



The Relationship between Career Interests and Academic Achievements in English, Mathematics, and Science of Grade 10 Students

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Abstract

This study examined the predictive influence of career interests on the academic achievements of 257 grade 10 students in English, Mathematics, and Science using locally-developed measures. Specifically, this research sought to answer the question: How significant are the dimensions of career interests in predicting the academic achievements of grade 10 students in English, Mathematics, and Science? The self-enhancement model was used as a research framework, while a cross-sectional, predictive study was used as a research design. Data were analyzed using both descriptive and inferential statistics. Based on the results of multiple regression analysis, an occupational group that engages in explicit, ordered, and systematic manipulation of data consistently positively predicts academic achievements in English, Mathematics, and Science. While an occupational group that works in the production, quality assurance, and maintenance of products, operations, and services consistently predicts academic achievements in English, Mathematics, and Science. Furthermore, an occupational group that develops and designs manufactured products and creates two- and three-dimensional models and animation predicted academic achievements in English and Mathematics but not in Science. Although it is considered a crucial period for Filipino adolescents to select a specific track in the middle school that matches their interests and capabilities, most of them are still quite uncertain of the occupational groups they would like to pursue. This stability of adolescents' career interests has essential implications for the conceptualization and practice of career guidance in schools.

Keywords: academic achievement, career interests, K-12, multiple regression, self-enhancement model

Introduction

Education aims to develop the necessary knowledge and skills among the students to prepare them for the world of work and eventually to have a meaningful lifelong career. The curricular reforms introduced in the Philippine primary education were a response to be at par with the standards of both regional and international communities (Cabasag, 2014). In the K-12 basic education program, the 10-years was added with two more years to better prepare students either at work or to pursue college education (Cabansag, 2014). Because specializations are offered in senior high school that include: academics, technical and vocational courses; sports; and arts and design, various measures such as aptitude tests, achievement tests, and career interests' tests are utilized to help guide students in their career decisions (Innotech, 2012).

Achievement Tests according to Borgans, Golsteyn, James, Heckman, and Humphries (2016) assess skills and general knowledge learned from the inside and the outside of the school. They believed that these are more objective than grades because teachers usually include non-cognitive traits (e.g., conduct) in their assessment of students' performance in the classroom. Skills are defined in terms of proficiency and competence that are developed through repeated practice, and these can be either general or domain-specific (Metz & Jones, 2013). A student's academic achievement pertains to his or her ability to learn and use these learned facts by communicating both in oral and written forms (Kpolovie, Joe, & Okoto, 2004). In K-12, national assessments are conducted at the end of each level of schooling. Grade 12 assessment serves two purposes: to determine if the standards are achieved, and the second serves as an entrance examination for college (Innotech, 2012).

Furthermore, Career Interests refer to the propensity of a person to a particular set of activities or subjects (Osipow & Fitzgerald, 1996). These are manifested in behavior or actions to satisfy the needs and aspirations (Albion & Fogarty, 2002). Career interests can be identified through different means such as expressed interest by asking about the activities one prefers, manifest interests by doing the activities one prefers, or inventoried interest by asking to what extent the activities are being liked or disliked.

Armstrong, Donnay, and Rounds (2004) emphasize the importance of understanding students' career interests cannot be overemphasized as they are still considered good representations of the world of work regardless of changes in technology, globalization, and specialization in the workplace. An integrated and comprehensive picture or understanding of students will be obtained by measuring career interests. Similarly, the student is likely to gain a more comprehensive understanding of himself or herself if career interests form part of the psychological assessment process (De Bruin, 2002).

Holland's (as cited in Bastien, 2014) theory is considered one of the most extensively used in both research and practice. The theory assumes that the environment shapes people and people prefer a career that would fit their personalities. Thus, members of an occupational group possess more or less similar personalities. Succinctly, "Interest directs individuals' choices and focuses effort on goal achievement in the chosen fields" (Holland, 1997 as cited in Su, 2012, p.7). Holland has identified six main types of career interests: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC). The cross-cultural validity of Holland's model has been supported in the studies conducted in various countries such as China, Germany, Hong Kong, India, Japan, Korea, Serbia, and Singapore but not in Africa. Although this framework has been widely used in vocational psychology, caution must still be exercised in using measures across cultures if their use has not been examined (Bastien, 2004).

