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Women in Engineering Careers: Does Parental Income Affect their Work Values?

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ABSTRACT

Engineering is one of the male dominated careers, however, there is an increasing women entry into the engineering profession in the Philippines. Scholars have reported numerous factors on women entry in engineering careers such as rewarding work opportunities, interest, and talent in science and mathematics, etc. This different reason led women to enter into engineering career which is worthy of study. The study assessed the effects of parental income on work values of women in the engineering profession. A descriptive survey research designed was used, 39 respondents were purposively selected from

various Engineering programs (civil, mechanical, electrical, computer, electronics, marine engineering, and environmental and sanitary). The study utilized One way MANOVA with post hoc analysis. Results showed that the respondents have "moderate" intellectual achievement orientations, interpersonal, and occupational work values and they had "weak" familial, managerial, and material work values. Further, the computed One way MANOVA reported that parental income affects the intellectual-achievement orientation, interpersonal, managerial, material, and occupational some work values of women engineers. This report has implication on guidance and counseling practice on career placement of women in the engineering industry.

Keywords — Social Science, engineering education, women engineers, work values, parental income, descriptive-survey, Philippines

INTRODUCTION

The science, technology, engineering, and mathematics (STEM) jobs were projected to grow 18% than non-STEM jobs in the U.S until 2018 (Langdon, McKittrick, Beede, Khan, & Doms, 2011). The planned growth of STEM jobs will provide opportunities to American and non-national to fill the occupational gap. In the Philippines, an estimated 102,864 Filipino's (men and women) who works abroad in the field of engineering from 1993 to 2006 (Zosa & Orbeta, 2009). These STEM-related job opportunities on the international market have improved the nation economy. STEM-related job was still an in-demand profession. Also, science and technology expand new STEM-related position will be created and require higher academic qualification such as masters and doctoral degrees. Some authors hold the position that STEM jobs are the jobs of the future (Langdon et al., 2011). They are essential for developing technological innovation and global competitiveness of a nation. In the U.S and Canada, the representation of women in STEM program has rapidly increased (McMullen, Gilmore, & Le Petit, 2010; "Science and Engineering Indicators 2006, NSB 06-01," 2006). Similarly, advancement of careers of Filipino women in non-traditional areas was also evident; increasing the number of women who became professionals occupying technical jobs; holding government key positions; and becoming corporate executives ("Philippine Statistics Office: Gender Statistics on Labor and Employment (GSLE), 2009-2013.," 2014). These changes on women work roles were brought by economic challenges (Edwards & Quinter, 2011; Munyingi, 2012).

STEM occupation has become an attractive career for women because of its high remunerations, status and works demands in local and international labor market (Bayog & Atie, 2012; "Occupational Employment and Wages," 2015). Scholars hold the position, that attitude, interest, and type of school (Llenares & Deocaris, 2014). Exposure to successful female role models in STEM fields (Stout, Dasgupta, Hunsinger, & McManus, 2011) and positive attitude towards mathematics (Chipman & Wilson, 1985; Tocci & Engelhard Jr, 1991) affect their decision to choose STEM fields.

Scholars, for example, (Hansen, Walker, & Flom, 1995) mentioned that math achievement and exposure to math and science (Adelman, 1998, 2006; Wang, 2013)The types of opportunities and experiences and support students receive in college (Chang, Sharkness, Newman, & Hurtado, 2010) attract women in STEM career. Research also showed a clear link between family supports and STEM careers (Armstrong, 1985; Boswell, 1985; Casserly & Rock, 1985; Chipman & Wilson, 1985; Ciccocioppo et al., 2002; Graham, 1997; Wilson & Wilson, 1992). Furthermore, family income was found to have positive effects on mathematics achievement (Dryler, 1998; Pong, 1997) and completion of engineering degree (Huang, Taddese, & Walter, 2000). Women from higher family income had educational advantages because of their capabilities to pay enhancement activities (McNeal, 1999; Ware, Steckler, & Leserman, 1985; Wilson & Wilson, 1992).

Despite underrepresentation of women in STEM careers, it is worthy to investigate their work motivation and goal-directed behavior which underlie on their work values. Knowledge of what goals they consider valuable and worth striving is a vital interest of organization in a rational way in respect to work effectiveness and productivity. This report hypothesized that parental income of women in engineering career affects their work values.

