out of the classroom.

These findings have implications for teaching practice in Papua New Guinean classrooms as well as potential motivational interventions. In order to increase students' adoption of positive self-regulatory processes, such as rehearsal, elaboration, organization, preparation and regulation, teachers and educators need to focus on increasing their mastery orientation. Techniques and interventions aimed at increasing mastery orientation must focus on increasing student's interest in subject matter, increasing their focus on effort, increasing their skills development and focusing on understanding and mastering content rather than achieving norms and standards.

The relations between social orientations and learning outcomes should also be investigated further. The correlation between social and mastery goal orientations ($r = .71$) was the strongest correlation. Given the emphasis that past research has found students placing on social and community goals, the links between mastery goals and social goals needs to be investigated further.

In addition to this future research should investigate the links between motivational goal orientations, self-regulatory learning strategies and other psychological predictors of student engagement and achievement. Future goal orientation, perceived instrumental value of schooling, self-concept and deep and surface learning strategies have also been shown to be linked to motivation, self-regulation and student outcome measures. These relations need to be investigated in Papua New Guinea and other Indigenous, majority and developing countries.

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