An Assessment of Nueva Ecija University of Science and Technology (NEUST) Civil Engineering Students' Understanding of Engineering Software: A Case Study

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Abstract— **Mastery of structural engineering software is essential for college students studying Civil Engineering, especially at universities such as NEUST (Nueva Ecija University of Science and Technology). This study focuses on the crucial component of comprehending civil engineering software among students in the Civil Engineering curriculum. The Civil Engineering curriculum at NEUST is designed to provide students with a thorough understanding and proficiency in the area. Mastery of structural engineering software is a crucial ability that students must possess in order to succeed in their academic studies and future professional efforts. This research used a case study methodology to assess the current degree of comprehension among NEUST Civil Engineering students about structural engineering software. The project seeks to collect detailed insights into students' experiences and perceptions by conducting questionnaires, interviews, and maybe hands-on assessments. The analysis will primarily aim to identify the strengths, shortcomings, obstacles, and potential for improvement in students' proficiency in using structural engineering software. The results are expected to guide improvements to NEUST's Civil Engineering program, namely by making changes to the curriculum, teaching methods, and resource allocation to better meet the learning needs of students in this important field. Furthermore, the results of this study may have wider ramifications for the field of civil engineering education, offering significant insights into efficient approaches for instructing and acquiring knowledge in structural engineering software inside the academic domain.**

***Index Terms*— Civil Engineering software, Student Proficiency, Engineering software training, Engineering education.**

1. Introduction

In the dynamic field of civil engineering, the integration of technology and software have become increasingly vital for efficient project management, design, and analysis. Knowledge and understanding in civil engineering software are essential skills for students pursuing careers in this discipline. Civil engineering software plays a crucial role in facilitating various tasks such as structural analysis, design of infrastructure, and construction management. However, the effective utilization of these software tools require not only access to the technology but also a comprehensive understanding of their functionalities and applications within the context of civil engineering projects.

This research focuses on evaluating the knowledge and understanding of NEUST civil engineering students in utilizing relevant civil engineering software. By conducting a case study, we aim to delve into the students' experiences, challenges, and perceptions regarding the use of these software tools in their academic pursuits and future professional endeavors. Understanding the strengths and weaknesses of students' proficiency in civil engineering software is paramount for curriculum enhancement and ensuring graduates' readiness for the demands of the industry. Additionally, insights gained from this study can inform educational strategies and interventions to better equip students with the necessary skills to excel in the field of civil engineering.

This study aims to assess the comprehension and proficiency levels of civil engineering students at Nueva Ecija University of Science and Technology (NEUST) regarding civil engineering software. Through this assessment, we endeavor to contribute valuable insights into the effectiveness of current educational practices in fostering proficiency in civil engineering software among students, ultimately aiming to bridge any existing gaps and enhance the quality of civil engineering education at NEUST.

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2. Review Of Related Literature

Despite a lot of educational research and studies proving its inefficacy, the "chalk and talk" method of teaching is still widely used as the primary way of teaching in some schools and universities, making students solely rely on the teacher's presentation and words, like watching a movie in a cinema. This pedagogy is still utilized in some higher education settings where actual application is a must, like civil engineering, where students are taught structural analysis theories and the behavior of typical building materials through lectures (Mills, 2002). However, this way of teaching in such a program leaves students clueless about other possibilities and applications in the actual field of engineering, where the actual is completely different from the theoretical approach that has been taught to them in school. This leaves the question of how well-prepared and ready these future professionals will be once they complete that degree. Are they aware enough of existing technologies, such as structural engineering software, that they can use once they get a job? This study aims to answer these questions.

