

UAE Female K-12 Students: Decision Influences on Bachelor's Degrees Choices

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Abstract

One of the most crucial decisions that students make in their lives is the major choice as it affects students' job opportunities and the labor market's structure. Many adolescents, who will one day meet the need of knowledge-based economies, have the goal of attending a university but lack the means to do so. In order to do this, it is necessary for adolescents to make the choices necessary to pick a certain line of work, employment, or organization to join. In the UAE, higher education has seen steady growth. However, the factors influencing students' choice of higher education major remains unexplored. In this study, we conducted a survey with first and second-year undergraduate students in the UAE to understand the personal, social, and financial factors influencing students' major choice. The study shows that personal factors such as passion and skills influence students' choice. Implications and future work are discussed. It is observed that students appreciate working in several industries and across many societal sectors. The study also shows little correlation between bachelor's degrees and job profiles. We recommend that universities and employers should provide K–12 students, their families, and K–12 educators with correct information regarding bachelor's degrees to combat misperceptions about engineering work and its practitioners and to prepare them to navigate their education and join the workforce as employers increasingly expect graduates to have experience and skills such as creativity and design, oral and written communication, teamwork and leadership, interdisciplinary thinking, business management and entrepreneurship, and multicultural understanding.

Keywords: College Access, Decision Factors; Specialty Selection, UAE Students

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1. Introduction

Access to university is the dream of many youths who will provide to the present demand of knowledge-based economies. For that, decisions to select in a specific career, job or organization must be carry out by adolescences. These factors may be inner to the individual, such as skills or personal interests or peripheral, like families influences or global economy factors. Activities that increase exposure to, understanding of or experiences in engineering and arts, for instance, play a role in these decisions too. To examine the factors that influence the decision making of bachelors at K–12 is the focus of the present writing.

There are at least two compelling reasons why any nation should be concerned about bachelor’s diversity challenge: the creativity and innovation costs of unused skills and talent, and equity/social justice. [1]

In terms of the theoretical model (Fig 1), the social cognitive career theory (SCCT) tries to identify the dynamics that affect an individual’s educational and career decisions as well as potential points for interventions to increase the likelihood that individuals will complete a university degree and use those skills and knowledge gained in their education throughout their careers.

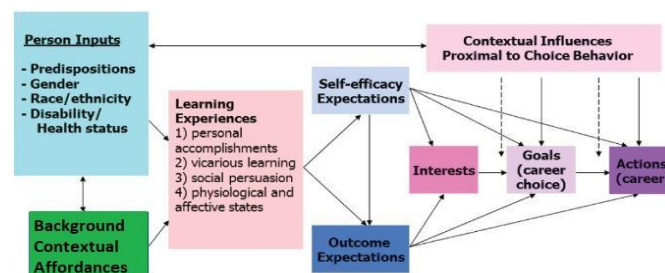


Fig. 1. Diagram of social cognitive career theory. [2]

It takes account of individual differences (person inputs like gender, race/ethnicity, health, personality traits) and background contextual affordances (home and school environment and experiences, family socioeconomic status) that affect opportunities to learn a set of tasks associated with a field (e.g., math and problem solving associated with engineering), including one’s learning experiences. People learn by performing a task themselves (personal accomplishment or mastery experiences) or by observing a friend or role model accomplish the task (vicarious learning) also include encouragement from others (social persuasion) or feelings of excitement about performing the task (physiological states). Learning experiences in turn shape self-efficacy expectations and outcome expectations, which then shape interests, goals and actions. Internal and external factors (person inputs and contextual influences) affect the elements of the SCCT model as well as how they interact with one another. They may serve as supports or barriers to an individual’s decisions throughout the pathway. [1]

The present research focus on Emirate’s females of K-12 students whose communication media is Arabic and/or English only. It will not follow any theoretical framework. Instead, it will be based on the responses of a survey for a descriptive and inferential statistical assessment (letting the data speak for themselves).

The main research question that is addressed is which factors have the greatest influence on UAE female students’ choice in selecting a bachelor’s degree.

This paper is divided into 5 sections, including the present introduction. Section 2 highlights some of the state-of-the-art associated to the decision factors for universities' candidates while section 3 underlines Zayed University global settings of the students interviewed. Descriptive, T-tests, regression and structured equation modeling are presented in the following section while the last section depicts global conclusions.

