



Research Paper

Female Engineering Students' Challenges in a Male-Dominated World

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Abstract

Challenges come in countless forms, faces, and features yet determination and courage are of countless forces for all of these to control and be able to surpass with fortitude and audacity. Students, of any gender, have no undeniable reasons at all for acquiring possible quality learning in spite of many problems that are met along the way. It is imperative that the educators must take the value of education which every student in an institution really deserves. This study examines the challenges in a male-dominated world among female engineering students of Pangasinan State University. This employed the descriptive survey with the utilization of the validated questionnaire. Particular interest is paid to the analyses on the profile of the students and the correlation between the profile variables and their assessments on the level of seriousness of the challenges encountered. By and large, there is robust indication to suggest intensive monitoring of the challenges encountered because this is moderately serious. Moreover, this frame of literature proposes that the provision of constant supervision and careful assessments on the problems and challenges should be strengthened. Female students should be constantly provided with equal opportunities in all aspects and be able to be always in the world of objectivity, in the structure of equality and in the aspect of fair learning landscape.

Keywords: Female Students' Challenges, Subject-Related, Personal-Related, Instructor-Related, Male-Dominated World

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I. Background of the Study

Education gives students opportunity to explore, understand and solve real-world problems. Sustainable Development Goals can be used as frameworks and tools to help students develop their research, critical thinking, problem-solving, teamwork, and communication skills. Students need these 21st century skills to prepare for the real problems they face throughout their lives. Teaching and exploring the Sustainable Development Goals (SDGs) also helps students find their identities and goals. On this end, the SDG Target is focused on achieving gender equality and empowering all women and girls in the academe(United Nations, 2020) {1}

Further, Lin (2016) {2} conducted a review of the literature on the challenges faced by female adult students enrolled in American colleges and universities. The most important variables associated to the hurdles and challenges of this demographic were multiple role obligations, low self-confidence, and limited family and social support, according to the findings. Suggestions for supporting this student group are presented, as well as the repercussions of doing so. The study's goal has been to enhance public awareness and understanding of the challenges those female adult students face. It is also projected that this specific student group will receive greater assistance from family, friends, schools, and communities.

As well, Madara (2016) [3] investigated the self-recognized challenges experienced by female undergraduate engineering students at Moi University's School of Engineering (SOE) (MU). This article was a report from a bigger gender-related study focused on SOE, MU, which used both quantitative and qualitative methodologies. The researchers created, administered, and analyzed a 20-question survey for female undergraduate students at MU's School of Engineering. The focal point (single-school, cross-sectional) sample was chosen at random and limited to 50 female students representing each of SOE's five engineering departments (roughly 20% of the female student population) during the 2014/2015 academic year. To interpret

the collected data, qualitative data coding techniques were used. NVivo software was used to assess the questioner's responses. Sixty-six percent of respondents stated that obstacles exist in their education at SOE. Based on the findings and analyses, it is clear that female students at SOE faced a variety of gender-related obstacles, including harassment from teachers and classmates. Female student support and mentoring activities should be devised and included at engineering schools in order to promote retention and improve learning environments in the field of engineering education, according to the study's suggestions.

Similarly, Barrot et al. (2021) [4] studied students' online learning challenges during the COVID-19 epidemic to acquire a more nuanced picture. Despite the fact that numerous research has looked into this topic, there is a scarcity of knowledge about the obstacles students face and the strategies they use to overcome them. As a result, this research aimed to fill in the gaps. The findings, which were based on a mixed-methods approach, demonstrated that college students' online learning problems varied in terms of type and intensity. Their greatest issue was related to their learning environment at home, while technical knowledge and proficiency was their least significant challenge. The studies also suggested that the COVID-19 epidemic had the largest impact on students' mental health and the quality of their learning experience. In terms of strategies employed by students, the most frequently used were resource management and utilization, help-seeking, technical aptitude enhancement, time management, and learning environment control. Implications for classroom practice, policy-making, and future research are discussed.

Additionally, the research of O'Sullivan (2017) [5] highlighted that students' ability to persevere when challenged is an important issue in many math classrooms. Students, especially female students, often do not persevere with challenges because they believe they are not smart. In this paper, a graduate student with a bachelor's degree in mathematics and education investigates whether teaching female students an implicit theory of intelligence, called thinking, changes the way students cope with challenges. challenge while studying or not. This action research project was carried out as part of a teacher training program and was conducted with female students aged 15-16 in a post-primary classroom in Ireland. Overall, the results suggest that when female students learn about the malleable nature of intelligence and growth mindset in particular, they persevere in the face of challenges and use them as domains. that they can learn from.

Also, Okello's (2021)[6] investigated student effectiveness and the challenges of the virtual classroom: an integrated conceptual model for university learning during the COVID19 pandemic. The results can guide university policymakers to focus on increasing faculty awareness and knowledge by organizing training programs on how to use virtual systems, as lecturers plays an important role in motivating students to use the virtual system, thereby affecting students' effectiveness of instruction and self-efficacy. Universities should focus on instilling a culture of virtual systems in students through training in the usefulness of virtual systems and developing their computer skills. The results of this study provided new insights and recommendations for policymakers to ensure the successful use and adoption of virtual systems during the COVID19 pandemic.