The integration of civil engineering design software into the curriculum has been suggested as a way to improve learning and increase students' career success, as some courses, like civil engineering, do not lend themselves to traditional teaching methods. In one of the studies conducted by the University of Hartford in the United States (2019), this is one of the concerns that they realize they need to pay attention to. The University's College of Engineering, Technology, and Architecture gathered academics, business leaders, alumni, and advisory board members for a workshop to discuss and develop ideas on the broad subject of improving their graduates' preparedness for the workforce. They ended up with a conclusion of making the students familiar with the computerized design tool which is usually used in the actual field. These tools include software for modeling, analysis, design, and drafting (ASEE, 2019). The university's faculty of civil engineering then later agreed to the suggestions from the stakeholders to allow them to improve and differentiate their program and give their graduates a competitive edge over the others by incorporating computer-aided design and drafting (CADD) tools into their four-year curriculum. The university chose Civil3D as the CADD platform and will teach it to the university's College of Engineering, Technology, and Architecture. After the session was over, the teachers asked their students for comments and to rate their level of competence both before and after the program. The result shows that the students' proficiency in Civil3D software has improved. Before the program was implemented, 61% of the respondents said that they had no experience at all with using the said software, 22% had basic knowledge, and 17% were skilled. After finishing the program, only 11% said that they had no experience using it, giving us the insight that the program helped the students to be more aware and proficient with the engineering software. Those who have basic skills have increased from 22% to now 50%, and those who are skilled have increased to 39%. These data give us an insight into why the students in the civil engineering curriculum are less aware of the software that is used in the actual field if it is not taught in the school. These should open our eyes and help us realize that it is not enough to make a student graduate but also to help them be career-ready once they finish their degree.

Another study conducted by Yanti et al. (2023) also aims to assess the proficiency of civil engineering students at the University Muhammadiyah of Aceh in using Auto-Computer-Aided Design (AutoCAD). Unlike the University of Hartford, the University Muhammadiyah of Aceh has already realized the importance of using and implementing engineering software like AutoCAD for its students, as it gives additional skills to the graduates they will produce. The result of this study shows that out of 74 respondents, 46% got high mastery, 13% got very high mastery, 7% got both low and medium mastery, and 27% got very low mastery for the said software. With such distributions, it can be concluded that the students of the University Muhammadiyah of Aceh showcase proficiency in using AutoCAD. Also, based on the final assessment done, 66% of the university's students passed and 34% failed. But those who failed the course didn't pass not because they were not proficient in AutoCAD but because of other factors like attendance, assignments, midterms, and final term examinations. This study concluded that the students are well aware and competent enough to use engineering software like AutoCAD because it is part of their curriculum. This is helpful because they are not only learning theoretical skills but also learning new skills that they can apply in the real-world scenario of the civil engineering field.

3. Methodology

A. Research Design

The study utilizes a quantitative approach to evaluate and analyze the challenges relevant to assessing civil engineering students' understanding of engineering software. The descriptive research design is centered on gathering and evaluating the characteristics of the student population by measuring the responses to questionnaires. The knowledge, understanding and experiences of students about the use of engineering software tools in their studies are reflected in these questionnaires.The method emphasizes quantitative analysis above qualitative implications, especially focusing on discovering meanings within numerical data acquired from student replies. Students will be given questionnaires as part of an organized data collection strategy. For this reason, a quantitative strategy is used for this research.

Additionally, in order to clarify the significance and administration of civil engineering software competency among students, a descriptive approach is appropriate. Hence, descriptive quantitative research is suitable for the study, considering the advantages of producing substantial information and data that can be utilized for future research or hypothesis development. Additionally, the quality and integrity

of the data will be secured through conducting the research in the natural academic environments of the students.

B. Research Locale

The study will be conducted at Nueva Ecija University of Science and Technology (NEUST), particularly within the Civil Engineering department.

C. Population and Sampling

The study focuses on assessing the understanding of engineering software among civil engineering students at NEUST, specifically targeting third year, fourth year and fifth-year students. This selection is based on the premise that these higher-level students have a stronger foundation in structural theories compared to first year and second-year students. A simple random sampling technique will be applied to select participants from the third year, fourth year and fifth year student population. This approach ensures high internal validity by minimizing potential confounding variables and high external validity by representing the characteristics of the larger student population. Additionally, the student population will be categorized as follows: "third year" for juniors, "fourth year and fifth year" for seniors. This classification aligns with standard academic terminology and provides clarity in participant selection.

D. Research Instrument

The survey questionnaire for assessing NEUST Civil Engineering students' understanding of engineering software was meticulously designed to gather insights into various aspects of their experiences and perceptions regarding the utilization of such software in their academic endeavors. Upon distribution of the questionnaire (through Google Forms), students were prompted to provide demographic information, including gender, age, academic year, and the number of semesters completed in their civil engineering program. Subsequently, the questionnaire delved into students' experience with engineering software, inquiring whether they had received formal training or coursework related to such software as part of their program, and if so, specifying the software(s) they were trained on.

