Understanding the Career Preferences of Computer Engineering Students and Graduates Across the Academic Years

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ABSTRACT

This study explores the career preferences and influencing factors among computer engineering students at Bulacan State University across various academic years. Utilizing a quantitative survey methodology with a sample of 128 students and graduates, the research identifies key determinants shaping students' career decisions, including job market prospects, personal interests, educational offerings, parental and peer influence, and societal factors. Findings reveal that software development, hardware engineering, data analysis, cybersecurity, and game development are the most preferred career paths, while a significant number of students remain uncertain or consider careers outside the field. The study underscores the necessity for holistic career guidance programs, experiential learning opportunities, mentorship, curriculum review, and continuous student support to enhance career readiness and satisfaction. Recommendations aim to foster informed decision-making, optimize career development strategies, and strengthen university-industry linkages to better align student aspirations with labor market demands.

Keywords: Career Preferences, Computer Engineering Students, Alumni, Job Relevance

INTRODUCTION

Career path is defined as the sequence of tasks that leads an individual to achieve career objectives and vision for life. Career paths include assessing your professional goals, present abilities and experience, personal qualities, and areas that need improvement to reach your full potential. Arhin V. (2018) states that organizing career guidance seminars can improve student academic performance by stimulating career awareness and nurturing enthusiasm.

Computer engineering has long been one of the most popular career choices for young aspirants. Through the years, technology continues to rapidly evolve, offering computer engineering numerous career paths and specializations. Due to this, some computer engineering students might struggle to navigate their decisions about career paths. Kras, A. (2022, June 24) defined choice overload as a cognitive impairment that happens when there is an overwhelming number of possibilities available that results in decision fatigue and dissatisfaction with the decision. This study is crucial for the educational institution to understand the student's career preferences to modify the educational programs.

This research aims to: 1) Map the preferred professional careers of computer engineering students from different year levels at Bulacan State University. Through a systematic investigation and analysis, the researchers intend to contribute valuable knowledge in understanding the preferences of the students and their impact on the curriculum of Bulacan State University and 2) Identify if the computer Engineering graduates' career are related to their respective course and program. The objective of this study is not limited to gaining a new perspective but also to assist in the advancement of the computer engineering industry to prove the validity of the 1st goal.

Objectives of the Study

- To be able to identify what are the common career choices among computer engineering students

- To be able to identify what are the different factors students consider in choosing computer engineering as a course.

- To be able to know how the jobs of the graduates of computer engineering is related to their course

- To be able to know how the computer engineering students evaluate the various factors in choosing career preferences?

METHODOLOGY

Research Design

This study will employ the quantitative research approach since it makes it possible to extrapolate research findings from a sample group to the entire population. To accomplish this goal, the researcher created a survey tool and presented it to the research sample. Descriptive research design will cater to the researchers in understanding the career preferences of computer engineering students at all levels as well as graduates at Bulacan State University. Using a descriptive study design, the quantitative data gathered from statistical analysis will be conceptualized. To accurately interpret the statistical results of the Likert-scale survey into descriptive output, the study design must be carefully constructed to guarantee that the results are valid and reliable.

Bulacan State University (BSU) understands the value of upholding the public's trust in the moral standing of authorized research carried out by students. BSU requires that all research be conducted in compliance with all applicable regulations, including those governing authorization letters and consent, as well as ethical standards and conduct. Procedures for obtaining supervisory and advisory approval for research ethics exist at the supervisor, school, and municipal levels for the researchers.

There are important ethical standards we must uphold or stress. First, notify. Assent. The nature, goal, and distribution of the study, the tasks that each responder will be expected to perform, any possible risks or advantages, and the rules of participation—including the participants' ability to withdraw from the study at any time—must all be stated simply and concisely by the researchers. Second, to protect participants' confidentially, their identity and privacy must be protected, together with the privacy of the data they submit. The material that researchers obtain needs to be stored safely. However, researchers must also be transparent and honest about their research efforts. They must negotiate their entry into the research environment. Lastly, researchers need to take into account any possible dangers that may arise from their work, including those involving physical, psychological, professional, or other types of harm.

Participants

The study takes place at Bulacan State University in the computer engineering department at Malolos, Bulacan. The overall sample size for this study will encompass 128: randomly selected students from all levels in the computer engineering department (64) and graduates (64), each student within the population has an equal chance of being selected, ensuring that the sample is not biased towards any particular subgroup. This sample size has been meticulously determined to balance feasibility, resource availability, and the requisite level of statistical power. By selecting a sample of this magnitude, the researchers aim to acquire ample data for comprehensive analysis while considering practical limitations.

The study's respondents were chosen to delve into the career preferences of computer engineering students across various academic years at Bulacan State University through random selection, the researchers aim to gain a holistic understanding of the factors influencing career decisions and how these preferences evolve over time.

Research Instruments

The section provides a tool, technique, or instrument used by the researchers to collect the data in a structured and systematic way.

