

Reasons for students taking aeronautical engineering course

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ARTICLE INFORMATION

Article History:

Received 18 December 2014

Received in revised form 23 February 2015

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ABSTRACT

The Aeronautical Engineering profession in the Philippines was established in 1982 by virtue of P.D. 1570. Aircraft research and development, manufacturing, maintenance, operation and aviation education were identified as careers through which aeronautical engineers can pursue jobs apt to their course. These roles are very crucial in the aviation industry, considering the increasing trends in aircraft manufacturing and production as well as demand for professionals who can competitively work in the aviation field. Still, it is among the smallest in number, when compared with other professions recognized by the Professional Regulation Commission (PRC). The Commission of Higher Education (CHED)

also identified engineering and technology as one of the priority courses for academic years 2014-2015 and 2017-2018, due to very few numbers of enrollees in these important fields. Lacking support for prioritization and promotion of aviation courses contributes in the low input of enrollees. The collected data from freshmen aeronautical engineering students helped determine the reasons for their pursuing aeronautical engineering course. The majority of the freshmen students answered that they want to become pilots someday. Other responses show interest in aircraft design, research and development, and as advised by their parents. The result of this study will be used as basis for the development and restructuring of the Aeronautical Engineering curriculum in preparation for the ASEAN 2015 integration and the on-going K to 12 program. Moreover, the evaluation will serve as basis in formulating policies and strategies in promoting the Aeronautical Engineering program.

Keywords

Aeronautical Engineering, Aviation Education

Introduction

I have my own story why I took aeronautical engineering course. It all started with my dream to become an astronaut when I was a child. From the astronauts' suits, the way they walk on the moon up to the spacecraft they use in flight, it truly amazed me thinking how wonderful flying even in outer space can be. I believe that the greatest influence to me why I pursued aeronautical engineering career was the movies I watched about flying and spacecraft. A study by Allen and Barnhart (2006) also mentioned movies about aviation as one of the top 5 most influential factors why students at Indiana State University took up aviation related programs. The other 4 major influences came

from one-on-one contact experience with an aircraft (Allen and Barnhart, 2006). The other reason was my profound interest in science. When I was asked to choose a program among aircraft maintenance, air transportation, aircraft avionics and aeronautical engineering in the school, I was enrolling during my freshmen year, I picked aeronautical engineering, as it has the most subject in sciences. Mau et.al (1995), as cited by Cheng and Yuen (2012), found that students who excel in science and mathematics during their high school years have the higher chance of enrolling in Science, Technology, and Engineering and Mathematics (STEM) courses. My parents also pushed me to take aeronautical engineering course after I finished high school. Because there were no

engineers yet in our family during that time, as well as the prestige and the promise of high salary an engineering career can offer to me, my parents encouraged me to take it up. *Padama, et.al (2014)* found that engineering courses, compared with other courses such as accounting, and education promise the highest rate of return of investment. Deciding either to work abroad or locally after passing the board examinations, engineering courses posted a maximum of 55.54 percent of return of investment (*Padama, et.al 2014*). No wonder why Filipino parents always wanted their children to pursue careers in engineering. After high school, I was still undecided about the course I wanted to pursue in college, and I remembered aeronautical engineering course when my parents persuaded me to take up the entrance exam in an aeronautical school. Parents were also one of the influential factors when it comes to choosing a course or major in college. *George-Jackson (2012)* observed that parents were the most influential factors to most Asian/pacific islands students taking up college. *Nicasio (2013)* also found that college students who are enrolled in STEM courses are significantly influenced by parental-career-related decisions. Other studies conducted to assess reasons why students pursue a particular course in college also emphasized the role of parents to the decision making of their children, when it comes to their careers (*Walmsley, et.al. 2010; Lam, 2012; Simon, et.al 2013; Clemente, 2014; Manibo and Lopez, 2014; Dimaculangan, 2014*). Personal relationships with parents, siblings and peers produce impact on the students' career decision making (*Walmsley, et.al. 2010*).