2. Prior Research

The state of the art concerning factors that influence bachelor's choice and related topics is quite vast. In 1992, [3] did a survey from 2,497 ninth-grade students and their parents to test the model using LISREL (statistical software for structural regression modeling) regarding family and high school experience influences on the post-secondary educational plan of ninth-grade students. Parents' expectations exerted the strongest influence throughout their model. As well, parents' education, student gender, high school GPA and high school experiences also contributed significantly to explaining students' aspirations.

By using the same software, [4] accomplished a sample of 703 male students and 718 female students while their parents responded to two sets of questionnaires regarding high school experiences and expectations about college. Endogenous variables examined included parents' expectation regarding higher education for their children, parents' savings for college, students' discussion of college with their parents and students' aspiration for post-secondary education. Their model explained 30.8% of the variance in students' aspiration for males and 36.8% for females.

Using a national longitudinal sample of 5,257 young people who were pursuing a bachelor's degree, [5] studied how credits in intensive high school mathematics courses affected their completion versus non-completion of the degree. Finishing one unit in any of four intensive math courses more than doubled the likelihood that participants would later complete their bachelor's degree.

To increase STEM (science, technology, engineering and mathematics) participation studies and careers, some countries have promoted inclusive STEM high schools. [6] compiled higher education records in 23 inclusive STEM high schools and 19 comparison schools without a STEM focus. A key conclusion should be stressed by their analysis: Students overall and from under-represented groups who had attended inclusive STEM high schools were significantly more likely to be in a STEM bachelor's degree program two years after high school graduation. For students who entered two-year colleges, on the other hand, attending an inclusive STEM high school was not associated with entry into STEM majors.

In a recent view, [7] examined the mediating role of STEM-oriented self-efficacy beliefs on the relationship between implicit ability beliefs and STEM intention. Using a Likert-type questionnaire to measure ability beliefs, self-efficacy (individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments) and intention to opt for a STEM degree of secondary school students in their fifth grade (n=483), a positive relation between implicit STEM ability beliefs and the intention to opt for a STEM field bachelor's degree was found. That is, incremental STEM ability beliefs predicted positive self-efficacy beliefs and increased STEM intention.

This perspective is confirmed by. [8] Self-efficacy most strongly influenced graduate school intention: for every one-unit increase in students' self-efficacy, they were over 8 times more

likely to plan to enroll in a master's program and 13 times more likely to enroll in a PhD program, relative to not attending graduate school.

In the context of the United Arab Emirates (UAE), the interest of women in STEM higher education has increased rapidly. Yet, women are globally underrepresented in STEM college programs [9] in Ireland. According to the authors, of the 22% points raw gap, about 13% points is explained by differential subject choices and grades in secondary school. Subject choices are more important than grades:” we estimate male comparative advantage in STEM (as measured by subject grades) explains about 3% points of the gender gap. Additionally, differences in overall achievement between girls and boys have a negligible effect. Strikingly, there remains a gender gap of 9% points even for persons who have identical preparation at the end of secondary schooling. However, this gap is only 4% points for STEM-ready students. We find that gender gaps are smaller among high-achieving students and for students who go to school in more affluent areas.”

The author in [10] endorses these results in Finland and Russia by indicating that there is a traditional gender gap regarding STEM subjects in every dimension, which favors females in biology and males in technology and engineering. STEM stereotypes among students—due to low exposure to STEM professions at school—can explain students’ low interest despite high self-efficacies.

For the evaluation factors affecting the choice of dentistry as a career as well as the choice of future specialty among senior dental students registered in British University of Egypt (BUE), [11] accomplished a questionnaire form during the academic year 2016/2017. Appealing conclusions were stated by these researchers: (A) 67% of the students chose dentistry according to their own will, 20.1% due to family pressure while the remaining 12.9% were due to their high school grades. (B) Fixed prosthodontics was the most favored specialty among the students who aimed for further postgraduate education (23.8%) while endodontics ranked as the second most popular specialty (22.7%) and Oral surgery came in the third rank (11%). (C) There was a statistically significant difference between males and females in choosing fixed prosthodontics as well as oral pathology ($p\text{-value}\leq 0.001$). (D) Based on multiple regression analysis, 67% of their respondents think they were given sufficient inspiration and guidance to decide on future, while 39% of these students were guided by faculty staff members, which constituted the highest influence rather than recommendations from practicing dentists, family members or friends.