On the same note, Lynch (2018) [7] has shown that some students have challenges completing math and English homework, submitting homework on time, and staying focused in class. However, these struggles may be part of a larger problem that is not clearly seen by parents, guardians, and educators. The 9 challenges students face in school are poverty, homelessness, child abuse and neglect, bullying (including cyberbullying), violence, obesity, and disorder. mental health, food, sex and pregnancy, suicide, drugs and school dropouts. This article examines the first two challenges of poverty and homeless families. Poverty is a big problem in the United States. The gap is widening between the upper and lower classes of society. The socioeconomic status of children and families has a profound effect on a child's education, even in a country that prides itself on equal opportunity and fair treatment for all. The distribution of wealth is skewed in the United States. The poorest 0% of US citizens receive 12% of the national income. In contrast, the richest 20% receive 51% of national income. There are more than 36 million poor Americans. While the majority of the poor are white, racial and ethnic minorities have higher rates of poverty. More than 17% of American children live in poverty, which makes up 35% of the poor. Most poor children come from single-mother households. Unemployment is a factor in poverty for some, but many already have jobs and still live below the poverty line. Contrary to what many believe may have happened in the past, education has not eradicated poverty. Schools are not designed to serve poor children. They reflect and promote the lifestyle of the middle class. They often come from underserved homes and may live in unsafe communities. In their neighborhoods, they may be exposed to drugs, violent crime, and prostitution, and they may engage in these types of activities on their own from an early age. Parents of children living in poverty often struggle to provide them with enough quality food and health insurance. Children living in poverty often go to school without getting enough sleep and without breakfast. They are often victims of domestic violence, abuse, passive smoking, neglect and inappropriate dress. They may not be able to afford field trips or other extracurricular activities that could expand their experience base. This is the scary reality for millions of children.

Moreover, Baharudin (2018) [8] conducted research into the challenges faced by adult learners in one of the postgraduate classes at Universiti Teknologi Mara. The goal of the study was to look into the challenges those adult students experience and how they deal with these challenges. In order to select its sample, this case

study uses a qualitative case study and convenience sampling. A total of 20 postgraduate students from parts 2 and 4 who are currently taking the EDU 714 (Adult Education) paper were chosen. This study found that the student's greatest problem is internal challenges, followed by time, finances, and family. As a result, those parties must take further steps to improve a conducive learning environment for adult learners in order to assure strong academic performance.

On the same vein, Al-Hussein, et al. (2018) [9] looked into the perceived learning challenges and coping methods used by Nursing and Health Sciences (NHS) students at Al-Hussein Bin Talal University (AHU) when dealing with general and medical English as a foreign language during the learning process. The findings revealed that the students suffer with a lack of linguistic proficiency. Thus, the study's findings reveal a two-fold problem: first, the students' lack of knowledge and proficiency in general English, and second, the students' lack of skill in medical English. In fact, students are hampered not just by their lack of basic English proficiency, but also by their unfamiliarity with medical English.

Students' learning issues were mentioned by Queensu (2020) [10]. Students may face a variety of cognitive, motivational, or affective challenges that affect their learning during the learning process. We'll look at how these factors affect the learning process in the section "Our Students as Learners." The three categories are intertwined, and many of the difficulties kids have in school arise from a combination of cognitive, motivational/affective, and social factors. Students will come to class with existing information, experiences, and learning strategies, which, when combined with the current course/classroom dynamics, may alter their motivation to learn.

In a similar line, Fook (2015) [11] looked into the learning challenges that students encounter in higher education. Undergraduates, postgraduates, and instructors in a School of Education at a selected university in the United States of America made up the study's population. To triangulate the data, the researchers used a qualitative technique that included questionnaires, interviews, and document analysis. The sample population included 181 undergraduate and postgraduate students, as well as 22 School of Education instructors. All 203 respondents were given questionnaires using a 6-point Likert scale, while 5 students, postgraduates, and instructors were interviewed. In addition, the syllabus for the 12 courses was subjected to document analysis. Students in higher education encounter eight key learning challenges, including cognitive challenge, becoming an active learner, coping with reading materials, instructional problem, language barrier, time management, assignment burden, and cultural difference, according to data analysis. Based on the findings, it was suggested that higher learning institutions should place a greater emphasis on knowledge construction through active interaction between lecturers and students, which would provide a platform for students to cope with the learning challenges they faced in higher education.

Having on the same wavelength, Rustam, et al. (2016) [12] looked into the challenges, impediments, and difficulties that pupils have when learning mathematics. Themes were identified as the key sources of challenges, hurdles, and difficulties during the content analysis. The frequency and proportion of challenges, impediments, and difficulties were then computed for each of the listed sources. The sources of challenges were found to be divided into five main themes and thirteen sub themes: a) self-factors (negative perceptions, low self-regulation), b) teachers (behaviors, practices, characteristics), c) parents (lack of cognitive, emotional, and financial support), d) friends (negative attitudes, behaviors, and lack of support), and e) other factors (nature of math and assessment pressure). The findings of this study have significant significance for practitioners and researchers in supporting children in dealing with challenges, impediments, and difficulties in daily school life, particularly in mathematics learning. One of the most important problems in mathematics education is students' mathematical proficiency. Despite this, many students consider mathematics to be one of the most difficult fundamental courses to master. This negative thinking might be caused by a variety of reasons that obstruct their math learning.

Finally, Calle (2020) [13] enumerated the ten (10) challenges college students face and how to deal with them. These are the following: time management and work-life balance, self-discovery, keeping up with classes, spreading oneself too thin, home sickness, financial strain, roommate friction, making friends, relationships with the family and taking care of oneself.

Through these prevailing concepts the researchers intended to determine the female Engineering students' challenges in a male-dominated world in Pangasinan State University.

II. Methods and Procedure

This part presents a brief discussion of the methods and procedures that were used in this study specifically the research design, the respondents, data gathering instrument, data gathering procedure and statistical treatment of data.

This study utilized the descriptive survey method of research. Descriptive research can be explained as a statement of affairs as they are at present with the researcher having no control over variable. It aimed at

casting light on current issues or problems through a process of data collection that enables them to describe the situation more completely than was possible without employing this method (Dudovskiy, 2018) [14]
 The study considered a total of 300 female Engineering students as the respondents broken down as follows: Civil Engineering (165); Computer Engineering (23); Electrical Engineering (75) and Mechanical Engineering (38).