Since the focus of this study is to assess the course preferences of students at Bulacan State University and with the large population size, it is more appropriate to survey with the use of an online questionnaire or Google Forms.

The researchers will consider using a structured questionnaire as the research instrument. In survey research, structured questionnaires serve as the main measuring tool. Quantitative analysis and the usage of structured questionnaires are closely related. The use of structured questionnaires in social research was very common in the collection of data on quality of life nowadays, which collects demographic information from individuals. In addition, the structured questionnaire is also often used as an assessment tool for psychological and psychiatric tests. (Cheung, 2021). Researchers will use this to ask respondents closed-ended questions. In addition, a large number of participants were given structured questionnaires in an attempt to collect more data about the career preferences of computer engineering students.

Data Gathering Procedure

In this study, the researcher composed a letter to the selected respondents requesting authorization to conduct a survey with them regarding the research being conducted. The researcher randomly chosen from the sixty four computer engineering students and sixty four graduates from Bulacan State University for inclusion in the study. The researcher verified that the questionnaire was dependable and validated after obtaining authorization. To get additional pertinent and essential information, the researchers employ primary data.

In order to collect data, the researchers will manually conduct a survey. They will use an online survey form as their instrument. Throughout the procedure of collecting data, the interview results were kept, evaluated, and interpreted. It was expected that the researchers would come up with findings and offer recommendations for further investigation

Data Analysis Procedure

Following the completion of the data-gathering phase, the obtained data will undergo several critical procedures to guarantee meaningful analysis and interpretation. To assist effective data management and analysis, the data will be methodically collated, sorted, structured, and tabulated. The data that will be collated, sorted, and tabulated will, then, be statistically treated. To get valid results and answer the survey questions given in the study, statistical analytic techniques will be used with the following scale:

- Strongly Agree (SA): 4.00 - 3.51
- Agree (A): 3.50 - 2.51
- Disagree (D): 2.50 - 1.51
- Strongly Disagree (SD): 1.50 - 1.00

Ethical Considerations

To ensure the confidentiality of the respondents in the study, aliases and codes will be used instead of their actual names. Also, the online form that submitted by the respondents does not include their names as well as private or sensitive information. Lastly, all the respondents shall be informed about where their responses will be used, as such, will be solely on this study.

RESULTS AND DISCUSSION

What are the common career choices among computer engineering students?

Table 4.1. Preferred career after graduating as a computer engineer

Choices	Frequency	Percentage
Software developer	15	23.4%

Hardware engineer	14	21.8%
Data Analyst	10	15.6%
Cyber Security Specialist	6	9.3%
Computer Network Architect	2	3.1%
Game Developer	6	9.3%
Others	11	17.1%

The Table above shows insights into the preferred career paths within the field of computer engineering among respondents. Software development emerges as the most preferred career choice, with 23.44% of respondents expressing a desire to pursue this path. Hardware engineering closely follows, garnering interest from 21.88% of respondents, indicating a balanced interest in both software and hardware aspects of computer engineering. Data analysis and cyber security are also popular career choices, with 15.63% and 9.38% of respondents respectively opting for these paths. Game development attracts a notable percentage of respondents at 9.38%, highlighting the appeal of creative and interactive roles within the industry. Additionally, 17.19% of respondents listed other career preferences, including hybrid roles, project management, graphic and web design, as well as uncertainty about their future career path. This diverse range of preferences underscores the multidisciplinary nature of computer engineering and the varied career opportunities it offers, catering to a wide spectrum of interests and skill sets within the field.

What are the factors the respondents consider in choosing computer engineering as a career?

Table 4.2. What are the factors that affected the respondents in enrolling computer engineering program?

Choices	Frequency	Percentage
Teacher's influence	2	3.1%
Parent's Influence	16	25%
Job Market and Opportunities	43	67.2%
Education and Training offered	13	20.3%
Friend's Influence	16	25%
Others	13	20.3%

The table above shows various factors influencing the decision of students to enroll in a computer engineering program. The predominant factor, affecting 67.2% of respondents, is the job market and opportunities, indicating that the majority of students were motivated by the potential for employment and career prospects in the field. Parental influence and friends' influence both played a significant role, each cited by 25% of the respondents, reflecting the impact of close social circles on educational choices. Education and training offered were a deciding factor for 20.3% of the students, suggesting that the quality and availability of academic programs are also critical considerations. Teacher's influence was the least significant, with only 3.1% of respondents

acknowledging it as a factor. Additionally, 20.3% of students listed other reasons such as personal interest, indecision, lack of other options, and being influenced by external pressures or administrative decisions. This diverse range of factors highlights the complex interplay of personal, social, and economic considerations in choosing a computer engineering program.