The survey further explored students' usage patterns of engineering software for academic purposes, including frequency of use, specific software used, and their confidence level in using these tools. Students were also asked to express their opinions on the importance of understanding engineering software for civil engineering students, the effectiveness of current teaching methods in this regard, as well as any challenges encountered and suggestions for improvement. Additionally, preferred learning methods for acquiring proficiency in engineering software were explored, along with students' perceptions of the importance of software proficiency for their future careers as civil engineers and their encounters with job postings or internship requirements related to engineering software skills.

The questionnaire concluded with inquiries regarding students' preferences and familiarity with specific engineering software, the availability of support and resources for learning and using such software effectively, and an opportunity for additional comments. Responses from the survey were transcribed and analyzed to gain comprehensive insights into NEUST Civil Engineering students' understanding and proficiency in engineering software within the context of their academic studies.

E. Data Collection

The data collection process for the assessment of NEUST Civil Engineering students' understanding of engineering software followed a straightforward and systematic approach, aligning with the quantitative nature of the study. Upon completion of the survey questionnaires, the responses were tabulated and analyzed to quantify students' perceptions, experiences, and proficiency in using engineering software. Each response was categorized according to the respective question it addressed. Subsequently, a percentage technique was employed to calculate the distribution of responses for each question. This involved determining the proportion of respondents who selected each option (e.g., "Yes," "No," or multiple-choice options) and expressing it as a percentage of the total number of respondents.

The obtained data were then presented graphically to provide a visual representation of the distribution of responses. Graphs such as bar charts or pie charts were utilized to illustrate the percentage breakdown of responses for each question. By plotting the data on graphs, patterns and trends in students' understanding and experiences with engineering software could be easily identified and interpreted. This graphical representation facilitated a clear understanding of the findings and enhanced the communication of results to stakeholders involved in the assessment process.

F. Data Analysis

The data collected from the survey questionnaires, which captured the responses of NEUST Civil Engineering students regarding their understanding of engineering software, underwent statistical analysis using the percentage technique. This method was chosen for its suitability in quantifying and calculating the knowledge gathered in the study based on the responses of the participants. The percentage technique facilitated the measurement of the average percentage corresponding to each detailed answer provided by the respondents for individual questions. This involved applying the formula:

$$\% = F/N \times 100$$

Where:

- % represents the percentage.
- F denotes the frequency of a specific response.
- N represents the total number of respondents.

By applying this formula, the proportion of respondents selecting each response option for a given question was calculated as a percentage of the total number of participants. This allowed for a standardized and quantitative analysis of the data, enabling comparisons and identification of trends across different variables.

The utilization of the percentage technique facilitated a comprehensive understanding of the distribution of responses and the overall perceptions of NEUST Civil Engineering students regarding their understanding of engineering software. This analytical approach ensured that the findings were systematically interpreted and accurately reflected the insights gleaned from the survey data.

4. Results And Discussion

A. Presentation, Analysis, and Interpretation of Data

1) Demographic Information

For this study, Table 1 presents the demographic breakdown of the survey responses obtained from 110 individuals out of a total population of 999, indicating a response rate of approximately 11.0%. While the sample size has increased, it still reflects challenges such as limited resources and maintaining a high response rate. Focusing on civil engineering students, the survey prioritized data quality over quantity to ensure representativeness within the target demographic. Time constraints and ethical considerations influenced the decision to maintain a manageable sample size for efficient and ethical data collection.

Gender distribution among respondents was nearly equal, with 53 female respondents (48.2%) and 57 male respondents (51.8%). Regarding age distribution, most respondents were 21 years old (46, 41.8%), followed by 20-year-olds (17, 15.5%) and 22-year-olds (20, 18.2%). Academic year distribution showed a majority in their third year, with 66 respondents (60%), followed by 21 respondents (19.1%) in their fourth year, and 23 respondents (20.9%) in their fifth year, indicating a higher level of engagement among students in the earlier years of their academic journey.

Table 1: Demographic Breakdown of Survey Responses

Demographic	Number of Respondents	Percentage
Gender		
Female	53	48.2%
Male	57	51.8%
Age		
19 years old	2	1.8%
20 years old	17	15.5%
21 years old	46	41.8%
22 years old	20	18.2%
23 years old	15	13.6%
24 years old	9	8.2%
27 years old	1	0.9%
Academic Year		
Third Year	66	60%
Fourth Year	21	19.1%
Fifth Year	23	20.9%

Despite the increase in sample size, the data continues to offer valuable insights into NEUST civil engineering students' understanding of engineering software, contributing to ongoing research and educational initiatives within the field.