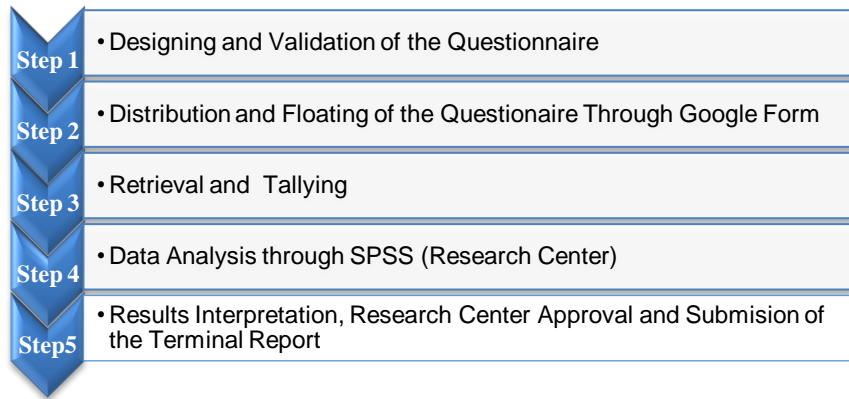


Figure 1. Research Process

The researchers obtained permission from the Campus Executive Director. The established questionnaire-checklist was meticulously evaluated. After the questionnaire was simplified, improved, and refined, the questionnaire was subjected to content validation by five experts in the field of engineering, student leadership, and social sciences. The experts ascertained the content validity of the instrument with the average of 4.98. In describing the validity, the average weighted mean was adopted.

The following mean scale range and descriptive rating below were used to interpret the validity of the questionnaire.

Numerical Values	Mean Scale Range	Descriptive Rating
5	4.51 – 5.00	Very Highly Valid
4	3.51 – 4.50	Highly Valid
3	2.51 – 3.50	Moderately Valid
2	1.51 – 2.50	Not Valid
1	1.00 – 1.50	Not Valid at All

The questionnaire was distributed, explained, and clarified to the respondents regarding the main purpose of the study. Likewise, the retrieval of the questionnaires was done just after the accomplishing the details of the questionnaire. Likewise, tabulation and tallying started right after the retrieval then submitted to the Campus Research Coordinator and endorsed to the Statistics Center for further analysis.

All the needed and relevant data that were gathered was consolidated and analyzed. In determining the profile of respondents, frequency counts and percentages were used as the main statistical tool. Likewise, to determine the level of seriousness of the challenges encountered by the female Engineering students of PSU, Average Weighted Mean (AWM) and frequency counts were utilized. The following scale was adopted to interpret the data:

Scale	Range	Descriptive Equivalent
5	4.51 – 5.00	Very Highly Serious (VHS)
4	3.51 – 4.50	Highly Serious (HS)
3	2.51 – 3.50	Moderately Serious (MS)
2	1.51 – 2.50	Slightly Serious (SS)
1	1.00 – 1.50	Least Serious (LS)

Further, to determine the correlation of the demographic variables and perceived level of seriousness of the challenges encountered, Pearson -r and Point-biserial were utilized. However, the correlation of the perceived seriousness of challenges, Person r was used.

Figure 1 presents the research paradigm of the study.

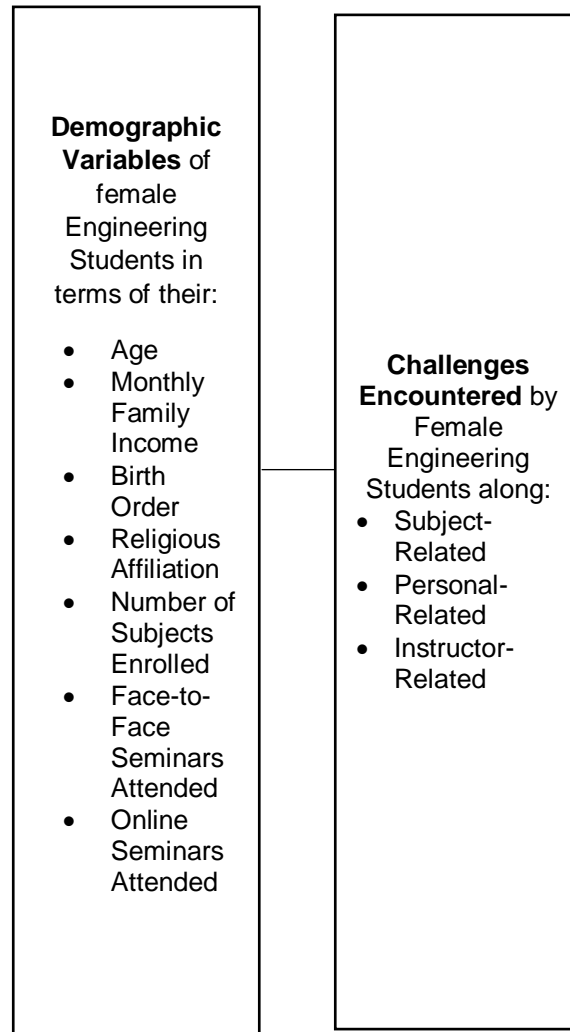


Figure 2. *Research Paradigm*

III. Results and Discussion

This part presents the analysis of the data and interpretation of salient findings to answer the problems of the study. Data on the profile of the respondents and the challenges encountered by the female Engineering students are presented in tabular and textual forms.