FRAMEWORK

This study can be understood from the perspectives of work values. Work values defined as a psychological state, relationship or material condition that a person holds important (D. E. Super (1980). Also, this refers to individual preferences towards certain job characteristics and features of work environments (Furnham, Forde, & Ferrari, 1999; Hofstede, 1998; Lofquist & Dawis, 1978; D. E Super, 1973).

Super's 'Life-Span, Life-Space Theory' explained a longitudinal view of career development. The theory states that career development occurs in 5

stages: growth, exploration, establishment, maintenance, and disengagement. The '*growth*' phase focuses on achieving independence and developing self-esteem. Then, '*exploration*' stage the goal is for an individual to discover the vocational identity and choose a career. The '*establishment*' stage, an individual, developed new skills set to meet work demands. When work-related skills and knowledge continue until the person takes lesser work responsibilities this is called '*maintenance*' stage. Lastly, '*disengagement*' stage occurs when a person with lesser responsibilities begins to plan for retirement (D. E. Super, Savickas, & Super, 1996). An individual career development cycles through each of these stages support career transition. Understanding the stages of career development would help guidance counselors and psychologists identify an individual's place in the career development continuum.

OBJECTIVES OF THE STUDY

The study aimed to: 1) Determine the level of work values of women in engineering profession; and 2) Identify the effects of parental income on women work values.

METHODOLOGY

Research Design

This study utilized a descriptive survey research design. The respondents recruited in the study were the thirty-nine (39) 4th year female engineering students of Technological Institute of the Philippines, Quezon City campus in SY 2013-2014. The respondents were purposively selected based on the following criteria; a) female b) forth year level c) regular students d) enrolled in engineering program e) enrolled in On-the-Job Training (OJT).

Research Setting or Locale

This study was conducted at Technological Institute of the Philippines, Quezon City (TIPQC) campus on SY 2013-2014. TIPQC is a recognize higher education institution whose flagship programs were engineering and information and communications technology. The school offers BS degree programs on electrical engineering, mechanical engineering, computer engineering, electronics engineering, industrial engineering, marine engineering, environmental and sanitary engineering. It also offers BS information technology, computer science, information system, and associate on computer technology. Furthermore, the

school has other academic offerings such as BS education major in SPED, science, English and mathematics, BS architecture, and BS Business education program.

Respondents

The respondents aged 19.76 ± 1.06 years (range: 19-24 years) from engineering programs such as civil engineering (33.33%), electrical engineering (15.4%), mechanical engineering (12.8%), computer engineering, electronics engineering and industrial engineering (10.3%), environmental and sanitary engineering (5.1%) and marine engineering (2.6%) programs. Their family income status were P12,000 - P19,999 (33.33%) (*Equivalent to USD 445<*: 1US dollar = 45pesos), P20,000 – P59,999 (33.33%) (*USD* 450 to *USD* 1,333), and P60,000 and above (33.33%) (>*USD* 1,334).

Engineering programs were taken in 5 years for two semesters/year. As the curriculum requires OJT training or internship during the junior year, part of the inclusion criteria is that the students must had sufficient career orientation and exposure in the work place prior to the conduct of survey. Career orientation was conducted at the school's career center. With the OJT and career orientation on the 4th year of the degree program, it was assumed that the student respondents may have clearer idea of their work preferences.

Survey Instrument

A survey questionnaire was used to obtain participants' demographic information such as age, gender, parental income, and academic programs. The Filipino Work Values Scale (FWVS) with a cronbach alpha (α = .81) with an inter-item correlation of 0.22-0.55. FWVS is a standardized psychological test used to determine the work values of study participants. The instruments were rated using a 5-point scale (1'*strongly disagree*' – 5 '*strongly agree*') and consisted of 80 items.

Validation of FWVS was previously done by Cervera (1999) based on the responses of 616 students enrolled in 13 BS degree programs (education, computer engineering, chemistry, mass communication, management, accountancy, psychology, medicine, social work, business administration, biology, computer science and physical therapy). The norms were based on 2,665 college students enrolled in various program in 9 schools (3 - public schools, 3- private sectarian schools, and 3- private non-sectarian schools) in Metro Manila, Philippines. Norms were expressed in terms of percentile rank equivalents of the raw scores.