The demographic data showcases a balanced gender distribution among respondents, indicating a representative sample from the civil engineering student population. This balance fosters inclusivity and ensures diverse perspectives in the survey findings. Regarding age distribution, while the majority falls within the 21-year-old category, there's a notable spread across different age groups, reflecting the program's diverse student body. Additionally, the distribution across academic years reveals that a significant proportion of respondents are in their third year, suggesting that the survey captures the perspectives of students at various stages of their academic journey.

2) Usage of Engineering Software

In this table, it shows insights into the usage patterns and confidence levels of NEUST civil engineering students regarding engineering software for academic purposes. AutoCAD emerges as the most widely used software, followed by SketchUp and Microsoft Excel, indicating a strong reliance on these tools for various tasks such as drafting, modeling, and data analysis. Weekly usage frequency predominates, suggesting consistent engagement with this software throughout the academic term. However, a noteworthy portion of respondents also reported daily usage, highlighting the integral role of engineering software in their academic activities. In terms of confidence levels, most respondents expressed a moderate level of confidence, indicating a generally positive perception of their proficiency in using engineering software. These findings provide valuable insights for curriculum development and support initiatives aimed at enhancing students' proficiency in engineering software.

Table 2.1: Usage of Engineering Software

Question 1: Which engineering software have you used for academic purposes?		
Software	**Number of Votes**	**Percentage**
AutoCAD	106	96.4%
SketchUp	67	60.9%
Revit	42	38.2%
Microsoft Excel	60	54.5%
STAAD.Pro	7	6.4%
SW Truss	10	9.1%
BeamDesign	9	8.2%
Others		
Trussanalysis.com	1	0.9%
Autodesk Robot Structural Analysis	1	0.9%
Autodesk CFD	1	0.9%

MIDAS	1	0.9%
QGIS HEC-Ras	1	0.9%

Table 2.2: Frequency of Using Engineering Software

Question 2: How frequently do you use engineering software for academic purposes?

Frequency	Number of Respondents	Percentage
Daily	11	10.0%
Weekly	64	58.2%
Monthly	15	13.6%
Rarely	20	18.2%

Table 2.3: Confidence Level in Using Engineering Software

Question 3: On a scale of 1 to 5, please rate your confidence level in using engineering software for academic purposes, with 1 being not confident at all and 5 being very confident.

Confidence Level	Number of Respondents	Percentage
1	1	0.9%
2	11	10.0%
3	70	63.6%
4	25	22.7%
5	3	2.7%

These findings offer valuable insights into the software usage patterns and confidence levels of NEUST civil engineering students, which can inform educational strategies and support initiatives aimed at enhancing students' proficiency in engineering software

The analysis of engineering software usage among respondents highlights the widespread adoption of essential tools such as AutoCAD, SketchUp, Microsoft Excel, and Revit for academic purposes. While this software are integral to civil engineering coursework, less common tools like STAAD.Pro, SW Truss, and BeamDesign are also utilized, albeit to a lesser extent.

In terms of frequency, a majority of respondents report using engineering software on a weekly basis, indicating its consistent application in their academic endeavors. However, usage frequencies vary, with some using these tools daily, monthly, or rarely.

The confidence levels in using engineering software also vary among respondents, with a significant proportion rating their confidence at a moderate level. This suggests a solid foundation in software proficiency but also indicates room for improvement and further skill development.

Overall, the data underscores the diverse software preferences, usage patterns, and confidence levels among civil engineering students, providing valuable insights into their academic experiences and needs.

3) Experience with Engineering Software

In this table, we examine the experience of NEUST civil engineering students with engineering software, focusing on their formal training or coursework related to such software within their academic program. The results indicate that a slight majority of respondents (46.4%) reported not receiving any formal training or coursework related to engineering software as part of their civil engineering program at NEUST. This suggests a potential gap in the curriculum or a lack of emphasis on practical software skills within the academic program. However, it's encouraging to note that a significant portion of respondents (53.6%) did report receiving formal training or coursework related to engineering software, indicating that efforts are being made to incorporate such training into the curriculum.