Demographic Variables of the Students

Table 1: Distribution of the Students According to their Demographics

Demographic Variables		Frequency	Percentage
Age	17 to 20	198	66
	20 to 25	99	33
	Above 25	3	1
Monthly Family Income	Poor	170	56.67
	Low Income but not Poor	69	23.00
	Lower Middle Class	44	14.67
	Mid-Middle Class	12	4.00

	Upper Middle Class	5	1.67
Birth Order	First Born	118	39.33
	2nd Child	75	25.00
	3rd Child	61	20.33
	4th Child	22	7.33
	5th Child	10	3.33
	6th Child or Beyond	14	4.67
Religious Affiliation	Roman Catholic	208	69.33
	Protestant	92	30.67
Number of Subjects Enrolled	At most 3 Subjects	34	11.33
	4 to 6 Subjects	55	18.33
	More than 6 subjects	211	70.33
Face-to-Face Seminars Attended	None	257	85.38
	1 to 5	39	12.96
	6 to 10	4	1.33
	More than 10	1	0.33
Online Seminars Attended	None	137	45.51
	1 to 5	125	41.53
	6 to 10	32	10.63
	More than 10	7	2.33

Age. It could be gleaned on the table that majority of the female Engineering students are 17-20 years old as supported by the frequency of 198 or 66 percent. Ninety-nine (99) or 33% have the age ranging from 20-25 while only three (3) or 1% do have an age of more than 25 years old. This implies that since the students are still in their college years, it is definitive to state that their age range is normal for tertiary students pursuing diploma courses.

Monthly Family Income. Majority of the female Engineering students belong to the poor socio-economic stratification as indicated by the frequency of 170 or 56.67%. Sixty-nine (69) or 23% and forty-four (44) or 14.67% are low income but not poor and lower middle class, respectively. While there are 12 of them or 4% belong to mid-middle class, only five (5) or 1.67 are part of upper middle class. This means that the university really caters students who are financially disadvantaged as has been the very purpose of Republic Act No. 10931 which is also known as the "*Universal Access to Quality Tertiary Education Act*" [15]

Birth Order. Most of the respondents are first-born as indicated by the frequency of 118 or 39.33%. Seventy-five (75) or 25%, 61 or 20.33% and 22 or 7.33% are second, third and fourth-born, respectively. Fourteen (14) or 4.67% are 6th-born and beyond while only 10 or 3.33% are 5th born. Girls do better than boys in universities making more number and indeed at every level of education. However, men are not completely on the back foot in higher education, and they are still outperforming women in some of the most prestigious areas - such as entry to the toughest universities and toughest courses. (Richardson, 2016) [16]

Religious Affiliation. The table shows that majority of the students are Roman Catholic devotees as evidenced by the frequency of 208 or 69.33% while only 92 or 30.67% are Protestant believers. Since the Philippines is a Christian nation, it is expected that most of the students are Christian devotees yet split up with various pious affiliations.

Number of Subjects Enrolled. Majority of the students have more than six (6) subjects as indicated by the frequency of 211 or 70.33%. Fifty-five (55) or 18.33% have enrolled 4 to 6 subjects and only 34 or 11.33% of them have at most 3 subjects enrolled. This means that students can have as many as 7 or more subjects for as long as the retention and academic performance are satisfactorily satisfied. Otherwise, lesser number of subjects are enrolled because of low academic performance as transpired in the student's manual of the university.

Number of Face-to-Face Academic-Related Seminars Attended. The table shows that majority of the students never had an access for face-to-face academic-related seminars as evidenced by the frequency of 257 or 85.38%. Thirty-nine (39) or 12.96% had 1- 5 seminars attended. While there were four (4) or 1.33% had 6-10 yet only one (1) of them or 0.33% had attended more than 10 face-to-face academic-related seminars.

Number of Online Academic-Related Seminars Attended. On the same vein, still majority of the respondents had no attendance to seminars as indicated by the frequency of 137 or 45.51%. One-hundred twenty-five (125) or 41.53% and 32 or 10.63% had attended 1-5 and 6-10 online seminars, respectively. However, it is so interesting to note that seven of them or 2.33% had participated more than 10 online seminar sessions.

It is believed that in many cases, getting a job depends on who not what. Therefore, it is needed to take advantage of the opportunity to build a network. Workshops and training for students to network with companies for potential career opportunities (Daniel, 2021) [17]

Perceptions of Female Engineering Students on their Subjects

Engineering is a science focused on the design and manufacture of machinery, engines and structures, offering a wide range of career areas. With the economy open over the last few decades, the technology industry and a variety of other companies are growing steadily, giving students a variety of career choices. A degree in engineering not only provides excellent insights, but also prepares students for expertise in various disciplines of the future. The skills, knowledge and understanding acquired in this course provide a good scope for their future. The advantage of a degree in engineering is not only have the opportunity to enter different disciplines, but also get a good reward. These programs are strong because of their multidisciplinary approach, which includes core technological principles, electric machines, chemical engineering and much more. The curriculum focuses on bringing in technological specialists, machine builders, chemical engineers, managers, and a variety of other engineering experts (careers.com, 2020) [18]

Table 2 : Perceptions on Subjects

Subject	Favored (%)	Difficult (%)
General Education	72 (24)	13 (4.33)
Mathematics	65 (21.67)	151 (50.33)
Specialization	137 (45.67)	157 (52.33)
Natural Science	25 (8.33)	59 (19.67)

Favored Subjects. The female Engineering students perceived that their most favored subjects are the specialization courses as evidenced by the 137 or 45.67%. This has been followed by the Mathematics courses (65 or 21.67%), General Education (72 or 24%) and Natural Science courses (25 or 8.33%). The data imply that specialization courses are favored because these serve as foundation of the desired disciplines.

When students begin to take technical complementing courses, they usually choose a specialization area. This usually happens in their final three semesters of study. (McGill, 2019).