In contrast, [12] presents a study in Nigeria to understand postgraduate students’ choice criteria for universities selection. Findings from their study revealed four key factors: the desire to study for a postgraduate degree; the facilities of the University, including its geographical location; the courses on offer; influence of other stakeholders like parents, siblings and friends. For these authors, this influence of stakeholders aligns with the fundamental values in a collectivist culture like Nigeria.

Using self-determination theory, [13] highlight the motivational experiences of seven low-income, first-generation students and their parents on the path to college. Specifically, results showed that students’ self-determination was enhanced when parents were involved in college planning, served as positive examples, set high academic standards early and fostered students’ sense of career volition. Motivation was undermined when families limited students’ choices, did not set clear expectations for college going, provided little feedback or emphasized family obligations.

In many countries, entrance to higher education is determined by the performance of students in secondary school and/or the scores obtained in national exams. The relative weight of these two scores on the admission decision is a relevant policy topic, given its implication on who is admitted to university. By using the dataset of bachelor students from Portuguese higher education institutions with detailed information about their characteristics and past achievement results, [14] measured the academic achievement and reaching the main finding that the scores given by teachers in secondary school are better predictors of subsequent performance than the access exam scores.

To explore the impact of higher education institutions digital marketing on student decision making process became the research focus of. [15] A qualitative research approach was employed in this study through semi-structured interviews, observation and documentation as data collection methods in a large public university in Indonesia. Creswell's analysis model was conducted and carried out inductively and interpreted with sentences that are logical and easily understood. Findings confirm the university marketing management engages with digital media since it has now become a trend in all the businesses around the globe. Mostly, students engage social media to seek information about university before choosing the right one.

At last, the authors in [16] presented a study to investigate the effects of several demographic and academic factors, such as gender, age, nationality, high school major (arts vs science) and high school score, on the academic performance of undergraduate students majoring in statistics in the UAE (142 female and 46 males). The researchers indicate that gender, age and nationality have no significant impacts on the academic performance of undergraduate students in statistics bachelor's degree program, while high school major and high school score do.

3. Institutional Background

The United Arab Emirates is a federation of seven states: Abu Dhabi, Dubai, Sharjah, Ras Al Khaimah, Ajman, Umm Al Quwain and Fujairah. The country's main cities and urban centers are located mainly along its coast. The country is about the size of Austria and it has a population of about 9.9 million people, including expatriates (in 2020). The official language is Arabic, but English is also widely spoken and understood.

Zayed University (ZU) is a public university established in 1998. The university offers 17 majors and 10 minors at undergraduate level and 10 master's degrees.

ZU has both male and female Emirate students. Yet, in Abu Dhabi campus, male and female are on separate campuses whereas the Dubai campus only hosts female students.

4. Analysis of Results

A survey was conducted with 68 female students at first and second year in ZU in Abu Dhabi and Dubai. 53 of the students are bilingual (Arabic and English) and, for the remaining 15, English is the main learning language. All the students are UAE nationals living in Dubai (13) or Abu Dhabi (55), in private (37) or governmental (31) high schools (Fig. 2). Globally, the students hold good marks (mean of 89.5% with a standard deviation of 6.1%). The majority selected a bachelor's in science (47) instead of a bachelor's in arts (21) although their

12th GPA is quite similar. All variables follow a Gaussian distribution (non-significant Kolmogorov - Smirnov p-value).

For the question “Have You Decided Your Major When in High School?” [1–Not sure ... 5-Very sure], the average equals 3.26 leading to the impression that these candidates hold some convictions about their bachelor’s degree to pursue at university level. Yet, the student with high passion presents higher conviction on which degree to pursue and testified by the Pearson correlation of 0.441.

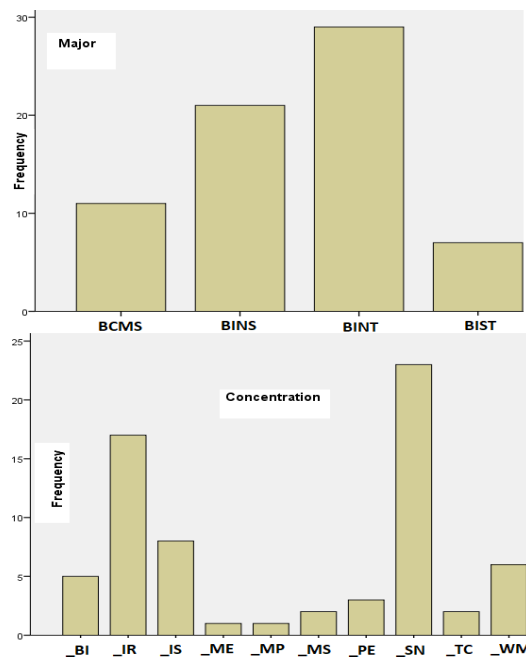


Fig. 2. Frequencies of the 4 bachelor majors (Communication and Media Sciences, Information Systems, Information Technology, International Studies) and 10 concentrations (Business Intelligence, International Relations, Information Systems, Marketing & Entrepreneurship, Media Production, Political Economy, Security and Network, Tourism & Culture, Web & Mobile Development).