During my freshmen year as an aeronautical engineering student in our school, we were 70 students only. Compared with the number of enrollees in aircraft maintenance technology and aircraft avionics in our school, we were outnumbered by hundreds. In contrast with other engineering professions in the country which registered thousands and even hundred thousand in number, according to the Society of Aerospace Engineers of the Philippines (SAEP), the Philippine Professional Regulations Commission (PRC) ranked aeronautical engineering next to metallurgical engineering

as one of the least taken careers by Filipinos. During our last year in college, only 22 students finished the course and 18 students passed the aeronautical engineering board examinations. The high rate of dropping the course in engineering courses makes a bad impression that engineering courses are very difficult, although they offer a lot of rewarding work opportunities in both national and international context. The current rise of aviation industry in the country has opened a lot of opportunities for the graduates of the aeronautical engineering program. With more aviation related businesses opening, the demand for professionals who can work with aircraft maintenance and operations, training and education also rises. The Presidential Decree No. 1570 of 1978, otherwise known as the Philippine Aeronautical Engineering Decree gives aeronautical engineers the privileges and responsibilities to work over major areas such as aircraft manufacturing, maintenance, operations, research and development and education. The Commission of Higher Education (CHED) of the Philippines also recognized the role of aeronautical engineering profession, as pronounced in CHED Memorandum Order No. 28 series of 2007 by providing higher education standards for universities and colleges, both private and public offering aeronautical engineering courses. Moreover, CHED also issued a list of priority courses for academic years 2014-2015 to 2017-2018, which strongly recommend engineering and aviation related courses.

Promotion and marketing of courses have been proven to be a major ingredient to increase the number of enrollees to a specific course, as in the case of nursing. Lack of priority and promotion of aviation courses in the country contributes to the low input of students taking up these courses. To better understand the nature of low enrollment in aviation courses, specifically aeronautical engineering, and the present study throws light on reasons for students pursuing aeronautical engineering course. The data hope to provide answers on what and who influences students to take aeronautical engineering course as well their expectations and goals after graduating from the course. The answers will serve as input for the design and creation of programs towards

restructuring curriculum responsive to the K to 12 program and ASEAN integration. According to the technical working group of aviation programs of CHED, there is a challenge in making the aeronautical engineering program 5 years due to some changes in the curriculum to adopt K to 12 programs. Also, the ASEAN integration imposes a great challenge to restructure the curriculum to make aeronautical engineering program more responsive and competitive to the global market. Moreover, the results can be used as basis for formulating strategies and policies in promoting the aeronautical engineering program in the future.

Method

Data in the form of essay writing were collected from freshmen Aeronautical Engineering students of FEATI University taking up subject in Aeronautical Engineering Orientation. Permission was first secured from the Aeronautical Engineering and Aircraft Maintenance Technology Chairperson to conduct interview. Instructions were carefully read to students before the start of the essay writing which imposed no limits on the number of words to be used by students. Students were asked to compose an essay about what and who influences them to take aeronautical engineering course. They were also asked to elaborate how they arrived on a decision to pursue aeronautical engineering course as well as their expectations and goals in the future, once they finished it. Each essay was carefully read and analyzed based on the objectives of the essay and the study. Answers were categorized into thematic strands common among the students' responses.

Participants of the Study

A total of 33 FEATI aeronautical engineering students taking up aeronautical engineering orientation subject participated in the study - 24 males and 9 females. This finding also supports the study of Allen and Barnhart (2006) that careers previously dominated by male were already pursued by female nowadays. About 25 out of 33 respondents belonged to the age bracket of 15-17 years old and the remaining 8 ranged 18-20 years old. This finding could be

explained by the fact that the aeronautical engineering orientation was offered during the first year of students in aeronautical engineering course. Although 7 out of 33 students were sophomore and junior aeronautical engineering students, they were still considered as sample of the study, considering that they were enrolled at the subject and the majority were transferees from other schools, thus the subject might be new to them. The aeronautical engineering orientation subject, part of the B.S. Aeronautical Engineering curriculum offered at FEATI University, which aims to introduce to students the nature of work of aeronautical engineers, as well as to prepare them to a required coursework and related policies of the university. Thus, the researcher decided to select the sample for this particular subject, having in mind that at this stage, students were starting to discover the aeronautical engineering course and reinforce their interest or decision in pursuing the course.

Students were asked to express their ideas in written form about their reasons for taking aeronautical engineering course. The participating students were also asked to elaborate on how they arrived at their decision and who and what influenced them to pursue it. The students had to express their goals after finishing their course to validate their reasons for taking it. Two consecutive Fridays were used to gather responses from the students.