The work value scores are interpreted as follows: a) 'very strong' (range = 80.1-99.9) which describes a firm conviction and adherence to a specific

work values. If the person perceives that a particular work value is upheld by a majority of co-workers, he/she would likely to report high job satisfaction. If these values are violated, tendencies for job withdrawal, or for impulsive and reactionary behavior that are intend to dissociate the employee from the organization e.g. of such behavior is retaliation, quitting or early retirement; (b) 'strong' (range = 60.1-79.9) implies that if the work value is in harmony with that of the organization, the person is likely to be satisfied with the job or the workplace. If a particular work value were violated, the individual may display varying levels of work withdrawal behaviors, e.g. tardiness, absenteeism, leaving work early, etc. (c) 'moderate' (range = 40.1-59.9) implies that if a work value is compatible with that of the majority of the individual's co-workers, then he/she may be comfortable with the work environment. Additionally, the person does not mind any minor violations to his/her work values; (d) 'weak' (range = 20.1-39.9) indicates that a particular variable is in the lower hierarchy of an individual's work values. Also, violation of the work value is allowed in exchange for the maintenance of other stronger work values or concerns in the workplace e.g. 'low salary – good companionship'. The employee simply re-frames his/her mind-set regarding the workplace to make the environment more tolerable; and (e) 'very weak' (range = 0.10-19.99) refers to a work value that the employee least considers in decision making. Even if the worker is dissatisfied with the job, he/she may not be empowered to make necessary changes to improve his/her work conditions (Cervera, 1999).

An operational definition or definition of terms was cited on this report see Table 1.

Table 1. Operational definition of the work values (Cervera, 1999)

Work Values Scale	**Definition**
Familial	Related to the family – family cohesion, family unity, emotional closeness and security in the household, firm loyalty to the family ties in activities, family-oriented achievement motivation, and respect for parents.
Intellectual-Achievement Orientation	Associated with work, which 1) provides an opportunity for independent thinking and for learning how and why things work, and 2) gives one feeling of accomplishment in doing a job well (Donald E Super, 1962).
Interpersonal	Related to persons – "amor propio", "hiya", "utang na loob", use of intermediaries, or go-between, the value of loyalty, hospitality, "pakikisama", emotional closeness, respect for authority.

Work Values Scale	Definition
Managerial	Related to work, which involves the coordination of human and material resources to accomplish the objectives of a work organization.
Material	Associated with work, which enables one to gain prestige, security and economic returns.
Occupational	Related to the exercise of one's occupation. Subsumed in this are the following: fairness, competence, altruism, self-regulation/ occupational autonomy and public service.

Data Collection

Permission to conduct a study was communicated to the research and development office (RDO) and VPAA office prior to the survey. Recruitment of the participants was communicated to the Guidance and Counseling Center of TIPQC to assist in the distribution of survey questionnaires. Consenting participants were handed the pen-and-paper instrument. Prior to the administration of the survey questionnaire, the participants were given an orientation on the purpose of the study and were told: a) that there are no right or wrong answers, b) not to leave any items unanswered and c) to take their time in answering carefully the instrument. To ensure confidentiality, identity of the participants was not divulged.

Ethical Considerations

Ethics approval was obtained from the research ethics committee of the Technological Institute of the Philippines, Quezon City prior to the conduct of study.

Data Analysis

The Shapiro-Wilk test was performed to examine the normality of data and to look for possible outliers. One way Multivariate Analysis of Variance (MANOVA) was tested using Levene's statistics and Box test. Levene's statistical data was computed to test the homogeneity of variances and box test of equality of covariance matrices at $p<0.05$. The Mahalanobis distance was also calculated to know if there are multivariate outliers. The correlation of dependent variables was examined to note the strength of relationship (moderate to weak) and to find out if there are violations prior to the use of MANOVA (Pallant, 2013). Example, strong to very strong interaction (*possible outliers to occur*) between

dependent variables may affect the MANOVA results irrelevant. The One way MANOVA with post hoc analysis (SPSS version 17.0) was used to determine the effects of parental income to work values of female engineering students at $p<.05$. One way MANOVA was used to determine whether there are differences between independent groups on more than one continuous dependent variables (Warne, 2014).

