INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN PROGRESSIVE EDUCATION & DEVELOPMENT

OPEN ACCESS JOURNAL

Vol 3, Issue 1, (2014) E-ISSN: 2226-6348

Assessment of Interest as Subjective Personal Data of Engineering Freshmen towards their Enrolled Degree Program

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To Link this Article: http://dx.doi.org/10.6007/IJARPED/v3-i1/760 DOI:10.6007/IJARPED/v3-i1/760

Published Online: 26 March 2014

Abstract

This study aimed to determine the level of interest of the Engineering Freshmen towards engineering program. Descriptive type of research was utilized in the study. Results showed that engineering is still dominated by male students from private schools; chose engineering as their personal choice, and find engineering moderately to highly difficult course. Engineering students have high interest in the engineering program specifically in terms of affective and cognitive learning. They find personal factor as high influence in their interest towards engineering program. Students who personally decided to take engineering have higher sense of inner growth that influenced their interest towards the engineering program. Personal and environmental factors have greater influence in the interest of the engineering students towards their enrolled degree program. The proposed action plan may be implemented to enhance the interest of engineering students towards their studies and surpass the challenges of higher engineering courses.

Keywords: Interest, Subjective Personal Data, Engineering

Introduction

Selecting a career path starts with the chosen college degree/program. Many high school students who entered college have no idea as to what career they would want to pursue in college. Some of them just relied their decision from someone they trust or from former teachers and friends. Some of them may have been influenced by their peers and relatives, the environment and culture where they belong, the behaviour that they possess and other personal reasons related to their interest towards the degree program.

Interest involves a sense of concern with and curiosity about something, for instance, students having an interest in technology subjects. A student's interest in academic achievement will induce him to behave and act in a certain way towards his studies (Ogbuanya & Owodunni, 2013). Identifying the level of interest of the students to pursue a certain program of study may help explain the succeeding behaviour on developing the positive or negative attitude of the students as related with their academic life. Interests may

vary also according to gender, ethnicity, environmental influences, and/or personal experiences (Smith, 2002).
In all levels of college life, adjustments need to be made. Students are expected to have varying responsibilities in both school and personal life (De Mesa, 2012) that could be an important aspect of their interest towards their degree program. De Mesa (2012) stated that students must study harder and accomplish all the requirements each course has and through these responsibilities will test their determination and zest.

It is understood that the levels of students' interest towards their degree program may vary from time to time due to different degrees of experiences encountered by the students themselves. Since this is a subjective personal data, it is necessary to monitor its magnitude. After six months of experiencing the challenges of an engineering program, another set of the same questionnaire will be administered to the same students to determine if there are changes on the level of their interest.

Interest like motivation could drive someone to pursue their degree programs as they plan it to finish in specified time of five years for engineering. Since due to low or lack of interest, students could have thought of either dropping the enrolled courses or even stop schooling. It is an important factor to be considered when admitting the students in a certain program of study. Identifying this level may somehow help the students and their parents to address some issues concerning students' interest. Making parents aware of the interests of their children towards their enrolled program may provide them basic information and better understanding on how they will treat and advice their children, while nourishing and challenging the interests of the students in a concerted effort and responsibility for the university and the College of Engineering, as well.

Students must realize the importance and objectives of having knowledge (cognitive), skills (psychomotor) and attitude (affective) which are significant in their future employment. But beyond the end result of acquiring those purposes at the end of their college years is the essence of their interest and detailed process on how they obtained proficiency and expertise in certain course or lesson (Laguador, 2013a).

The problem solving skills of students in Mathematics is an essential competence that drives them to pursue engineering together with their interest to become engineers in the future (Othman et al., 2012). Mathematics is a prime constituent and infrastructure of the education of engineering students (Kashef, 2012). Mathematics education has long been recognized as a major factor in development, prompting nations to emphasize this in their national agenda. An alarming observation of Filipino students reveals that they excel in knowledge acquisition but fare considerably low in lessons requiring higher order thinking skills (Patena & Dinglasan, 2013) while Mathematics anxiety which can be extreme is often caused by having a negative attitude due to a previous bad experience (Alday & Panaligan, 2013).

Interest is an intrinsic motivational factor that stimulates the enthusiasm of a person to perform better or more than what is expected of him to accomplish. Expectancy Theories connect thought and motivation and are explanations of behaviour that focus on people's expectations of success in reaching a goal and their need for achievement as energizing factors (Miranda, 2008).

For young men in higher-level math tracks, math interest is much more strongly related to math school grades than for young women in the same math courses. Indeed, interest in math courses or math-related activities remain flat across the junior high and high school years for women who are in the higher level math courses (Ogbuanya & Owodunni, 2013).