On the other hand, Relationship Between Career Interests and Academic Achievement is another thing to consider. Holland (as cited in Proyer, 2006) suggests that career interests can be interpreted as an expression of personality. In borrowing from the theoretical conceptualizations of the literature on academic self-concept, there are three existing distinct models concerning causal ordering between self-concept variables and academic achievement these are the self-enhancement model, the skill-development model, and the reciprocal effect model (Green, Nelson, Martin, & Marsh, 2006). The self-enhancement model suggests that self-concept variables primarily cause academic achievement (Calsyn & Kenny, 1997). In the skill-development model, the case is reversed. This idea suggests that self-concept emerges principally as the effect of academic achievement (Calsyn & Kenny, 1997). The reciprocal-effect model suggests that self-concept and academic achievement are reciprocally related and mutually reinforcing. Both prior self-concept and prior achievement may affect each other and vice versa. Both the self-enhancement model and skill-development model are only feasible in cross-sectional studies. Only the reciprocal-effect model requires a longitudinal approach (Green, Nelson, Martin, & Marsh, 2006).

According to Elsworth, Harvey-Beavis, Ainley, and Fabris (1999), school subject preferences are related to career interests. Some studies also support this claim. One is the study by Kahn, Nauta, Gailbreath, Tipps, and Chartland (2002) that revealed that three out of the six subscales of the career interests turned out to be significant predictors of academic performance. Another is the study of Ackerman and Heggestad (1997). They discovered that Mathematical abilities are associated with Realistic, Investigative, and Conventional interests, while verbal abilities tend to be most highly correlated with Artistic Investigative interests.

In addition to this, Low, Yoon, Roberts, and Rounds (2005) claim that vocational interests before 16 are considered stable and reliable predictors of future outcomes. With the implementation of the K-12 curriculum in the Philippine basic education, it is imperative to determine the predictive properties of tests that can help guide Filipino students in their career decision-making. Several studies relating career interests to academic performance (e.g.,

Ackerman & Heggstad, 1997; Elsworth, Harvey-Beavis, Ainley, & Fabris, 1999; Kahn, Nauta, Gailbreath, Tipps, & Chartland, 2002) were conducted. However, no local empirical studies have explored the relationship between career interests and academic achievement using locally-developed measures.

Thus, this study aimed to investigate the predictive influence of the dimensions of career interests as measured by the CEM Interest Profiler in the academic achievements in English, Mathematics, and Science as measured by K-12 Achievement Tests in English, Mathematics, and Science of grade 10 students using the self-enhancement model. Specifically, this research sought to answer the question: How significant are the dimensions of career interests in predicting the academic achievements of grade 10 students in English, Mathematics, and Science?

Methodology

Regarding this study's time dimension and research objective, the Cross-sectional, Predictive design was used because the research aimed at predicting the influence of career interests on academic achievements in English, Mathematics, and Science without experimental manipulation (Johnson, 2001). The study was composed of 257 grade 10 students because the most common rule of thumb for doing a regression is to have at least 10 to 15 cases of data per predictor (Field, 2009). The participants' age ranged from 13 to 18 years old. On average, the age was 15 ($SD = 0.764$). In terms of gender distribution: there were 143 (55.6%) males; 111 (43.2%) females; and 3 (1.2%) undisclosed. Though the numbers are not the same, it can be said that both genders are nearly equally represented. These participants came from four different regions, namely: Eastern Visayas with 97 (37.7%); CALABARZON with 67 (26.1%); NCR with 58 (22.6%); and Central Visayas with 35 (13.6%).

When it comes to Measures, *CEM Career Interest Profiler* was used. The purpose of the instrument is to measure the level of interest a student has in fourteen identified occupational groups. The instrument is intended for grade 7 to grade 12. One hundred fifteen items describe activities or tasks related to different occupations that can be administered in 45 minutes. There are four predetermined response options: 4 = very interested, 3 = interested, 2 = a little interested and 1 = not interested at all. In terms of scoring, the interest score has a numerical value ranging from 25 to 175. This instrument is designed to report the degree of interest in each occupational group, which has its conversion table for transforming raw scores into interest scores and interest categories. The occupational group is reported only when there are less than three unanswered statements (CEM, 2016; CEM, 2017, June 19).

K-12 Achievement Tests in English, Mathematics, and Science. These achievement tests are designed to assess students' knowledge and skills in English, Mathematics, and Science at the elementary and junior high school levels. The scale score of this instrument is a transformed raw score with extra points adjustment given to difficult items. The lowest possible scale score is 100,

while the highest is 500 (CEM, 2017, June 19). Lastly, in analyzing the data, both Descriptive Analysis and Zero-order correlations were performed. The Multiple Regression Analysis, specifically the forced entry, was used for the primary analysis.