Results and Discussions

Table 1
Major reasons why students take aeronautical engineering course

Reasons	No. of Responses
To become a commercial pilot or space vehicle pilot	14
Advised and encouraged by parents, peers and siblings	8
Build an aircraft someday	7
Promise of good job and high salary	4
TOTAL	33

Students answered with mixed reasons for pursuing the aeronautical engineering course, but the majority agreed that their love for flying and want to become a pilot someday persuaded them to do so. In other words, they see aeronautical engineering course as the best initial step in realizing their dream career in the future, considering that aeronautical engineering is directly related to the course of flying. Also, according to one of my colleagues, an aeronautical engineer now taking flying courses, some of the units he took during aeronautical engineering were credited to his pilot ground course.

Student no. 23: *"My childhood dream was to become a pilot. But because the tuition in an aviation school is high, I decided to take aeronautical engineering course as my stepping stone to become a pilot."*

Student no. 8: *"Ever since I was a small kid, airplane has always caught my attention. I always watched videos and read magazines about airplanes, till one day I thought to myself 'if I love airplanes that much, why not get a job where I can work with them every day'."*

The other major reason why students take aeronautical engineering course is the aspiration to build an aircraft someday. This has a deep connection with their interest in aircraft/spacecraft research and development, air transportation operation and management and aircraft design and manufacturing.

Student no. 20: *"To be an aircraft designer someday is my dream. By the help of this course, it is the best decision I've ever made actually. Also, by contributing innovations and new products of research and development, with which we could represent the country, will be the next big thing in the future."*

Student no. 13: *"I choose aeronautical engineering because I want to design different kinds of aircraft. The other reason is that I would like to design and produce the first conventional flying cars. Better yet, I would like*

to be part of a research and development team that will help the country's air transportation."

Student no. 4: *"I would like to engage myself in developing the first-ever commercial flying car which I will name as BLITZREVI."*

Student no. 6: *"I pursued the aeronautical engineering course because I want to traverse space. And when that time comes, I am an engineer capable of building aircrafts that can travel light years in a span of months."*

In conceptualizing this study, I already thought that parents play a major factor in the decision of students in taking aeronautical engineering course. Truly, our parents have a major say when it comes to our career decision making, as supported by various studies regarding the impact of parents in career decision making. I found out also that students had uncertainty when it comes to the course they will take once they finish high school; they readily seek their parents' advice, as much as opinions from peers and siblings that later on recommended the course to them. As an Asian country, we truly value our family, especially to the decisions that we should make as to our careers. No wonder why George-Jackson (2012) mentioned that among Asian/Pacific Island students, they pointed to their parents as the major influence in their decision to pursue a degree and career in college. Parents, peers and siblings that become successful in the aviation industry made a huge impact on the students' perception of the course. They see these people as role models that made them realize that once they follow their footsteps, they will also become successful in their career.

Student no. 29: *"The main reason why I took this course is my father, because he himself is an aeronautical engineer who had inspired me. He graduated from FEATI and is now working in Lufthansa Technik Philippines. Besides my older sister is an aeronautical engineer."*

Student no. 16: *"In my senior year in high school, I had no idea on what course to take in college. Until one day, my father asked me*

about it and later introduced to me the aeronautical engineering course."

Student no. 33: *"My family made me realize to take this course so that we could have an engineer/pilot in our family."*

Student no. 2: *"One day, I visited my mother's office full of engineers and thought of how cool it is to be called "engineer" someday. My mother, brother and grandfather, who were all working in the aviation industry, encouraged me to take up aeronautical engineering."*

Students' other major reason why they take aeronautical engineering is the promise of good job and high salary that aeronautical engineering career can offer them. A study by Padama, et.al (2014) found that when placed against other courses like accounting and education, engineering promises the highest rate of return of investment. Deciding either to work abroad or locally after passing board examinations, engineering courses posted a maximum of 55.54 percent of return of investment. Being a less popular course in the country and considering the high demand for aviation professionals, students are attracted to take this course.

Student no. 25: *"I never wanted this course. What I really wanted was marine biology. Aeronautical Engineering was broadcast in television one time. It is much in demand at the same time has a low supply of workers, besides paying high amount of salary and a unique job."*

Student no. 18: *"I have chosen this course because of the good future that waits ahead of me. Hiring of aeronautical engineers is in-demand nowadays, good salary is given and a chance to fly an airplane by taking a flying course."*

Students' reasons are reinforced by various influences. Watching movies, flight in an aircraft and parents are mostly mentioned by students in this study. This also supports the study made by Allen and Barnhart (2006) giving these very reasons for pursuing career

in aviation or aeronautical engineering course. Allen and Barnhart (2006) also mentioned that most of the influences to students in taking up aviation courses are those that involve one-on-one encounter.