Based on the same computation mean, career advancement (4.21), job responsibilities (4.13), alignment with UAE future vision (4.19) and future demand (4.22) are the main powerful factors that these pupils take into consideration when choosing their bachelor. Curiously, career advancement holds a Pearson correlation of 0.418 with the capability to work at home. On the other hand, friends (1.78), workshops (1.53) and expert discussion (1.91) are the least influencers factors of all.

Others descriptive characteristics of this sample follows next: (A) Passion and Internet information averages for the four majors is close to 4.1; (B) With the exception of the Bachelor of Communication and Media Sciences, the capability to work at home is central; (C) For all majors, parents’ advice holds a low influencer ranking of importance; (D) International Studies candidates seek a prestigious career with Business Opportunities features; (E) Only Information and Technology Systems take into consideration the celebrities’ aspect; (F) Dubai students (93%) hold a better 12th grade average than their Abu Dhabi (88%) counter partners. As well, pupils of private high schools (94%) have a high 12th grade mean than government (86%) ones. The independent T-Test certify about this statistical difference for a 95% level of confidence (the Pearson correlation of 12th grade and type of

high schools is -0.442) although this statement is not confirmed when comparing both states with the learning language factor; (H) Flexibility in terms of time and space should also be highlighted for these female UAE youngsters when it comes the choice of their careers.

Several regression attempts were accomplished but no appealing results were achieved apart from the following one: the estimation of the 12th Grade (dependent variable) based on EmiratesResidency and SchoolType (independent variables) holds a fair R^2 of 25.6%: $12\text{Grade} = 0.923 - 0.05 \times \text{SchoolType} + 0.039 \times \text{EmiratesResidency}$. No multicollinearity (VIF) was found among these independent variables and, globally, this is a good model as confirmed by the high F statistics (11.159). All T independent tests for each beta were also significant for a 95% level of confidence. The Durbin-Watson residual test equals 2.117 (no first order correlation). This denotes that student at UAE federal high schools hold, in average, a lower score of 5 points compared with their private institutions. Moreover, Dubai schools' beats Abu Dhabi ones by 3.9 points, in average.

Structured equation modeling (SEM) is a multivariate technique to test and evaluate multivariate causal relationships. Somehow, it is a combination of two statistical methods: confirmatory factor analysis (CFA) and path analysis. CFA has an objective to estimate the latent variables. Path analysis, on the other hand, aimed to find the causal relationship among variables by creating a path diagram. Its evaluation is based on a set of fit indices:

- The acceptable RMSEA (root mean square error of approximation) should be less than 0.06;
- The comparative fit index (CFI) should be close to 0.95 or higher;
- The Tucker-Lewis index (TLI) of >0.90 is considered acceptable;
- CMIN/DF is the minimum discrepancy divided by its degrees of freedom. Ratios between 1 and 3 are considered excellent.

SEM was run to examine the correlations and causal relationships among 5 latent variables (school, bachelors, job features, personal influencers and bachelor choice) and 36 initial observable measures: Degree, Major, Concentration, Desired major, Desired concentration, Match code (Desired VS Reality), 12Grade, Language Education, School type, Emirates residence, Major decision at high school, Passionate, Skills, Career advancement, Work home, Man-woman, Parents advice, Siblings influence, Friends guide, Prestigious, Celebrity, Social media, Income, Business opportunities, Expert discussion, Family discussion, Internet information, Guides-brochures, Workshops, Future demand, Job responsibilities, Flexible, Interviews alumni, Scientific research, Demanding competitiveness and Alignment UAE vision.

As part of CFA, factor loadings (standardized regression weights) were assessed for each item with a 95% significancy. From the original full model, numerous model revisions were performed to fit the model to the given data. In the end, one latent variable (school) and twenty-one input variables were removed due to low factor loadings (less than 0.5).