Gender has been identified as one of the factors influencing student's interest and achievement in vocational and technical education (Howden, 1998; Ogbuanya & Owodunni, 2013). There has been a renewed debate on the controversial issue of gender differences on science and technology achievement and interest. Other research has also shown a decline in the differences between the genders in the past few decades on vocational courses, suggesting that the more exposure that women are getting to vocational and technical classes.

Meanwhile, students with high level of interest towards their enrolled degree problem might develop good study habits. Study skills encourage areas such as work attitudes, time management, homework strategies and test-taking skills. Many study skills are taught in the classroom, but others can only be addressed at home (Laguador, 2013b).

This study attempted to identify the level of interest of the students towards engineering programs wherein the findings may serve as basis for a proposed student development program that would to address some of the underlying issues related to the concern of the students regarding their interest.

Objectives of the Study

This study aimed to determine the level of interest of the Engineering Freshmen towards their enrolled degree/program. Specifically, to determine the profile of the engineering freshmen in terms of: gender, program preference, program difficulty; to determine the level of interest of engineering freshmen towards their enrolled degree program in terms of three learning domains and the factors that influence their interest during: 1st Semester and 2nd Semester; to test the difference in the level of students' interest towards their enrolled degree program between 1st and 2nd Semesters; to test the difference on the level of interest of Engineering freshmen as well as the factors that influence their interest during 1st Semester when they are grouped according to their profile; to determine which of the identified factors best influenced the interest of the engineering students towards their enrolled program and based on the findings of the study, to propose an action plan to address some issues concerning interest of the engineering freshmen towards their degree program.

Materials and Methods

Research Design

Descriptive type of research design was utilized in the study. In descriptive-survey method research, participants answer questions administered through interviews or questionnaires. After participants answer the questions, researchers describe the responses given. In order for the survey to be both reliable and valid it is important that the questions are constructed properly. Questions should be written so they are clear and easy to comprehend (Hale, 2011).

Participants

The respondents of the study were 100 percent of the total population of the currently enrolled 80 Engineering Freshmen at the Lyceum of the Philippines University – Batangas during the 2nd Semester of School Year 2013-2014. From the administration of questionnaire during 1st semester, only 70 questionnaires were retrieved and only 65 were considered valid with complete information from the respondents. In the administration of instruments during 2nd semester, out of 65 questionnaires only 52 were retrieved and considered in the study.

Instrument

The survey questionnaire utilized in the study was a researcher-made instrument composed of three parts. First part determined the profile of the students in terms of gender, type of high school attended, program preference and program difficulty. Second part is composed of fifteen items was divided into three sub-variables based on the three domains of learning: cognitive, affective and psychomotor to identify the level of the students' interest towards engineering program. The third part identified the factors that influence the interest of the students with fifteen (15) statements divided into three sub-variables: behavioural, environmental and personal factors.

The questionnaire already underwent content validation from registered guidance counselors and psychologists of the university from Counseling and Testing Center as well as from College of Education, Arts and Sciences. Suggestions to modify some statements in the instrument were already incorporated.

The questionnaire was also pilot-tested to the First year Criminology students who were not included in the study to test its reliability obtaining the Cronbach Alpha of 0.78 which falls within the rule of thumb of 'good' which also signifies that the instrument is acceptable and valid for use.

Data Gathering Procedure

The questionnaires were already administered by the researchers during the 1st semester among Engineering Freshmen and were administered again for 2nd semester last December. Only the second part of the instrument was given to check the interest of students and examine if there are significant changes in their level of interest after six months of experiencing the challenges of the engineering course. One-hundred (100) percent retrieval rating of the questionnaire was achieved.

Data Analysis

Gathered data were coded, tallied, analyzed and interpreted using frequency count, weighted mean, arithmetic mean, rank and T-test and regression analysis as statistical tools.

Weight that Influence Interest	Range	Interest	Factors
5	4.50 – 5.00	Very Highly Interested	Strongly Agree
4	3.50 – 4.49	Highly Interested	Agree
3	2.50 – 3.49	Moderately Interested	Moderately Agree
2	1.50 – 2.49	Slightly Interested	Disagree
1	1.00 – 1.49	Not Interested	Strongly Disagree

Results and Discussion

Table 1 presents the profile of the engineering students. There were 42 or 80.77 percent male respondents against 10 or 19.23 percent of females. Engineering was a field of study that remained within the male domain for a long time (Zacaj, 2010). Majority of respondents with 24 or 46.15 percent are considering engineering program as highly difficult while 21 or 40.38 percent of them answered moderately difficult. There were 5 or 9.62 considered engineering as extremely difficult while 2 or 3.85 answered slightly difficult. There were 27 or 51.92 percent of the respondents have chosen engineering program personally while 19 or 36.54 percent answered that both of their parents chose engineering.