Table 4.3 Career of Computer Engineers Relation to Course

As a CpE graduate, is your career related to your course?		
Choices	**Frequency**	**Percentage**
Yes	56	12.5%
No	8	87.5%
If not, what is your reason? (skip if your answer from previous question is 'yes')		
Choices	**Frequency**	**Percentage**
Undecided	6	66.7%
I plan to pursue a different career	3	33.3%

Table 4.3 shows insights into the career relations of undergraduate computer engineering graduates. A significant majority of respondents, 87.5%, indicated that their career is related to computer engineering, while only 12.5% expressed a desire to continue in another field. Among those who do not have a career related in computer engineering, 66.7% are undecided about their future career path, reflecting uncertainty and potential exploration of other opportunities. Meanwhile, 33.3% explicitly plan to pursue different careers, suggesting that some students have already identified alternative professional interests.

This data underscores a notable trend where a substantial portion of computer engineering undergraduates are reconsidering their future career paths, highlighting the need for further support and guidance in career planning within this academic discipline.

The responses provided by students who do not plan to pursue a career in computer engineering offer valuable insights into their alternative career aspirations. Several distinct paths are evident from the responses: • Transition to Web Development and E-commerce

• Venturing into Business

• Interest in Cybersecurity

• Exploration of Architecture and Small Businesses

Table 4.4 Evaluation of Various Factors Influencing the Career Preferences

Evaluation	Respondents				Weighted Mean	Descriptive Interpretation
	4	**3**	**2**	**1**		
My preferred career is truly what I want.	21	24	16	3	2.98	Agree
My career originates through my skills and talent.	14	23	20	7	2.68	Agree

The courses offered at the University affect my career preferences.	18	32	11	3	3.01	Agree
My community influences my career choices.	20	29	8	7	2.96	Agree
My career preferences were influenced by my family.	13	22	15	14	2.53	Agree
Friends and relatives influence my career choices.	10	22	20	12	2.46	Disagree
Technological advances and trends affect my career choices.	41	18	5	0	3.56	Strongly Agree
Local demographics affect my career preferences.	20	24	19	1	2.98	Agree

Table 4.4 shows the evaluation of various factors influencing the career preferences of respondents. The weighted mean scores provide insights into the degree of agreement or disagreement with each statement. Overall, respondents tend to agree that their preferred career aligns with their true desires (2.98), indicating a strong sense of personal alignment

with their chosen path. They also agree that their careers originate from their skills and talents (2.68) and that the courses offered at the University significantly affect their career preferences (3.01), highlighting the influence of educational opportunities on career trajectories. Community influence is also acknowledged (2.96), indicating the impact of external factors beyond personal attributes and education. However, while respondents agree that family influences their career choices (2.53), they tend to disagree that friends and relatives significantly shape their preferences (2.46). Notably, respondents strongly agree that technological advances and trends greatly influence their career choices (3.56), reflecting the dynamic nature of the field and the importance of staying abreast of emerging technologies. The influence of local demographics also receives agreement (2.98), suggesting an awareness of regional factors impacting career decisions. Overall, the findings emphasize the multifaceted nature of career decision-making, influenced by personal, social, educational, and environmental factors within the dynamic landscape of the computer engineering field.

CONCLUSION

The research conducted at Bulacan State University delves into the career preferences of computer engineering students, revealing significant insights into the factors influencing their choices and perceptions within the field. The findings highlight a diverse range of influences shaping students' career decisions, emphasizing the multifaceted nature of their considerations.

Career decisions among computer engineering students are primarily influenced by factors such as the job market and opportunities, parental and friends' influence, as well as the quality and availability of education and training offered. Additionally, personal interests, indecision, and external pressures contribute to the complexity of students' decision-making processes.

A notable trend emerges, with a majority of undergraduate computer engineering students expressing uncertainty or plans to pursue different careers outside the field. This underscores the importance of providing comprehensive support and guidance to students exploring alternative career paths.

Despite the varied career preferences within the field of computer engineering, software development emerges as the most preferred career choice, followed closely by hardware engineering, data analysis, cybersecurity, and game development. This diversity reflects the multidisciplinary nature of the field and the wide spectrum of opportunities available to students.

The findings of the study underscored the importance of understanding and addressing the complex interplay of personal, social, and educational factors influencing career decisions among computer engineering students.

RECOMMENDATION

 Upon arriving at the findings and conclusions of the study, the following recommendations are proposed:

- Implement comprehensive career guidance programs within the computer engineering department to provide students with valuable insights into various career paths and opportunities.

- Facilitate internship and experiential learning opportunities in collaboration with industry partners to help students gain practical skills and exposure to different areas of computer engineering.

- Establish mentorship programs where senior students or alumni can provide guidance and support to juniors in exploring career options and navigating challenges.

- Review and enhance the computer engineering curriculum to align it with industry trends and offer elective courses or specializations catering to students' diverse career interests.

- Offer professional development workshops focused on soft skills, career planning, and job search strategies to prepare students for success in the job market

- Establish mechanisms for continuous monitoring of students' career preferences and provide ongoing support to address any challenges they may face in their career journey

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