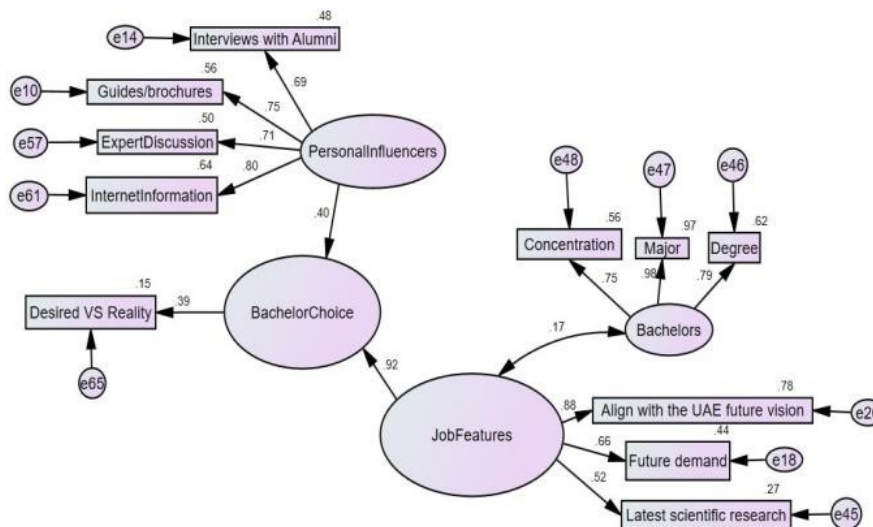


Fig. 3. Structured equation modeling computed by SPSS AMOS 23.

Due to the relative low number of samples (200 is considered the minimum, quite often), the model fitness is not perfect: CMIN/DF=2.85, CFI=0.88, RMSEA=0.09; TLI=0.82. For reference, the upper right percentage associated to each rectangle represents the R^2 , the measure of fitness of the proposed model to the observed data in the context of regression analysis while small circles represent the error associated to each measure.

According to Fig. 3 and attested by the statistical validity indexes of Table 1, three striking inferences can be stated: (A) The school latent variable was removed (p -value>0.05) including Language Education, School type and Emirate's residence observable variables. This signifies that the learning high school environment does not affect the bachelor choice process for these K-12 females; (B) The job inner features are the most noticeable factor regarding which bachelor to apply soon and enroll. At the same time, income and business opportunities, for instance, are not listed as the most prominent consideration by these universities' candidates. Yet, further confirmation on this topic is required; (C) Based on their personal factors, the absence of the parents and sibling variables was, somehow, a surprise because of the solid ties among family members; (D) The relationship between bachelors and jobs profile is quite low (17%) leading the idea that a specific work employment can be full field by a variety of degrees, majors and concentrations.

| | CR | AVE |
|----------------------------|-------|-------|
| PersonalInfluencers | 0.709 | 0.466 |
| JobFeatures | 0.843 | 0.585 |
| Bachelors | 0.881 | 0.715 |

Table 1. Model Validity Measures: The convergent validity (average variance extracted - AVE) should be greater than 0.5.

Regarding the construct reliability (CR), no issues for the present model since all values are greater than 0.7.

5. Conclusions

Knowledge is foundational to technological innovation and development, driving long-term economic growth. Therefore, and to ensure national competitiveness and quality of life, it is central to understand and to continuously adapt and improve the educational and career pathways in countries including the UAE.

The work preference of the students focuses on many different industries and across all sectors of society. Although future levels of career and work satisfaction were not covered here, certainly the right choice of the bachelor at this early life stage of every teenager will help to achieve both aspects. Regarding the main research question, inner personal and external job features influence the decision making of student's bachelors mostly for this population. Therefore, it is essential to help students form a well-informed decision of their major. In fact, the authors have contributed a platform that helps provide information to students desiring to select their major. [17]

Faculty and employers should provide K–12 students, their families and K–12 educators, accurate information about bachelor's degree, both to counter inaccurate stereotypes of the nature of engineering work and the people who do it, for instance, and to prepare students to navigate their education and enter the workforce.

Beyond strong technical skills, more and more employers expect graduates to have experience and competence in professional areas such as creativity and design, oral and written communication, teamwork and leadership, interdisciplinary thinking, business management and entrepreneurship and multicultural understanding. [1] This perspective might answer to the low relationship between bachelors and job profiles for the present model.