Table 1
Profile of the Respondents

Gender	**F**	**%**
Male	42	80.77
Female	10	19.23
Degree of Difficulty		
Extremely Difficult	5	09.62
Highly Difficult	24	46.15
Moderately Difficult	21	40.38
Slightly Difficult	2	03.85
Fairly Easy	0	0
Very Easy	0	0
Program preference		
Personal Choice	27	51.92
Relatives/Guardians/Parents Choice Only	6	11.54
Both (Parents & Personal Choice)	19	36.54

It is good to know that engineering students have high interest on how they could learn to become innovative and creative as denoted by 4.40 total weighted mean score on cognitive domain followed by their high interest in widening their knowledge and skills most suitable for their future work responsibilities and discovering their full potentials as one of the future engineering professionals as denoted by the total weighted mean scores of 4.29 and 4.21, respectively.

Moreover, they also have high interest in explore the benefits and complexities of engineering and encountering stimulating problems relevant to the practices of engineering with the least computed total weighted mean scores of 4.11 and 4.07, respectively on the cognitive learning domain. The composite mean score of 4.20 implies that the engineering students have high level of interest towards engineering in terms of cognitive domain.

Respondents have also high interest towards the program in fulfilling their dreams and aspirations in engineering as denoted by the computed total weighted mean score of 4.39 followed by their interest in developing strong personality which can be useful in facing difficulties of engineering and acquiring appropriate work values and attitude suitable for engineering as manifested by the total weighted mean scores of 4.29 and 4.27, respectively. Meanwhile, they also have high interest in developing a character of a globally competitive professional and experiencing different challenges towards a better appreciation of engineering which obtained the least weighted mean scores of 4.23 and 3.98, respectively on the affective learning domain. The composite mean score of 4.23 implies that the engineering students have high level of interest towards engineering program.

Engineering students have high level of interest towards engineering in terms of meeting and communicating with engineering professional who can share expertise with computed total weighted mean score of 4.16 followed by their interest in utilizing the skills that they could acquire from engineering as well as participating in the activities of the organizations related to engineering and working with members of a team who have common objectives and interest with total weighted mean scores of 4.16, 4.00 and 4.00, respectively. Conducting investigation and researches on engineering topics obtained the least score of 3.93. The composite mean score of 4.05 implies that the engineering students were highly interested in the engineering program under psychomotor domain. It can be noted that the computed composite mean scores have increased from 1st sem to 2nd sem.

On the study conducted by Laguador (2013c), he concluded that those who stayed in the engineering program have significantly higher interest in pursuing the program compared with the interest of those who already left the university and transferred to another school and degree program. It is worthy to note that those students who stayed in engineering have significantly higher degree of readiness to face the challenges of engineering.

Engineering students agreed that they were motivated to pursue engineering because of their ambition as denoted by the total weighted mean score of 4.27. They also believed that they possess the qualities and character to become successful engineers and they feel that they are ready to face the challenges of engineering no matter how hard it is as indicated by the total weighted mean scores of 4.04 and 3.89, respectively.

They also believed that their personality is appropriate to engineering and they are confident that they can handle all the challenges and difficulties of engineering which obtained the least weighted mean scores of 3.86 and 3.84, respectively. The composite mean score of 3.98 implies that the students agreed behavioural factor can influence their interest towards the engineering program.

Respondents agreed that they want to work with companies related to engineering that can offer competitive salary with computed weighted mean score of 4.33. They believe that graduates of engineering have more chances of working abroad and engineering offers many career opportunities which obtained computed weighted mean scores of 4.29 and 4.27, respectively. They moderately agreed that engineering is their relatives'/parents' choice and most of their friends and relatives are enrolled in engineering which obtained the least weighted mean scores of 3.00 and 2.89, respectively. It is evident in the previous result that

only few of the engineering students have experienced that their parents or relatives chose the program for them. The composite mean score of 3.76 implies that the students agreed that environmental factor can also influence their interest towards the engineering program.

Engineering students believe that they can finish engineering as denoted by the computed total weighted mean score of 4.40.They also wanted to develop their knowledge and skills on engineering and engineering is their personal choice which obtained total weighted mean score of 4.33 and 4.22, respectively. Likewise, they also believed that their intellectual capacity can handle the challenges of engineering and engineering is their childhood dream to work as engineer which obtained the least total weighted mean scores 4.09 and 3.91, respectively. The composite mean of 4.19 is the highest score among the three learning domains which signifies that the personal factor can influence the interest of the students towards engineering.