RESULTS AND DISCUSSION

General Observations on the Work Values of Female Engineering Students

To describe the work values of female engineering students mean score was computed, **Figure 1** shows the characteristics of their perceived work values. The respondents have 'moderate' work values on intellectual-achievement orientation, occupational, and interpersonal. The results suggest that female engineering students have realistic expectation of his or her job. He or she may find his job a comfortable place to work given a satisfying and or dissatisfying condition, for example, a job that is challenging and offers advancement of skills and talents (*intellectual-achievement orientation*) and a job aligned with education and training (*occupational*) or an organization where colleagues and coworkers have smooth working relations (*interpersonal*). They are likely a 'realistic' type of worker who can stay longer in the company because they can endure the dissatisfying condition.

Data also show female engineering students scores on familial, managerial, and material work values as 'weak'. The result suggests that student may compromise certain condition in their workplace in exchange for a bigger concern. For example, he or she may be willing to work for companies that may not provide high salary and offers various fringe benefits like housing, SSS insurance or vacation (*material*) as long as smooth relations with boss and colleagues are present or a job that takes away time for family (*familial*) or even a job that offers proper handling of resources (*managerial*). They are potentially a 'kangaroo' type of worker who jump from one job to another job in exchange for better and bigger opportunities.

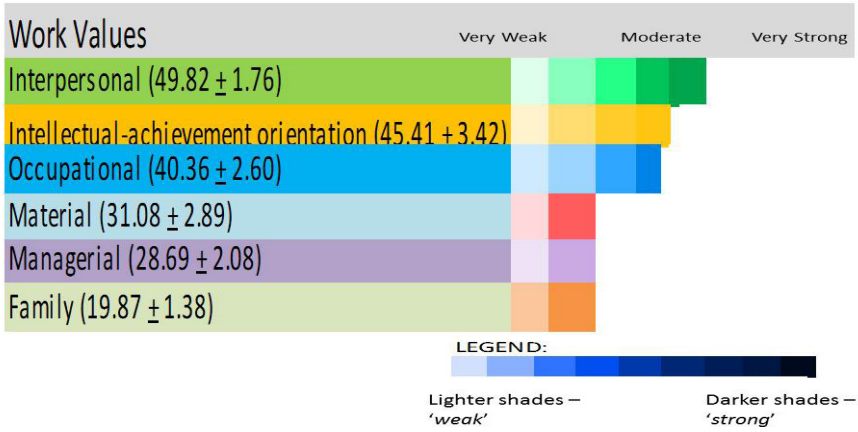

Figure 1. Women Engineers' Work Values

Table 2 shows the results of computed MANOVA. Data revealed that there is a significant difference between parental income and work values of female engineering students (Pillai's Trace = 1.85, $F(12, 64) = 66.10$, $p<.001$). The result suggests that dependent variables have significantly contribute to the model (interaction between parental income and work values).

Consider the results from dependent variables separately, Bonferroni correction was used to reduce the chances of obtaining false positive results. The only difference to reach statistical significance, using a Bonferroni adjusted alpha of .017 were intellectual-achievement orientation, interpersonal, managerial, material, and occupational. This means that the five work values individually showed positive effect on parental income. In this case, only familial work values did not reach higher statistical results.

Table 2. The Effects of Parental Income on Work Values

Source	Dependent Variables	Value	*df*	M^2	*F*	Sig.	Partial Eta Squared	Observed Power
Parental Income	Pillai's Trace	1.85	12, 64		66.10	<.001	.92	1.000
	Familial work values		2, 36	5.564	3.271	<.05	.15	.585
	Intellectual-achievement orientation work values		2, 36	176.718	69.151	<.001	.79	1.000
	Interpersonal work values		2, 36	14.179	5.711	<.001	.24	.835
	Managerial work values		2, 36	29.846	10.271	<.001	.36	.980
	Material work values		2, 36	115.154	47.947	<.001	.73	1.000
	Occupational work values		2, 36	76.949	26.875	<.001	.60	1.000

Table 3 shows the Posthoc analyses of MANOVA F Test using Tukey's *HSD* test conducted to determine all possible pairwise contrast. The following pairs of groups were found to be significantly different based on their scores on intellectual achievement orientation work values: groups 2 '*students from average income family*' and 3 '*students from high family income*' and groups 2 '*students from average income family*' and 1 '*students from borderline family income*.' The results suggest that level of parental income affects the study participant's preferences to look for a job that is challenging, promote independent thinking, and a sense of accomplishment. Groups 1 '*students from borderline family income*' and 3 '*students from high family income*' emerged to have high desire for intellectual achievement orientation work values.