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References

- [1] National Academy of Engineering. (2018). *Understanding the Educational and Career Pathways of Engineers*. Washington, DC: The National Academies Press. doi: <https://doi.org/10.17226/25284>
- [2] Lent RW, Brown SD, Hackett G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior* 45:79–122.
- [3] Hossler D, Stage FK. Family and High School Experience Influences on the Postsecondary Educational Plans of Ninth-Grade Students. *American Educational Research Journal* (1992). 29(2):425–451. doi:10.3102/00028312029002425
- [4] Stage, F.K., Hossler, D. Differences in family influences on college attendance plans for male and female ninth graders. *Res High Educ* 30, 301–315 (1989). <https://doi.org/10.1007/BF00992606>. Trusty, J., & Niles, S. G. (2003). High-School Math Courses and Completion of the bachelor's degree. *Professional School Counseling*, 7(2), 99–107. <http://www.jstor.org/stable/42732549>
- [5] Means, Barbara. *Effectiveness of Inclusive STEM High Schools*. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2019-11-29. <https://doi.org/10.3886/E115783V1>
- [6] Van Aalderen-Smeets, SI, Walma van der Molen, JH, Xenidou-Dervou, I. Implicit STEM ability beliefs predict secondary school students' STEM self-efficacy beliefs and their intention to opt for a STEM field career. *J Res Sci Teach*. 2019; 56: 465– 485. <https://doi.org/10.1002/tea.21506>
- [7] Borrego, M., Knight, D.B., Gibbs, K., Jr. and Crede, E. (2018). Pursuing Graduate Study: Factors Underlying Undergraduate Engineering Students' Decisions. *J. Eng. Educ.*, 107: 140-163. <https://doi.org/10.1002/jee.20185>
- [8] Judith M. Delaney, Paul J. Devereux, Understanding gender differences in STEM: Evidence from college applications. *Economics of Education Review*, Volume 72, 2019, Pages 219-238, ISSN 0272-7757, <https://doi.org/10.1016/j.econedurev.2019.06.002>
- [9] Tomperi, P.; Kvivesen, M.; Manshadi, S.; Uteng, S.; Shestova, Y.; Lyash, O.; Lazareva, I.; Lyash, A. Investigation of STEM Subject and Career Aspirations of Lower Secondary School Students in the North Calotte Region of Finland, Norway, and Russia. *Educ. Sci.* 2022, 12, 192. <https://doi.org/10.3390/educsci12030192>
- [10] Noha S. Kabil, Gehan G. Allam, Ola M. Abd El-Geleel, Motivational reasons for choosing dentistry as a professional career & factors affecting specialty choice among final year dental students, *Future Dental Journal*, Volume 4, Issue 2, 2018, Pages 308-313, ISSN 2314-7180, <https://doi.org/10.1016/j.fdj.2018.04.002>

- [11] Adefulu, Adesoga, Farinloye, Temitope and Mogaji, Emmanuel (2019). Factors influencing postgraduate students' university choice in Nigeria. In: Mogaji, Emmanuel, Maringe, Felix and Hinson, Robert Ebo, (eds.) Higher Education Marketing in Africa - Explorations on Student Choice. Springer, Cham, Switzerland (In Press).
- [12] Allison M. Mitchall & Audrey J. Jaeger (2018). Parental Influences on Low-Income, First-Generation Students' Motivation on the Path to College, *The Journal of Higher Education*, 89:4, 582-609, DOI: 10.1080/00221546.2018.1437664
- [13] Cerdeira, JM, Nunes, LC, Reis, AB, Seabra, C. Predictors of student success in Higher Education: Secondary school internal scores versus national exams. *Higher Educ Q.* 2018; 72: 304– 313. <https://doi.org/10.1111/hequ.12158>
- [14] Andriani KUSUMAWATI (2019)," Impact of Digital Marketing on Student Decision-Making Process of Higher Education Institution: A Case of Indonesia", *Journal of e-Learning and Higher Education*, Vol. 2019 (2019), Article ID 267057, DOI:10.5171/2019.267057
- [15] Yousef, D.A. (2019). "Determinants of the academic performance of undergraduate students in statistics bachelor's degree program: A study in an Arabic setting", *Quality Assurance in Education*, Vol. 27 No. 1, pp. 13-23. <https://doi.org/10.1108/QAE-12-2016-0087>
- [16] Kuhail, M. A.; Al Katheeri, H.; and N., Joao, (2021). "MyMajor: Assisting IT students with major selection", *Global Journal of Engineering Education*, WIETE.

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