Among those who received formal training, the majority (75.6%) reported being trained on AutoCAD only, while a smaller percentage (1.8%) reported being trained on Revit, 10.8% on both AutoCAD and Revit, 3.6% on AutoCAD and Excel, and 1.8% on AutoCAD, Revit, and SketchUp. This highlights the prevalence of AutoCAD as a fundamental software tool in civil engineering education, with other software being less commonly included in formal training programs. These findings underscore the importance of evaluating and potentially expanding the inclusion of engineering software training within the civil engineering curriculum to ensure that students are adequately prepared for the demands of the field.

Table 3: Experience with Engineering Software

Question 1: Have you received any formal training or coursework related to engineering software as part of your civil engineering program at NEUST?

Response	Number of Respondents	Percentage
Yes	51	46.4%
No	59	53.6%

Question 2: If yes, please specify the software(s) you have been trained on:

Software(s)	Number of Votes	Percentage
AutoCAD	43	75.6%
Revit	1	1.8%
AutoCAD and Revit	6	10.8%
AutoCAD and Excel	2	3.6%
AutoCAD, Revit and SketchUp	1	1.8%

These findings provide insights into the extent of formal training or coursework related to engineering software within the civil engineering program at NEUST, highlighting areas where additional training or support may be beneficial for students.

The data from respondents at NEUST indicates that a considerable number of civil engineering students have undergone formal training or coursework specifically related to engineering software as part of their academic program. This suggests that the curriculum at NEUST recognizes the importance of software proficiency in the field of civil

engineering and has incorporated relevant training into the coursework.

Among those who have received training, AutoCAD emerges as the most frequently mentioned software, with a significant majority of respondents indicating they have been trained on it. AutoCAD is widely used in civil engineering for drafting and design purposes, making it a fundamental tool for students in the discipline.

4) Perceived Importance and Effectiveness

In this table, we explore NEUST civil engineering students' perceptions regarding the importance of having a good understanding of engineering software and the effectiveness of current teaching methods in their civil engineering program. The results indicate that the majority of respondents (95.5%) perceive it as important or extremely important for civil engineering students to have a good understanding of engineering software. Specifically, 61.8% of respondents considered it extremely important, followed by 31.8% who rated it as very important, while only a small percentage (5.5%) perceived it as moderately important. These findings underscore the significant value placed on proficiency in engineering software within the civil engineering field, reflecting its crucial role in various aspects of civil engineering practice.

Regarding the effectiveness of current teaching methods in teaching engineering software, most respondents (70.9%) rated the methods as very effective or extremely effective. Specifically, 47.3% of respondents considered the methods very effective, followed by 23.6% who rated them as extremely effective. Additionally, 22.7% of respondents found the methods moderately effective, indicating a substantial proportion of students who perceive current teaching approaches positively. However, a small percentage (6.4%) rated the methods as only slightly effective. These findings suggest that while there is a generally positive perception of the effectiveness of current teaching methods, there may still be room for improvement to address the needs and preferences of all students effectively.

Table 4: Perceived Importance and Effectiveness

Question 1: How important do you think it is for civil engineering students to have a good understanding of engineering software?		
Importance Level	**Number of Respondents**	**Percentage**
Extremely important	68	61.8%
Very important	35	31.8%
Moderately important	6	5.5%
Not important at all	1	0.9%
Slightly important	0	0%

Table 4: Perceived Importance and Effectiveness

Question 2: In your opinion, how effective are the current methods (e.g., lectures, workshops, tutorials) in teaching engineering software within your civil engineering program at NEUST?		
Effectiveness Level	Number of Respondents	Percentage
Extremely effective	26	23.6%
Very effective	52	47.3%
Moderately effective	25	22.7%
Slightly effective	7	6.4%
Not effective at all	0	0%

These findings offer valuable insights into the perceived importance of engineering software proficiency and the effectiveness of current teaching methods among NEUST civil engineering students, which can inform curriculum development and instructional strategies aimed at enhancing students' skills and learning experiences.

Respondents overwhelmingly recognize the critical importance of engineering software skills, with a significant majority considering proficiency in these tools as extremely important. This collective perception underscores the pivotal role of software proficiency in academic and professional success within the civil engineering field.

Additionally, the favorable perception of current teaching methods, particularly the high effectiveness ratings for lectures, workshops, and tutorials, suggests that existing instructional approaches effectively equip students with the necessary software competencies.