Further, Shadows (2022) [19] mentioned that engineering majors will find that they have a wide range of employment choices available to them after graduation requiring them to focus on their fields of specialization. Change and evolution are a given in engineering employment, so they will never have to worry about doing the same thing year after year. Engineering degrees also provide individuals with a variety of transferable skills. Engineering students develop problem-solving, decision-making, innovation, project management, teamwork abilities, and communication skills that can be employed on a daily basis. As a result, engineering students are more likely to succeed in whichever field they pursue.

Subjects They Perceived Difficult. Though specialization courses are perceived to be favored and still assessed as difficult as indicated by the frequency of 157 or 52.33%. However, general education courses are perceived as less difficult as supported by the frequency of 13 or 4.33%. This implies that mathematics is still considered as a higher form of intellectual sponge. Also, since general education courses are just only affiliate subjects and are only universal in approach and collective in terms of its methods, these are superficial in nature and being studied with less seriousness.

Figure 1 presents the Wordcloud of favored subjects among female Engineering students of PSU-Urdaneta Campus.

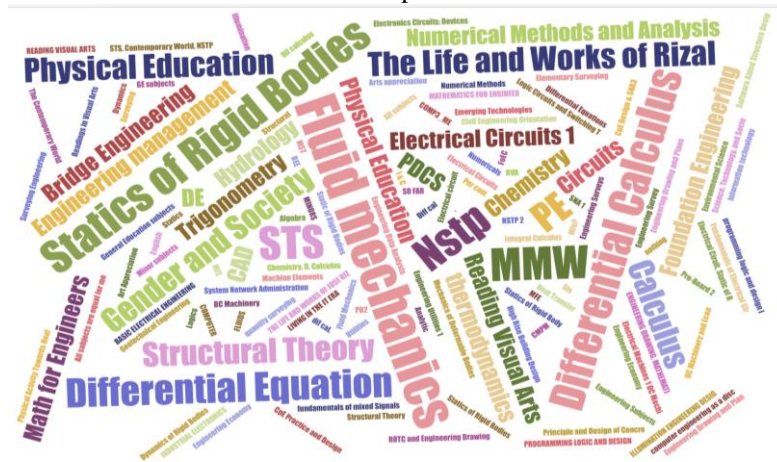


Figure 1. Wordcloud of Favored Subjects

Figure 2 presents the Wordcloud of the perceived difficult subjects among female Engineering students of PSU-Urdaneta Campus.

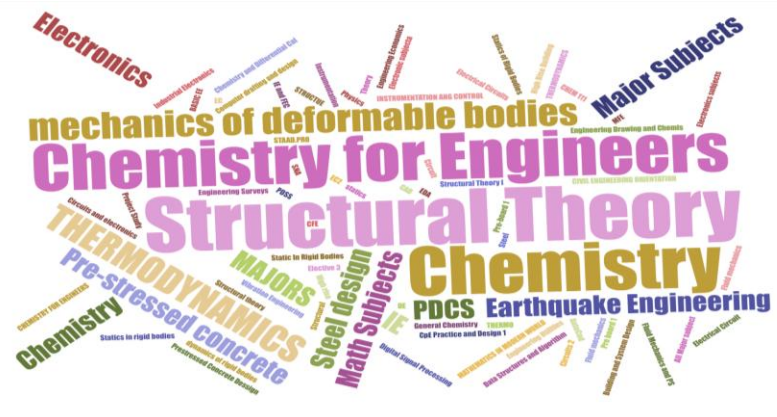


Figure 2. Wordcloud of Subjects Having Difficulty With

CHALLENGES ENCOUNTERED BY FEMALE ENGINEERING STUDENTS OF PANGASINAN STATE UNIVERSITY

A. Subject-Related

Table 2: Assessment on the Challenges Encountered by Female Engineering Students Along Subject-Related

Indicators	LS	SS	MS	HS	VHS	x	Des	Rank
Subjects enrolled are difficult to grasp	5	22	118	117	38	3.54	HS	2
Burdened with loads to study	9	23	81	113	74	3.73	HS	1
No/less background about the subjects currently enrolled	28	71	99	64	38	3.04	MS	4
Intellectual competition among engineering students exists in the class	76	67	91	39	27	2.58	SS	6
Academic-related bullying lives in the learning environment	162	65	49	18	6	1.80	LS	9
Weak in general education disciplines	109	83	83	20	5	2.10	SS	8
Co-curricular and extra-curricular are bombarding and heavy to handle	83	80	88	33	16	2.40	SS	7
Lots of specified topics included in the syllabus	18	53	147	57	25	3.06	MS	3
Lack of quality education that affects the provision of engineering students with inferior tools to establish themselves in the world.	41	71	108	42	38	2.88	MS	5
Overall Rating						2.79	MS	

Legend:

LS= Least Serious

SS=Slightly Serious

MS=Moderately Serious

HS=Highly Serious
 VHS=Very Highly Serious
 X=Mean
 Des= Description

It could be seen on the table that the highly serious challenge encountered by the female Engineering students has been burdened with loads to study as evidenced by the mean of 3.73. This implies that because subjects given are really difficult especially Mathematics because Engineering is a mathematics-grounded discipline, it has been the greatest predicament and contributory to the agony of learning the subjects enrolled. This is also attributed to the indicator, subjects enrolled are difficult to grasp with a mean of 3.54.

Today's students are burdened with loads to study. The study curriculum has expanded and gotten more sophisticated than ever before. They not only bear the weight of ever-increasing study materials, but they also bear the load of continuous study long after they have left the classroom (Targetstudy, 2021) [20]

Further, lots of specified topics included in the syllabus has been perceived as moderately serious challenge as indicated by the mean of 3.06. This implies that the topics integrated to all subjects are sometimes overflowing that are impossible to master in a semester. However, the contents of the subjects are meticulously evaluated by the experts in the field, making them as academically valid. Stinger (2018) [21] mentioned in her article that overloading learners not only generates academic stress, but it also has a negative impact on their mental and physical health, which, predictably, impedes learning.