Results

The purpose of the study was to determine how significant were the dimensions of career interests in predicting the achievement test scores in English, Mathematics, and Science. Preliminary analysis was first conducted to examine the variables under study. Table 1 shows the descriptive analysis of the 14 occupational groups of the CEM Profiler using means and standard deviations. Results indicate that the mean scores of the 14 occupational groups ranged from 67 to 92, using the lowest possible score of 25 and a highest possible score of 175 as reference points for the transformed scores of the instrument. Using the prescribed categorization of the instrument, which is based on mode, the participants showed little interest in both *Public and safety wellness* and *Home economics*; while no interest at all was noted in the 12 occupational groups, namely: *Production, processing, logistics, and maintenance*; *Mechanical and electrical specialties*; *Health care*; *Research and evaluation*; *Health science and technologies*; *Computer sciences and technologies*; *Performing arts*; *Visual arts*; *Applied arts*; *Social services*; *Business, management and administration*; and *Administrative and financial operations and support*.

Table 1 Means and Standard Deviations of Occupational Groups of the Career Interest Profiler

Occupational Groups	Mean	Std. Deviation
1. Production, processing, logistics and maintenance	67.06	24.197
2. Mechanical and electrical specialties	76.40	29.453
3. Health care	72.72	41.304
4. Public and safety wellness	92.20	25.637
5. Home economics	89.29	25.982
6. Research and evaluation	79.89	25.198
7. Health science and technologies	83.08	33.563
8. Computer sciences and technologies	79.11	26.296
9. Performing arts	78.18	37.099
10. Visual arts	84.46	35.210
11. Applied arts	91.25	34.522
12. Social services	81.10	20.599
13. Business, management, and administration	83.81	25.257
14. Administrative and financial operations and support	78.24	26.981

Table 2 shows the descriptive analysis of the achievements test scores in English, Mathematics, and Science using Means and Standard Deviations. Results indicate that the scores in English, Mathematics, and Science are slightly above the midpoint of the lowest possible score (i.e., 100) and the highest possible score (i.e., 500). Regarding the values of the mean scores, these may indicate average performances. However, the results should be taken with caution since the distribution of scores per subject is highly dispersed because the values of the standard deviations are considerably high.

Table 2 Means and Standard Deviations of Achievement Test Scores

Subjects	Mean	Std. Deviation
English	293.08	34.387
Mathematics	272.21	35.018
Science	287.84	37.740

To check for the multicollinearity of the career interests and the achievement tests in English, Mathematics, and Science, zero-order correlations were performed. As shown in Appendices A, B, & C, all of the dimensions of career interests were not highly correlated with the scores on the achievement tests in English, Math, and Science. These suggest no evidence of multicollinearity between career interests and achievement tests in English, Mathematics, and Science. Hence, multiple regression can be used for the analysis.

To explore how these career interests, as indicated by the different occupational groups, can predict the achievement test scores in English, Mathematics, and Science respectively, occupational groups were entered into the regression equation to test for their specific effects using three different sets of analyses for the three achievement test scores namely: English, Mathematics, and Science.

Table 3 Regression results on Achievement Test in English

	B	SE B	β
Constant	311.363	10.170	
1. Production, processing, logistics and maintenance	-0.263	0.118	-.185*
2. Mechanical and electrical specialties	-0.183	0.129	-.156
3. Health care	0.039	0.082	.046
4. Public and safety wellness	0.051	0.099	.038
5. Home economics	-0.366	0.099	-.276**
6. Research and evaluation	0.050	0.110	.037
7. Health science and technologies	-0.060	0.102	-.059
8. Computer sciences and technologies	0.193	0.152	.147
9. Performing arts	-0.073	0.064	-.079
10. Visual arts	0.104	0.093	.106

11. Applied arts	0.245	0.095	.245*
12. Social services	-0.163	0.161	-.098
13. Business, management, and administration	-0.212	0.118	-.156
14. Administrative and financial operations and support	0.381	0.102	.299**

Note: $R^2 = .26$ * $p < .05$, ** $p < .001$.

The results in Table 3 indicate that *Administrative and financial operations and support* positively predicted the achievement test scores in English. While, *Production, processing, logistics and maintenance*; *Home economics*; and *Applied arts* negatively predicted the achievement test scores in English. On the other hand, no significant effects on the achievement test scores in English were noted in the remaining 10 occupational groups namely: *Mechanical and electrical specialties*; *Health care*; *Public and safety wellness*; *Research and evaluation*; *Health science and technologies*; *Computer sciences and technologies*; *Performing arts*; *Visual arts*; *Social services*; and *Business, management, and administration*.