Furthermore, the data show significant differences between the scores of different groups of interpersonal work values: groups 2 '*students from average income family*' and 3 '*students from high-income family*' and groups 2 '*students from average income family*' and 1 '*students from borderline income family*.' The results suggest that level of parental income affect the students' preferences to look for a job where smooth interpersonal relations (SIR) were exercise among colleagues and immediate superior. Groups 1 '*students from borderline income family*' and

3 '*students from high-income family*' appeared to have the strong preference for interpersonal work values.

About managerial work values, the groups remain significantly different: groups 3 '*students from high-income family*' and 1 '*students from borderline income family*' and groups 3 '*students from high-income family*' and 2 '*students from average income family*.' Findings suggest that level of parental income affect the study participants' preferences to look for a job where training on the handling of resources (people, budget, and schedule) was exercise. Group 3 emerged to have a high desire for managerial work values.

Data show the groups were found significantly different on material work values: groups 1 '*students from borderline income family*' and 2 '*students from average income family*' and groups 1 '*students from borderline income family*' and 3 '*students from high-income family*' have different scores on material work values. Results suggest that level of parental income affects the students' preferences to look for a job where job security, performance incentives, and bonuses, and employee benefits such as SSS benefits, paternal and maternal leaves, sick and vacation leaves given to staff. Group 1 '*students from borderline income family*' appeared to have the high preference for material work values.

Lastly, the groups were found significantly different in occupational work values: groups 3 '*students from high-income family*' and 1 '*students from borderline income family*' and groups 3 '*students from high-income family*' and 2 '*students from average income family*.' Findings suggest that level of parental income affects the study participants' preferences to find a job align with education and training. Group 3 '*students from high-income family*' emerged to have the strong desire for occupational work values.

In the study, parental income was used to measure its effects on engineering students work values. The result suggests that indirectly socioeconomic conditions affect the development of their work values. The differences on the scores of study participants on work values may seem to be affected by family backgrounds e.g. parents' educational attainment and occupations, family support, etc. which were not included in the report. Scholars like (Dahl & Lochner, 2012; McLoyd, 1990) mentioned that parents from stable socioeconomic condition could nurture and improve children life circumstances (achievement in mathematics and reading achievement, etc.). Children born into poor economic situations, specifically single-parent homes are less likely to benefit parental attention and resources that stimulate soft skills (McLanahan, 2004). Furthermore, the study supported the results of previous scholarly work of (McNeal, 1999; Ware et al., 1985; Wilson

& Wilson, 1992) that women from higher family income had educational advantages because of their capacity to finance academic-related activities.

In contrast, the groups were not significantly different in familial work values as observed on their scores. Findings suggest that parental income did not affect preferences of students to find a job that promote work life balance such as time for family activities and gathering.

Table 3. Tukey's HSD Multiple comparisons (n = 39)

Dependent Variables	(I) groups	(J) groups	Descriptive		Mean Difference (I-J)	Std. Error	Sig.
			M	*SD*			
Familial	Borderline	Average	19.62	1.45	1.0000	0.51	
		High	19.38	0.96	1.2308	0.51	
	Average	Borderline	20.62	1.45	-1.0000	0.51	
		High	19.38	0.96	.2308	0.51	
	High	Borderline	20.62	1.45	-1.2308	0.51	
		Average	19.62	1.45	-.2308	0.51	
Intellectual-achievement orientation	Borderline	Average	41.15	1.52	6.3077*	0.63	**
		High	47.62	1.61	-.1538	0.63	
	Average	Borderline	47.46	1.66	-6.3077*	0.63	**
		High	47.62	1.61	-6.4615*	0.63	**
	High	Borderline	47.46	1.66	.1538	0.63	
		Average	41.15	1.52	6.4615*	0.63	**
Interpersonal	Borderline	Average	48.62	1.45	1.8462*	0.62	**
		High	50.38	1.61	.0769	0.62	
	Average	Borderline	50.46	1.66	-1.8462*	0.62	**
		High	50.38	1.61	-1.7692*	0.62	*
	High	Borderline	50.46	1.66	-.0769	0.62	
		Average	48.62	1.45	1.7692*	0.62	*
Managerial	Borderline	Average	27.46	1.61	.7692	0.67	
		High	30.38	1.61	-2.1538*	0.67	*
	Average	Borderline	28.23	1.88	-.7692	0.67	
		High	30.38	1.61	-2.9231*	0.67	**
	High	Borderline	28.23	1.88	2.1538*	0.67	**
		Average	27.46	1.61	2.9231*	0.67	**