On the same vein, there has been no/less background about the subjects currently enrolled with the mean of 3.04 has been also considered as moderately serious challenge. This is slightly true to freshmen who have a not aligned track in their senior high school education leading them seemed to have a difficulty of coping math-related disciplines along with the indicator, lack of quality education that affects the provision of Engineering students with inferior tools to establish themselves in the world as indicated by the mean of 2.88, also assessed as moderately serious.

Other indicators that have been assessed as slightly serious challenge are arranged in descending means: Intellectual competition among engineering students exists in the class (2.58); Co-curricular and extra-curricular are bombarding and heavy to handle (2.40); and Weak in general education disciplines (2.10)

However, an academic-related bullying lives in the learning environment as indicated by the mean of 1.80 has been assessed as slightly serious challenge. Bullying stays in the classroom especially if the students' assessments results are flaunted and grades are released. Regards such as unsavory words from fellow students are disclosed that create madness or even quarrel inside the classroom.

Mahmoudi (2021) [22] emphasized that bullying in the classroom is all too widespread, and institutional responses are frequently insufficient. Although most publications focus on what victims of bullying may do to protect themselves, it is crucial to recognize that academic bullying can and must be addressed by all members of the school community. To reduce academic harassment, all members of the workforce must pay attention and work together.

Notwithstanding, the over-all mean of 2.79 indicates that the female Engineering students experienced moderate serious challenge in their enrolled subjects.

Mulwa's (2015) [23] research found that learners have difficulty using engineering and mathematical phrases and concepts. There were also suggestions for how to teach these terms so that they would have greater meaning for the students. This is supposed to aid teachers, curriculum developers, and textbook authors in combating dismal performance in the discipline.

B. Personal-Related

Table 3: *Assessment on the Challenges Encountered by Female Engineering Students Along Personal-Related*

Indicators	LS	SS	MS	HS	VH S	x	Des	Rank
The course is not a personal choice	123	49	65	40	23	2.30	SS	8
Not financially equipped that obstructs the interest to study	45	67	98	45	45	2.93	MS	6
Concerned with academic issues instead of studying which hampers the performance	20	60	112	79	29	3.12	MS	4
Easily disheartened because of constant failure in various subjects	15	41	82	92	70	3.54	HS	2
Emotionally imbalanced and continued presence of hectic student life that elicit negativity	17	26	74	98	85	3.69	HS	1
Easily disrupted because of pornography and online games advertisements.	189	48	42	10	11	1.69	LS	9
Poor study habits	31	67	101	64	37	3.03	MS	5
Negative attitude towards some enrolled subjects	93	75	78	36	18	2.37	SS	7
Low mathematical and logical intelligence	20	63	111	57	49	3.17	MS	3

Overall Rating	2.87	MS	
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Legend:

- LS= Least Serious
- SS=Slightly Serious
- MS=Moderately Serious
- HS=Highly Serious
- VHS=Very Highly Serious
- X=Mean
- Des= Description

The table shows that the over-all mean of 2.87 is a strong indication that the female Engineering students suffered moderate serious personal challenges.

As to the extent of seriousness, emotionally imbalanced and continued presence of hectic student life that elicit negativity has been assessed as high as evidenced by the mean of 3.69. This means that students still cannot contain the frantic condition in the tertiary stage because of multitude of academic tasks to accomplish, they tend not to hold and develops the feeling of being less enthusiastic.

The COVID-19 epidemic had the largest impact on students' mental health and the quality of their learning experience that leads to negativity. Resource management and utilization, help-seeking, technical aptitude enhancement, time management, and learning environment control were the most commonly used tactics by students. There are implications for classroom practice, policy-making, and future research (Barrot, et.al., 2021) [24]

Accordingly, easily disheartened because of constant failure in various subjects has also been evaluated as highly serious as indicated by the mean of 3.54. This means that failing seems to be the reason of concern. Students are discouraged to pursue and get through until the end of their quest. Indicating that every after semester in the University, the number of enrollees get smaller where expected graduates become lesser.

Indicators that the female Engineering students have evaluated as moderately serious are the following as arranged in descending means: Concerned with academic issues instead of studying which hampers the performance (3.12); and Poor study habits (3.03); Not financially equipped that obstructs the interest to study (2.93). On a less worrying note, negative attitude towards some enrolled subjects has been assessed as slightly serious as indicated by the mean of 2.37. This implies that some students tend to be pursuant and keep going.

Universities should concentrate on building a positive virtual educational system culture among students by providing instruction on its benefits, which will help to reduce negative attitudes toward studying. The findings of this study provided new insights and recommendations for decision-makers on how to properly use and deploy virtual systems in order to boost student interest and vitality (Okello, 2021) [25]

Also, the course is not a personal choice has also been perceived as slightly serious as evidenced by the mean of 2.30. This also means that the course is really their own and particular preference. Leading to the desire of passing all their subjects and let all the challenges be hurdled. Interestingly, the indicator which states that easily disrupted because of pornography and online games advertisement has been evaluated as least serious as supported by the mean of 1.69. Though the influence of social media is very strong and sometimes irresistible, the female students tend to be very selective of the viewing matters and themes they focus on.