Table 4 Regression results on Achievement Test in Mathematics

	B	SE B	β
Constant	278.672	10.702	
1. Production, processing, logistics and maintenance	-0.306	0.124	-.211*
2. Mechanical and electrical specialties	-0.080	0.136	-.067
3. Health care	0.007	0.086	.009
4. Public and safety wellness	0.185	0.104	.135
5. Home economics	-0.080	0.104	-.059
6. Research and evaluation	0.063	0.115	.045
7. Health science and technologies	0.028	0.108	.027
8. Computer sciences and technologies	0.070	0.160	.053
9. Performing arts	-0.041	0.067	-.044
10. Visual arts	-0.017	0.098	-.017
11. Applied arts	0.210	0.100	.207*
12. Social services	-0.322	0.169	-.189
13. Business, management, and administration	-0.346	0.124	-.249**
14. Administrative and financial operations and support	0.478	0.108	.368***

Note: $R^2 = .20$ * $p < .05$, ** $p < .01$, *** $p < .001$.

The results in Table 4 indicate that *Administrative and financial operations and support* and *Applied arts* positively predicted the achievement test scores in Mathematics. While *Production, processing, logistics and maintenance*, and *Business, management, and administration* negatively predicted the achievement test scores in Mathematics. On the other hand, no significant effects on the achievement test scores in Mathematics were noted in the remaining 10 occupational groups namely: *Mechanical and electrical specialties*; *Health care*; *Public and safety wellness*; *Home economics*; *Research and evaluation*; *Health science and*

technologies; Computer sciences and technologies; Performing arts; Visual arts; and Social services.

Table 5 Regression results on Achievement Test in Science

	B	SE B	β
Constant	288.003	11.349	
1. Production, processing, logistics and maintenance	-0.462	0.132	-.296***
2. Mechanical and electrical specialties	-0.023	0.144	-.018
3. Health care	0.063	0.091	.069
4. Public and safety wellness	0.202	0.111	.137
5. Home economics	-0.205	0.110	-.141
6. Research and evaluation	0.131	0.122	.087
7. Health science and technologies	-0.004	0.114	-.004
8. Computer sciences and technologies	0.132	0.170	.092
9. Performing arts	-0.175	0.071	-.172*
10. Visual arts	0.112	0.104	.104
11. Applied arts	0.174	0.106	.159
12. Social services	-0.168	0.179	-.092
13. Business, management, and administration	-0.231	0.132	-.154
14. Administrative and financial operations and support	0.364	0.114	.260**

Note: $R^2 = .23$ * $p < .05$, ** $p < .01$, *** $p < .001$

The results in Table 5 indicate that *Administrative and financial operations and support* positively predicted the achievement test scores in Science. While *Production, processing, logistics and maintenance*, and *Performing arts* negatively predicted the achievement test scores in Science. On the other hand, no significant effects on the achievement test scores in Science were noted in the remaining 11 occupational groups namely: *Mechanical and electrical specialties; Health care; Public and safety wellness; Home economics; Research and evaluation; Health science and technologies; Computer sciences and technologies; Visual arts; Applied arts; Social services; and Business, management, and administration.*

Discussion and Conclusion

This study explored the relationship between career interests and academic achievements in English, Mathematics, and Science using local measures. Career interests are premised on facilitating the fit between people and their environment to improve occupational success and satisfaction. Based on the results, most of the participants showed no interest in almost all occupational groups. The results exclude the occupational groups that provide general services in transportation, security, and wellness (e.g., driver, seaman, and commercial airline pilot). Also, results saw no interest from the occupational groups involved in using specific skills to perform homemaking duties (e.g., chef, housekeeper, and room attendant), which indicates little interest.

This finding may suggest that most Filipino adolescents do not clearly understand various work activities.

Based on the results of Multiple Regression, an occupational group that engages in explicit, ordered, and systematic manipulation of data such as keeping records, filing and reproducing materials, and organizing written and numerical data consistently predict academic achievements in English, Mathematics, and Science positively. On the other hand, an occupational group that works in the production, quality assurance, and maintenance of products, operations, and services consistently predict academic achievements in English, Mathematics, and Science. An occupational group that develops and designs manufactured products and creates two- and three-dimensional models and animation predicted Academic Achievements in English and Mathematics but not in Science.

The results of this study did not support Low, Yoon, Roberts, and Rounds' (2005) explanation that career interests are considered stable and reliable predictors of future outcomes even before the age of 16. Although it is considered a crucial period for Filipino adolescents to select a specific middle school track related to their interests and capabilities, most of them are still quite uncertain of the occupational groups they would like to pursue. The stability of adolescents' career interests has necessary implications for the conceptualization and practice of career guidance in schools. Therefore, it can be considered that career interventions in elementary and middle schools among Filipino adolescents are still primarily based on the acquisition of self-esteem and knowledge about work and industry (Whiston & Sexton, 1998).