Developing positive mental attitude of the students in the early years of college would provide them greater opportunity as they step-up to higher year level of studies to broaden the scope of their responsibility and maturity to be more confident and independent (Laguador, 2013a). Engineering students have greatly acquired the value of leadership from joining the community extension programs of both college and the Institution (Laguador & Chavez, 2013). Community Extension may also provide co-curricular activities that would support to the acquired knowledge, skills and values by the students to apply what they have learned from classroom experience.

Table 2 reveals the difference in the Interest of the Freshmen Engineering Students between 1st and 2nd Semesters.

Table 2
Difference in the Interest of the Freshmen Engineering Students between 1st and 2nd Semesters

Interest	**1st Sem**	**2nd Sem**	**t-value**	**Sig**
Cognitive Learning	4.12	4.27	-1.499	.145
Affective Learning	4.19	4.28	-.883	.385
Psychomotor Learning	3.96	4.14	-1.746	.092
Factors				
Behavioral Factor	3.98	3.96	.160	.874
Environmental Factor	3.74	3.79	-.369	.715
Personal Factor	4.13	4.23	-1.154	.259

There is no significant difference in the interest of the freshmen Engineering Students after six months of staying in the university from the time they have answered the questionnaires regarding their interest towards the engineering program. Although it can be noted from the result of the computed weighted means that majority of the variables have increased the values except behavioural factor which decreases by .02 from 3.98 in the 1st semester and it becomes 3.96 in 2nd semester. But the increase of computed weighted means does not mark significantly due to slight variations in the individual scores. It is good to note that the interest of LPU freshmen engineering increases after 6 months of their stay in the university. The

positive change of interest of the students could be associated to the level of challenges they experienced in the courses during first year.

Table 3 reveals the difference in the interest of the Freshmen engineering students and factors affecting it when they were grouped according to gender.

Table 3
Difference in the Interest of the Freshmen Engineering Students and Factors Affecting it when they were grouped according to Gender

	1st Sem				2nd Sem			
Interest	**Male**	**Female**	**Sig**	**Remarks**	**Male**	**Female**	**Sig**	**Remarks**
Cognitive	4.10	4.17	.787	NS	4.19	4.51	.094	NS
Affective	4.21	4.11	.702	NS	4.21	4.49	.191	NS
Psychomotor	4.02	3.77	.314	NS	4.09	4.31	.325	NS
Factors								
Behavioral	3.99	3.94	.862	NS	3.99	3.94	.871	NS
Environmental	3.80	3.57	.326	NS	3.79	3.71	.746	NS
Personal	4.16	4.03	.662	NS	4.25	4.26	.967	NS

There is no significant difference in the interest towards engineering program between males and females both in 1st and 2nd semesters. This signifies that they have diverse patterns of interest towards the engineering program. The result of this study contradict the finding of Ogbuanya and Owodunni (2013) that gender has been identified as one of the factors influencing student's interest and achievement in vocational and technical education. There has been a renewed debate on the controversial issue of gender differences on science and technology achievement and interest. This debate currently focuses on why women are not interested in seeking careers in technology occupations. The most comprehensive reviews of the research in the area of gender differences have shown very few true differences between math and verbal abilities between men and women (Halpern, 2000; Ogbuanya & Owodunni, 2013).

Table 4 reveals the difference in the interest of the Freshmen Engineering students and factors affecting it when they were grouped according to degree of difficulty and program preference.

Table 4
Difference in the Interest of the Freshmen Engineering Students and Factors Affecting it when they were grouped according to degree of difficulty and Program Preference

	Degree of Difficulty (Sig.)		Program Preference (Sig.)	
	1st Sem	2nd Sem	1st Sem	2nd Sem
Cognitive Learning	.754	.961	.077	.439
Affective Learning	.434	.578	.027*	.432
Psychomotor Learning	.387	.319	.066	.368
Behavioral Factor	.266	.730	.377	.011*
Environmental Factor	.687	.533	.292	.454
Personal Factor	.589	.869	.002*	.023*

**Significant at 0.05*

There is no significant difference in the interest of the engineering students as well as the factors that influence their interest when they were grouped according to their perceived degree of difficulty of engineering as indicated by the computed p-values which are all greater than 0.05 level of significance, therefore, the null hypothesis is accepted.