Student no. 12: *"Watching T.V., movies, reading articles related to airplanes have boosted my interest in aeronautical engineering."*

Student no. 28: *"Every time my family goes to the province, I am very fascinated whenever I see that big plane in the tarmac. That's why I dreamt of becoming a pilot. I am simply amazed at how that big thing can fly."*

Student no. 23: *"My uncle, also an aeronautical engineer, is very successful in his career. He encouraged me to take up aeronautical engineering because it is in demand and the salary is very high here in the Philippines and abroad."*

Students taking up aviation courses have a high degree of certainty in pursuing career in this field (Allen and Barnhart, 2006). The same phenomena were observed in students taking up the aeronautical engineering course.

Student no. 20: *"When I was a kid, I was very much interested in things that fly. I was so fascinated at their massive size, weight and performance when it took off the ground. At the age of 3, I would draw on walls using chalk, different models of aircraft which have shaped my creativity until now."*

Student no. 17: *"I choose this course because I love planes, and the other reason is that I want to become a commercial pilot someday."*

Student no. 11: *"Choose a job you love and you will never work for a day in your life."*

Students' goals in the future after they finished the course were also asked on their essays. Major answers included enroll in a flying school, work in aviation industry locally and abroad, and establish an aviation

related business such as an airline or aircraft spare parts seller.

Student no. 26: *"I took up BS Aeronautical Engineering course as a stepping stone for becoming a pilot someday. After taking the course, I'll proceed to flying, if we still have money for that. Indeed, BS Aeronautical engineering is the best preparatory course to flying."*

Student no. 9: *"Once I finished this course, I want to enter a flying school to become a licensed pilot."*

Student no. 11: *"This course as I have researched will be a great help and advantage for me. This course focuses in the building and designing of aircrafts and it will be beneficial for me when I enter flying school."*

Student no. 8: *"My plans for the future are to graduate from aeronautical engineering, work for a few years to earn money and experience, and then take the commercial pilot flying course and work the rest of my career as a pilot."*

Student no. 12: *"After 5 years, I will work in an airline company and then save money to study again to become a pilot."*

Student no. 32: *"My future goal is to be a licensed aeronautical engineer in the field of aircraft operations, work abroad and travel to travel to different countries to gain more knowledge about aircrafts."*

Student no. 5: *"My dream someday is to work and be paid with high salary and save money and eventually establish my own airline company much greater than PAL, Cebu Pacific and other airlines."*

Student no. 24: *"My goal as I finished the course is to apply at a top paying airport in the Philippines and help to build the company and to share my knowledge. After some years, I*

would also want to establish aerospace equipment and aircraft Parts Company."

Conclusion and Recommendations

Students taking Aeronautical engineering have mixed reasons why they pursued this course. Their listed major reasons are to become a pilot someday, build an aircraft someday, was advised and encouraged by parents, peers and sibling and the promise of good job with high salary. Although aeronautical engineers are supposedly taking care of the technical aspects of an aircraft and its operation like maintenance, research and development, education, aircraft operation and design and manufacturing, as mandated by the Philippine Law, students considered aeronautical engineering as a window to other careers that may be considered out of line with the job duties of an aeronautical engineer. Considering that flying courses is very costly and will entail huge investments both from the students and their parents, students tend to think realistically and be optimistic somehow, taking things one point at a time. An aeronautical engineer major job is to design and build an aircraft and the lack of manufacturing industries in the country would place some of its graduates and eventually students who seek careers in research and development, design and manufacturing to seek job out of their comfort zones.

Students taking aeronautical engineering relationship with their parents, peers and siblings played a major role on their career decision making. The majority expressed that the work as well as parents' advice influenced their decision to take aeronautical engineering course. Parents, siblings and peers who become successful in their aeronautical engineering careers have persuaded many students to take the aeronautical engineering course. This finding was further supported by *Nicasio (2013)* and *George-Jackson (2012)* that students enrolled at Science, Technology, Engineering and Mathematics (STEM) courses like aeronautical engineering are significantly influenced by their parents. Success in careers can be inferred as one of the driving factors for

students to enroll in a particular course. Students enrolled in aeronautical engineering associate success to their careers to the success of others. This finding was supported by *Manibo and Lopez's* (2014) study that accountancy students' associate success within their careers to the outside forces such as employability and support of parents.