It would be appropriate perhaps to administer the Career Interest Profiler to students from grades 11 & 12. It is also wise to determine the relationship of career interests to both specialized and applied subjects in middle school because these subjects are considered domain-specific compared to elementary subjects, including grade 10, as they are considered domain-general.

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Appendix A. Zero-Order Correlations of Achievement Test Scores in English and Occupational Groups

Variables	English	1	2	3	4	5	6	7	8	9	10	11	12	12	14
English	-	-.264**	-.092	.049	-.144*	-.287**	.005	-.019	-.031	-.132*	.102	.168**	-.161**	-.149*	.060
1. Production, processing, logistics and maintenance		-	.527**	.144*	.555**	.434**	.447**	.382**	.306**	.317**	.292**	.252**	.490**	.432**	.346**
2. Mechanical and electrical specialties			-	.067	.429**	.171**	.482**	.800**	.147*	.051	.308**	.446**	.105	.184**	.331**
3. Health care				-	.212**	.287**	.387**	.113	.800**	.213**	.128*	.057	.450**	.029	.076
4. Public and safety wellness					-	.306**	.481**	.335**	.344**	.239**	.143*	.160*	.458**	.332**	.251**
5. Home economics						-	.246**	.082	.465**	.459**	.286**	.205**	.546**	.388**	.228**
6. Research and evaluation							-	.442**	.508**	.245**	.377**	.354**	.450**	.287**	.301**
7. Health science and technologies								-	.161**	.006	.204**	.355**	.080	.123*	.397**
8. Computer sciences and technologies									-	.309**	.196**	.127*	.640**	.237**	.140*
9. Performing arts										-	.391**	.293**	.450**	.253**	.121
10. Visual arts											-	.761**	.253**	.099	.064
11. Applied arts												-	.163**	.188**	.210**
12. Social services													-	.538**	.342**
13. Business, management and administration														-	.622**
14. Administrative and financial operations and support															-

Note: * $p < .05$; ** $p < .01$

Appendix B. Zero-Order Correlations of Achievement Test Scores in Mathematics and Occupational Groups

Variables	Math	1	2	3	4	5	6	7	8	9	10	11	12	12	14
Math	-	-.189**	.062	-.016	-.035	-.180**	.021	.133*	-.088	-.129*	.028	.140*	-.209**	-.149**	.143*
1. Production, processing, logistics and maintenance		-	.527**	.144*	.555**	.434**	.447**	.382**	.306**	.317**	.292**	.252**	.490**	.432**	.346**
2. Mechanical and electrical specialties			-	.067	.429**	.171**	.482**	.800**	.147**	.051	.308**	.446**	.105*	.184**	.331**
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6. Research and evaluation							-	.442**	.508**	.245**	.377**	.354**	.450**	.287**	.301**
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12. Social services													-	.538**	.342**
13. Business, management and administration														-	.622**
14. Administrative and financial operations and support															-

Note: * $p < .05$; ** $p < .01$

Appendix C. Zero-Order Correlations of Achievement Test Scores in Science and Occupational Groups

Variables	Science	1	2	3	4	5	6	7	8	9	10	11	12	12	14
Science	-	-.221**	.060	.081	-.020	-.214**	.095	.118*	.008	-.196**	.083	.155**	-.143*	-.137**	.089
1. Production, processing, logistics and maintenance		-	.527**	.144*	.555**	.434**	.447**	.382**	.306**	.317**	.292**	.252**	.490**	.432**	.346**
2. Mechanical and electrical specialties			-	.067	.429**	.171**	.482**	.800**	.147**	.051	.308**	.446**	.105*	.184**	.331**
3. Health care				-	.212**	.287**	.387**	.113*	.800**	.213**	.128*	.057	.450**	.029	.076
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7. Health science and technologies								-	.161**	.006	.204**	.355**	.080	.123*	.397**
8. Computer sciences and technologies									-	.309**	.196**	.127*	.640**	.237**	.140*
9. Performing arts										-	.391**	.293**	.450**	.253**	.121*
10. Visual arts											-	.761**	.253**	.099	.064
11. Applied arts												-	.163**	.188**	.210**
12. Social services													-	.538**	.342**
13. Business, management and administration														-	.622**
14. Administrative and financial operations and support															-

Note: * $p < .05$; ** $p < .01$