It so saddening to note that pornography is part of a larger societal environment that includes gender stereotypes, misogyny, sexual objectification, and violence-supportive attitudes. Nearly half of children aged 9 to 16 are exposed to pornographic pictures on a regular basis. (Quadara, et.al , 2017) [26]

C. Instructor-Related

Table 4. *Assessment on the Challenges Encountered by Female Engineering Students Along Instructor-Related*

Indicators	LS	SS	MS	HS	VHS	x	Des	Rank
Lack of ability to give clear directions and logical explanations	35	56	103	67	39	3.06	MS	1
No effective motivation and introduction	45	83	89	57	26	2.79	MS	4
No sufficient and concrete examples to create meaningful learning experiences	43	65	101	60	31	2.90	MS	2
Not creative enough to adapt the method to the learner's capability	47	74	91	59	29	2.83	MS	3
Lack of ability to encourage critical and creative thought	44	82	96	53	25	2.78	MS	5
Questions are not properly distributed to all learners	67	93	91	29	20	2.47	SS	9
Not asking appropriate and different types of questions that direct students' thinking	75	81	89	34	21	2.48	SS	8
No effective use of formative test after teaching	77	91	84	33	15	2.39	SS	

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Overlooks to link learning with prior experiences	49	83	100	43	25	2.71	MS	6
Not demonstrating in-depth knowledge of the subject matter	59	84	86	43	28	2.66	MS	7
Constructed evaluation tools and measures are not valid	79	95	82	33	11	2.34	SS	10
Overall Rating						2.67	MS	

Legend:

LS= Least Serious

SS=Slightly Serious

MS=Moderately Serious

HS=Highly Serious

VHS=Very Highly Serious

X=Mean

Des= Description

The table shows that lack of ability to give clear directions and logical explanations among instructors has been perceived as moderately serious as indicated by the mean of 3.06. Instructors are expected to show mastery and a systematic approach for teaching process. It is deemed that once before the midst of the students, they should be exuding clarity on their instruction and magnanimity in their means of bridging gaps for the students to acquire the knowledge and skills alike.

Collaboration must be considered to have excellent teaching galore in the institution to give the best service to students. Kinchin (2017) [27] mentioned in his paper that instructors should use pedagogic fragility to create their own personal narrative to help them communicate their teaching philosophy and achieve a more sophisticated and integrated perspective on the values that underpin their professional role. They must also guide and mentor other colleagues if they are unable to express their opinions clearly. There is a risk of fragility developing inside an institution when academics do not share a same set of ideals. Frailty leads to the preservation of conservative teaching methods that may no longer be effective, as well as the creation of unproductive tensions between different areas of the institution.

Further, no sufficient and concrete examples to create meaningful learning experiences has also been assessed as moderately serious challenge as supported by the mean 2.90. This implies that the instructors are reluctant and become less profound. Others also claimed that instructors give simple and effortless problems for practice yet become very hard once examination is already administered.

Generally speaking, students learn through explanation, example, and experience (Maxwell, 1978) [28]. Unfortunately, teachers rely too heavily on teaching their discipline's knowledge, jargon, and procedures, which can all sound like a foreign language to their students. As a result, teachers may spend less time using examples and supporting experiential learning within their discipline, which is typically where the true learning happens. Exercising students' ability to widen and enhance their understanding through examples and pictures is a strong tool. Selecting the most effective examples and knowing when and how to use them is one of the challenges that teachers face (Alford, 2019) [29]

Other indicators that have been assessed as moderately serious as perceived by the respondents are enumerated in their descending means: Not creative enough to adapt the method to the learner's capability (2.83); no effective motivation and introduction (2.79); lack of ability to encourage critical and creative thought (2.78); overlooks to link learning with prior experiences (2.71) and not demonstrating in-depth knowledge of the subject matter (2.66).

However, the female Engineering students of PSU have evaluated that not asking appropriate and different types of questions that direct students' thinking as slightly serious challenge as supported by the mean of 2.48. This implies that instructs are very critical and do cite mind-boggling inquiries that develop that logical thinking of the students. This is along abstraction, perceptual evaluation and conceptual appraisal in teaching.

Also, the questions are not properly distributed and dispersed to all learners with a mean of 2.47 has also been evaluated as slightly serious challenge. This means that the instructors give equal chances among their students to prove themselves and to have their own individual justifications and be able to project their intellectual prowess.

Notwithstanding, the table shows that the over-all mean of 2.67 is a solid indication that the female Engineering students suffered moderate serious instructor-related challenges. Poor classroom management abilities result in a lower rate of academic engagement in the classroom, and a high incidence of classroom disciplinary problems has a major negative influence on the effectiveness of teaching and learning (Johnston, 2018) [30]

SUMMARY TABLE ON THE CHALLENGES ENCOUNTERED BY FEMALE ENGINEERING STUDENTS

Table 5. Over-all Summary on the Challenges Encountered by Female Engineering Students of PSU

CHALLENGES ENCOUNTERED	MEAN	DESCRIPTION
Subject-Related	2.79	Moderately Serious
Personal-Related	2.87	Moderately Serious
Instructor-Related	2.67	Moderately Serious
Over-all Weighted Mean	2.78	Moderately Serious

The over-all weighted mean of 2.78 is an indication that all of the challenges are just moderately serious. As to the specific items, the table further shows that the subject-related (2.79); personal-related (2.87) and instructor-related (2.67) challenges have been evaluated as moderately serious.

Coinciding with the results of the study, Unciano (2019) [31] mentioned in his paper that the challenges discovered are lack of background, difficulty in understanding, the teacher's teaching methods, and a lack of time and preparation (study habits) in studying.