There is a significant difference in the interest of engineering students when they were grouped according to program preference in terms of affective learning and personal factor that influenced their interest during 1st semester, therefore, the null hypothesis for these variables is rejected. This implies that those students with personal preference in engineering program have higher interest towards the program compared to those students whose relatives/guardians or parents only chose the program for them which is also true in the case of both personal and parents choice.

However, during second semester in terms of affective learning when they were grouped according to program preference, the interest of the students towards engineering becomes diverse compare to the previous semester. On the other hand, the difference on the personal factor that influenced the interest of the students when they were grouped according to program preference remains the same. Meanwhile, difference in the behavioural factor is evident when the engineering students were grouped according to the program preference. Changes in the behaviour of the students manifest on how they see things and as they experience the challenges of the engineering program.

Table 5 reveals the factors that could best influence the interest of the Engineering Students towards their enrolled degree program.

Table 5
Factors that Best Influence the Interest of the Engineering Students Towards their Enrolled Degree Program

(i)Cognitive Domain

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.685(a)	.469	.448	.31946
2	.743(b)	.552	.515	.29951

a Predictors: (Constant), personal
*b Predictors: (Constant), personal, environmental

*y = .814x + 0.906

(ii) Affective Domain

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.743(a)	.552	.534	.29998
2	.806(b)	.649	.620	.27090

a Predictors: (Constant), personal
*b Predictors: (Constant), personal, environmental

*y = .902 x + 0.581

(iii) Psychomotor Domain

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.534(a)	.285	.256	.38146
2	.643(b)	.413	.365	.35258

a Predictors: (Constant), personal

*b Predictors: (Constant), personal, environmental

*y = 0.784x + 0.903

Personal and environmental factors have greater influence in the interest of the engineering students towards their enrolled degree program with 55.2 percent in cognitive domain, 64.9 percent in affective domain and 41.3 percent in psychomotor domain.

Conclusions and Recommendations

Engineering is still dominated by male students who chose engineering as their personal choice, and find engineering moderately to highly difficult course. Engineering students have high interest in the engineering program specifically in terms of affective and cognitive learning. They find personal factor as high influence in their interest towards engineering program. There is no significant difference existing in the interest of the students between the first and second semesters as well as in gender and type of high school attended but there is a difference in the personal factor that influenced the interest of the students when they were grouped according to program preference because those students who personally decided to take engineering have higher sense of inner growth that influenced their interest towards the engineering program. Personal and environmental factors have greater influence in the interest of the engineering students towards their enrolled degree program. The proposed action plan may be implemented to enhance the interest of engineering students towards their studies and surpass the challenges of higher engineering courses.

It is hereby recommended that the College Dean together with the Department Chairs may conduct a comprehensive orientation to engineering as a degree and profession and to discuss specific challenges and job opportunities during general assembly and engineering days which could help the students in enhancing their interest to achieve greater goals.

Faculty members handling AutoCAD class may provide activities and projects to students that would enhance their innovative and creative skills with clear objectives and application to real life situation and work environment to motivate them in performing and fulfilling their academic requirements with interest, passion and commitment.

The Engineering College Council and recognized engineering student organization may provide co-curricular activities that would allow maximum participation of the students to experience different challenges in engineering towards a better appreciation of their currently enrolled degree program.

Engineering students who are enrolled in research subjects may be allowed to participate and present their findings in the research forum within the university or other research conferences to develop their self- confidence and communication skills. Students should

improve the way of learning in many ways to be able to adapt quickly, more so, they should exert more effort, given that engineering is really a difficult one (Abanador et al., 2014).

The Outcomes-Based Education system may also be adapted by the faculty members to enhance the interest of the engineering students. Faculty members with high level of knowledge and understanding on the implementation of OBE have also higher possibility to contribute in the realization of the objectives of OBE through practice (Laguador & Dotong, 2014).

The result of the study conducted by Abante et al (2014) may be useful in the development and enhancement of interest of Engineering students wherein they found out that the General Engineering students' primary mode of learning is visual learning. The factors that greatly affect the learning of General Engineering students are physical and environmental factors, thus environmental factors has a greater impact to their learning compared to physical factors. This can be considered by the faculty members in choosing the appropriate teaching strategies to deliver their lessons.

Knowing the students better through interviews will give surface analysis of problems that will open to a deeper sense and cause of the academic dilemma inside the classroom (Laguador & Pesigan, 2013). On this way, faculty members may have an idea of the personal problems or background of the students that might affect the interest of the students to pursue their studies in engineering. Understanding the conditions of the students would also held increase the retention rate of the students in engineering programs through proper addressing the encountered difficulties.

Future engineering researchers may conduct similar study to the next freshmen enrolees with additional set of variables related to Outcomes-Based Education, Engineering competencies, and academic performance.

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