Student' reasons in taking up aeronautical engineering course can be linked with various influences that drove them to pursue this career. Watching movie, flight in an aircraft and parents advice were among the major influences to students' reasons for taking up the aeronautical engineering course. Students with one on one encounter with an aircraft, aviation industry workers and businesses show high degree of interest in aeronautical engineering. Aside from watching movies which cannot be associated with one on one encounter, students interest was further reinforced by watching shows and reading articles that are related to flying. Parents are a major force in influencing their students to take aeronautical engineering course. Our deep connections with family indeed drive us to pursue careers that will make our parents and relatives happy.

Aeronautical engineering students' goals once they finished the course are closely tied up with their reasons for pursuing the course. This clearly shows that students' nowadays are being realistic and optimistic in taking their courses. The majority of the students answered that they would enroll at a flying school once they finished the course. This finding shows that students take aeronautical engineering course as a stepping stone for careers in flying, and willing to spend 5 years in college for a rewarding career in engineering, save some money and eventually support themselves to take flying course. The other goal that students have in their minds after they finish the course is to have a rewarding career either in an airline or airport, both locally and abroad. They see aeronautical engineering as an in-demand career yet very few engaged in it. Engineering careers, locally and abroad, registered the highest return of investment for graduates (*Padama, et.al.* 2014). No wonder why students and parents have high expectations for aeronautical engineering in terms of salary

pay. It is very interesting to know that students in taking aeronautical engineering course would want to have their aviation related businesses in the future, when they expressed their interest in establishing an airline and aerospace equipment and aircraft parts company in the future. Businesses create jobs, thus, if any of these student goals would be feasible, it will impact positively to our national economy and development in the future.

The K to 12 programs and the ASEAN integration that will begin in 2015 creates an opportunity to higher education authorities in the country as well as universities and colleges to examine the timeliness and appropriateness of various courses in the country like aeronautical engineering to the demands of various industries and students as well. The reasons of students taking up aeronautical engineering course can serve as basis to some changes and restructuring of existing policies with regard to BS Aeronautical Engineering.

Aeronautical engineering is vital in contributing to the development of our national aviation industry. Thus, there is a need to positively reinforce students' reasons in taking up aeronautical engineering course in that, it offers a lot of promise to our aviation industry and the country. There is also a need to sustainably produce aeronautical engineers not solely for employment abroad. This study also suggests that:

1. We can add flying courses to the current aeronautical engineering curriculum to ease transition of students from engineering to flying, to make students learning experience more meaningful and enjoyable on their part.
2. Research should be an integral part of the aeronautical engineering curriculum. Students' interests in aircraft design and building can be reinforced by injecting research programs to the curriculum such as aircraft prototype design, making and testing. The current course in aircraft design in the program is lacking in terms of research and application.

3. Scholarships should be made available for students planning to take aeronautical engineering course in the future. Although CHED already identified engineering and technology courses as priority courses for grants of scholarships, still aeronautical engineering was not clearly identified to the list of engineering courses recognized by CHED and DOST. Offering scholarships is an effective way to promote the less preferred course by students.
4. The guidance office, faculty members of colleges and universities as well as parents should closely monitor and evaluate aeronautical engineering student progress. Some students are still uncertain in their current course and we could help them by advising them and offering activities and programs that will enable them to identify what they really want.
5. Introduce new entrepreneurial subjects and strengthen some of the entrepreneurial related subjects already offered in the aeronautical engineering course such as engineering economy. Most of the students in this study display great interest in establishing businesses related to aviation such as aircraft spare parts sellers or airline operators.
6. Colleges and universities should strengthen ties with their alumni associations. They can tap their alumni to their marketing and promotional activities and programs. Allen and Barnhart (2006) also suggested to persons who are not directly connected to academic aviation but have the capability to influence like alumni who are working with the industry, make collaborative programs like sponsoring tours for high school students to airports, arrange flight if possible or allow them to experience flight by touching flight controls or enable them to sit right in the pilot's seat. These simple programs will make them appreciate aviation and possibly influence their choice of career in the future.
7. The Society of Aerospace Engineers of the Philippines should invest in programs

towards promoting the aeronautical engineering course, career advancement and continuing education to aeronautical engineers, as well as forge partnerships with institutions that will help boost the aeronautical engineering profession.

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