Material	Borderline	Average	30.23	1.59	4.1538*	0.61	**
		High	28.62	1.45	5.7692*	0.61	**
	Average	Borderline	34.38	1.61	-4.1538*	0.61	**
		High	28.62	1.45	1.6154*	0.61	*
	High	Borderline	34.38	1.61	-5.7692*	0.61	**
		Average	30.23	1.59	-1.6154*	0.61	*
Occupational	Borderline	Average	39.62	1.45	-1.2308	0.66	
		High	43.08	1.80	-4.6923*	0.66	**
	Average	Borderline	38.38	1.80	1.2308	0.66	
		High	43.08	1.80	-3.4615*	0.66	**
	High	Borderline	38.38	1.80	4.6923*	0.66	**
		Average	39.62	1.45	3.4615*	0.66	**

*The mean difference is significant at the *.05 and ** .001 level*

CONCLUSIONS

Results showed that women in engineering career who came from different socioeconomic class (*parental income*) affect some of their work values. Women in engineering professions aspiration varied on intellectual achievement orientation, interpersonal, material, managerial, and occupational work values.

However, this report could not generalize the findings because of the limited number of respondents. A stratified or cluster sampling techniques was recommended to use considering Higher Education Institution (HEI's) offering engineering programs in the Philippines. Future studies may also consider millennial as cohort among women in engineering profession. The use of newer version of instrument that measure global values of women and other characteristics that affect the development of work values.

TRANSLATIONAL RESEARCH

The guidance program (group process module) was designed to attend the needs of women in engineering careers. A memorandum of agreement (MOA) may be established among partnered industry to prepare women for the engineering profession.

LITERATURE CITED

Adelman, C. (1998). *Women and Men of the Engineering Path: A Model for Analyses of Undergraduate Careers*: ERIC.

Adelman, C. (2006). The Toolbox Revisited: Paths to Degree Completion From High School Through College. *US Department of Education*.

Armstrong, J. M. (1985). A national assessment of participation and achievement of women in mathematics. *Women and mathematics: Balancing the equation*, 59-94.

Bayog, J. J., & Atie, S. A. (2012). Labor Market Trends: Top 10 High-Paying Jobs in the Philippines.

Boswell, S. L. (1985). The influence of sex-role stereotyping on women's attitudes and achievement in mathematics. *Women and mathematics: Balancing the equation*, 175-198.

Casserly, P. L., & Rock, D. (1985). Factors related to young women's persistence and achievement in advanced placement mathematics. *Women and mathematics: Balancing the equation*, 225-247.

Cervera, V. M. (1999). *Filipino Work Values Scale*. Quezon City, Philippines: MAVEC Specialists Foundation, Inc.

Chang, M. J., Sharkness, J., Newman, C., & Hurtado, S. (2010). *What matters in college for retaining aspiring scientists and engineers.* Paper presented at the annual meeting of the American Educational Research Association, Denver, CO.

Chipman, S. F., & Wilson, D. M. (1985). Understanding mathematics course enrollment and mathematics achievement: A synthesis of the research. *Women and mathematics: Balancing the equation*, 275-328.

Ciccocioppo, A.-L., Stewin, L. L., Madill, H. M., Montgomerie, T. C., Tovell, D. R., Armour, M.-A., & Fitzsimmons, G. W. (2002). Transitional patterns

of adolescent females in non-traditional career paths. *Canadian journal of Counselling, 36*(1), 25.

Dahl, G. B., & Lochner, L. (2012). The impact of family income on child achievement: Evidence from the earned income tax credit. *The American Economic Review, 102*(5), 1927-1956.

Dryler, H. (1998). Parental role models, gender and educational choice. *British journal of Sociology*, 375-398.

Edwards, K., & Quinter, M. (2011). Factors influencing students career choices among secondary school students in Kisumu municipality. *Kenya. Journal of Emerging Trends in Educational Research and Policy Studies, 2*(2), 81-87.

Furnham, A., Forde, L., & Ferrari, K. (1999). Personality and work motivation. *Personality and individual differences, 26*(6), 1035-1043.