SIGNIFICANT RELATIONSHIP BETWEEN THE PERCEIVED LEVEL OF SERIOUSNESS OF THE CHALLENGES ENCOUNTERED BY THE FEMALE ENGINEERING STUDENTS AND THEIR DEMOGRAPHICS

Table 6. Correlation of the Demographic Variables and Perceived Level of Seriousness of the Challenges Encountered

Variable	Statistics	Subject-Related	Personal-Related	Instructor-Related
Age	Correlation	0.071	0.025	0.039
	Significance	0.219	0.670	0.500
Birth Order	Correlation	0.053	0.063	0.006
	Significance	0.360	0.274	0.915
Religious Affiliation	Correlation	0.029	0.051	0.049
	Significance	0.614	0.379	0.399
General Education (Favored)	Correlation	-0.053	0.004	-0.040
	Significance	0.361	0.945	0.490
Mathematics (Favored)	Correlation	-0.004	-0.059	-0.001
	Significance	0.941	0.309	0.982
Specialization (Favored)	Correlation	-0.019	0.011	-0.015
	Significance	0.737	0.854	0.798
Natural Science (Favored)	Correlation	0.053	0.059	0.017
	Significance	0.362	0.313	0.769
General Education (Difficulty)	Correlation	0.030	0.030	-0.040
	Significance	0.606	0.607	0.488
Mathematics (Difficulty)	Correlation	0.037	0.088	-0.005
	Significance	0.521	0.129	0.934
Specialization (Difficulty)	Correlation	0.062	-0.011	0.016
	Significance	0.287	0.851	0.780
Natural Science (Difficulty)	Correlation	-0.026	0.005	0.018
	Significance	0.651	0.928	0.755
Face-to-Face Seminars	Correlation	-0.021	0.037	0.074
	Significance	0.716	0.523	0.203
Online Seminars	Correlation	-0.009	0.063	0.089
	Significance	0.881	0.278	0.123

The table shows that none of any demographic variables has its correlation to the perceived level of seriousness of the challenges along subject-related, personal-related and instructor-related as supported by the values of more than the values of 0.05 level of significance. Their age, birth order, religious affiliation, participation to face-to-face and online seminars are not significant to their perception on the level of seriousness of the challenges encountered.

Moreover, their favored subjects and their assessments as regards their corresponding difficulty level are not also significant to their perceived level of seriousness of the challenges along subject-related, personal-related and instructor-related.

Negating the findings of the study, the paper of Ali, et al. (2013)[32] revealed that students' academic performance is influenced by their age, socio economic standing, and daily study hours. A linear model was also presented as a means of improving students' academic achievement at the university level.

Likewise, Talwar (2018) [33] revealed in his paper that majority of university students face moderate difficulties. Among students, there was a substantial inverse association between challenge level and coping techniques. Finally, some degrees of challenge can be beneficial if they are met with the correct kind of challenge, which stimulates them to develop and grow. Students who are unable to cope with obstacles, on the other hand, might become a burden.

SIGNIFICANT RELATIONSHIP OF THE PERCEIVED LEVEL OF SERIOUSNESS OF CHALLENGES ENCOUNTERED BY THE FEMALE ENGINEERING STUDENTS

Table 7. Correlation of the Perceived Seriousness of Challenges

Pair		Correlation	Significance
Subject	Student	0.568	0.000
Subject	Instructor	0.561	0.000
Student	Instructor	0.501	0.000

The table shows that all correlations are moderately strong as evidenced by all computed significant values of 0.000; thus, the relationships are substantial and practically significant. The relationships among items-related are positive, hence, as level of seriousness for one problem increases, so is the level of seriousness for the other.

Moreover, the identified pair relationships (subject-student:0,568; subject-instructor:0.561 and student-instructor:0.501) are all statistically highly significant as indicated by all computed values of 0.000. The data imply that the challenges might be bundled together, not independent of one another. A teacher-related challenges may lead to a subject-related challenges which can also ultimately lead to a student-related challenges.

Coinciding with the results of the study, the paper of Malab (2018) [34] revealed that, in general, Personal issues such as educational expenditures, lack of enthusiasm, and a negative attitude toward the subject were encountered. Excessive stress while undertaking academic work, as well as low self-esteem or a lack of belief in one's own talents, are common emotional issues. No effective motivation and introduction, as well as a lack of creativity in adapting his or her method to the learner's potential, are issues with teacher instruction. The most common issues with school adjustment are trouble adjusting to the life/role of a college student and not performing well on tasks. The difficulties in adjusting to classmates/board mates include how to be accepted by classmates and board mates, as well as how to work efficiently with various types of classmates.

On the same wavelength, Ahmed's, et.al. (2017) [35] study revealed that personality mismatches and a lack of interest in the subject are risky and can lead to student dissatisfaction, demotivation, and lack of productivity, which can lead to increased dropouts and career failure. The findings indicate the need of providing students with updated knowledge and information in order to pique their interest in the best choices and accessible possibilities through counseling sessions and other interventions. The degree of their favorite teachers, social status, financial resources, affordability, and future employability all influences students' career choices.

IV. Conclusions

1. Majority of the female Engineering students are 17-20 years old, belong to the poor socio-economic status, first-born, Roman Catholic believers, have enrolled more than 6 subjects, attended 1-5 face-face seminars and had no attendance to online seminars.
2. The specialization subjects are considered preferred yet also assessed as difficult to learn.
3. The challenges encountered by the female Engineering students are moderately serious. Likewise, no profile variables can be associated to the challenges they met.

4. Subject-related, personal-related and instructor-related challenges are intertwined.

V. Recommendations

1. The levels of poverty continue to make life a daily struggle for the students. The government should continue reinforcing the effective implementation of the Republic Act No. 10931. The educational needs of the female students should be unselfishly served to fulfill their dreams to finish their profession.
2. All subjects should be given equal attention and ample interest whether general or specialization courses because these are still contributory to the welfare and development of the students.
3. The challenges encountered by the female Engineering students may still affect their college education journey. Therefore, these should be dealt accordingly, not only the instructors but more of the involvement of the parents. They should be involved in gender-grounded interest clubs in the Campus to know their corresponding rights and privileges and to also have their skills be developed.
4. Challenges are interwoven. That is why, all of its facets, sides and forms should be given priority. The school administrators and the University's Gender and Development as well as the Campus Guidance Office should extend more of their gender-based training and learning services to the female students

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