Graham, L. P. (1997). Profiles of persistence: A qualitative study of undergraduate women in engineering.

Hansen, L. S., Walker, J., & Flom, B. (1995). *Growing smart: What's working for girls in school*: Amer Assn of Univ Women.

Henne, D., & Locke, E. A. (1985). Job dissatisfaction: what are the consequences? *International Journal of Psychology, 20*(2), 221-240.

Hofstede, G. (1998). Attitudes, values and organizational culture: Disentangling the concepts. *Organization studies, 19*(3), 477-493.

Huang, G., Taddese, N., & Walter, E. (2000). Entry and Persistence of Women and Minorities in College Science and Engineering Education. *Education Statistics Quarterly, 2*(3), 59-60.

Langdon, D., McKittrick, G., Beede, D., Khan, B., & Doms, M. (2011). STEM: Good Jobs Now and for the Future. ESA Issue Brief# 03-11. *US Department of Commerce*.

Llenares, I. I., & Deocaris, C. C. (2014). Predictors of Women Entry in STEM Degree Programs in the Philippines. *International Journal of Education and Research, 2*(11).

Lofquist, L. H., & Dawis, R. (1978). Values as second-order needs in the theory of work adjustment. *Journal of Vocational Behavior, 12*(1), 12-19.

McLanahan, S. (2004). Diverging destinies: How children are faring under the second demographic transition. *Demography, 41*(4), 607-627.

McLoyd, V. C. (1990). The impact of economic hardship on Black families and children: Psychological distress, parenting, and socioemotional development. *Child development, 61*(2), 311-346.

McMullen, K., Gilmore, J., & Le Petit, C. (2010). Women in non-traditional occupations and fields of study. *Education Matters, 7*(1).

McNeal, R. B. (1999). Parental involvement as social capital: Differential effectiveness on science achievement, truancy, and dropping out. *Social Forces, 78*(1), 117-144.

Munyingi, L. (2012). Factors affecting career choice of the female students in Kenyan Tertiary Institutions: a case of United States International University (USIU-AFRICA). University of Nairobi, Kenya.

Occupational Employment and Wages. (2015). *Bureau of Labor Statistics*.

Pallant, J. (2013). *SPSS survival manual*: McGraw-Hill Education (UK).

Philippine Statistics Office: Gender Statistics on Labor and Employment (GSLE), 2009-2013. (2014).

Pong, S.-L. (1997). Family structure, school context, and eighth-grade math and reading achievement. *Journal of Marriage and the Family*, 734-746.

Science and Engineering Indicators 2006, NSB 06-01. (2006).

Stout, J. G., Dasgupta, N., Hunsinger, M., & McManus, M. A. (2011). STEMing the tide: using ingroup experts to inoculate women's self-concept in science, technology, engineering, and mathematics (STEM). *Journal of personality and social psychology, 100*(2), 255.

Super, D. E. (1962). The structure of work values in relation to status, achievement, interests, and adjustment. *Journal of applied psychology, 46*(4), 231.

Super, D. E. (1973). The Work Values Inventory.

Super, D. E. (1980). A life-span, life-space, approach to career development. *Journal of Vocational Behavior, 13*, 282-298.

Super, D. E., Savickas, M. L., & Super, C. M. (1996). The Life-span, Life-space approach to careers. D. Brown, L. Brooks, & Associates (Eds.). Career choice and development. 121-178.

Tocci, C. M., & Engelhard Jr, G. (1991). Achievement, parental support and gender differences in attitudes toward mathematics. *The Journal of Educational Research, 84*(5), 280-287.

Wang, X. (2013). Why students choose STEM majors motivation, high school learning, and postsecondary context of support. *American Educational Research Journal*

Ware, N. C., Steckler, N. A., & Leserman, J. (1985). Undergraduate women: Who chooses a science major? *The journal of higher education*, 73-84.

Warne, R.T. (2014) A primer on multivariate analysis of variance (MANOVA) for behavioral scientists.
Practical Assessment, Research & Evaluation, 19 (17).

Wilson, P. M., & Wilson, J. R. (1992). Environmental influences on adolescent educational aspirations: A logistic transform model. *Youth and Society, 24*(1), 52.

Zosa, V., & Orbeta, A. C. (2009). *The social and economic impact of Philippine international labor migration and remittances*: Philippine Institute for Development Studies.