B. Preferred Learning Methods

In this table, we explore the preferred learning methods of NEUST civil engineering students for acquiring proficiency in engineering software. The results provide insights into the effectiveness of various learning approaches in facilitating students' skill development in this domain. Among the respondents, tutorials emerged as the most favored learning method, with 82.7% indicating its effectiveness. Tutorials offer a structured approach to learning, providing step-by-step guidance and practical exercises to reinforce understanding, making them highly valued by students. Workshops also garnered significant support, with 67.3% of respondents recognizing their effectiveness. Workshops provide opportunities for hands-on learning and interactive instruction, allowing students to apply theoretical concepts in a practical setting, which enhances their comprehension and retention of engineering software skills. Additionally, lectures were considered effective by 56.4% of respondents, suggesting that traditional classroom instruction still plays a valuable role in supplementing students' learning experiences.

Hands-on projects were favored by 60.9% of respondents, highlighting the importance of practical application and experiential learning in acquiring proficiency in engineering

software. These projects provide opportunities for students to engage with real-world problems and challenges, fostering creativity, problem-solving skills, and independent learning. Peer collaboration, although less commonly endorsed compared to other methods, was still valued by 38.2% of respondents. Collaborative learning allows students to exchange ideas, share insights, and learn from one another's experiences, promoting a supportive and interactive learning environment. A precise teaching method with videos was mentioned as "other" and received 0.9% of the votes.

Self-paced online courses received comparatively lower endorsement, with only 16.4% of respondents considering them effective. While online courses offer flexibility and accessibility, they may lack the hands-on, interactive elements that are crucial for mastering engineering software.

Table 5: Preferred Learning Methods

Question: Which learning methods do you find most effective for acquiring proficiency in engineering software?		
Learning Method	**Number of Votes**	**Percentage**
Lectures	62	56.4%
Workshops	74	67.3%
Tutorials	91	82.7%
Self-Paced online courses	18	16.4%
Hands-on projects	67	60.9%
Peer collaboration	42	38.2%
Other	1	0.9%

These findings provide valuable insights into the preferred learning methods of NEUST civil engineering students for acquiring proficiency in engineering software, which can inform instructional strategies and curriculum design to better meet students' learning needs and preferences.

Analysis of preferred learning methods reveals a strong preference for interactive and hands-on approaches, with tutorials and workshops emerging as the most effective modalities for acquiring proficiency in engineering software. This preference underscores the value of experiential learning and collaborative environments in fostering deep understanding and skill acquisition, aligning with pedagogical approaches that prioritize active engagement and practical

C. Future Career Preparation

In this table, we explore NEUST civil engineering students' perceptions regarding the importance of proficiency in engineering software for their future career as civil engineers and their encounters with job postings or internship requirements mentioning this skill. The results shed light on the significance of engineering software proficiency in the context of students' career preparation and the alignment between academic training and industry expectations.

Proficiency in engineering software is deemed crucial for future career success by the majority of respondents, with 91.8% considering it important (57.3% extremely important and 34.5% very important). This emphasizes the essential role that engineering software plays in the contemporary civil engineering profession. Given the increasing reliance on technology and computer-aided design in the industry, proficiency in engineering software is perceived as a foundational skill that enhances employability and competitiveness in the job market. The high percentage of respondents rating proficiency in engineering software as extremely important underscores the recognition of its significance for future career prospects among NEUST civil engineering students.

Furthermore, a considerable proportion of respondents (68.2%) have encountered job postings or internship requirements that specifically mention proficiency in engineering software as a desired skill. This finding reflects the industry's expectations and the growing demand for civil engineers who possess technical expertise in utilizing engineering software tools. The prevalence of such requirements highlights the importance of integrating comprehensive training in engineering software within civil engineering education to ensure that students are adequately prepared to meet the demands of the workforce upon graduation.

Table 6: Future Career Preparation

Question 1: How important do you believe proficiency in engineering software is for your future career as a civil engineer?		
Importance Level	**Number of Respondents**	**Percentage**
Extremely important	63	57.3%
Very important	38	34.5%
Moderately important	8	7.3%
Slightly important	1	0.9%
Not important at all	0	0%
Question 2: Have you encountered any job postings or internship requirements that specifically mention proficiency in engineering software as a desired skill?		
Response	**Number of Respondents**	**Percentage**
Yes	75	68.2%
No	35	31.8%

These findings underscore the importance of proficiency in engineering software for future career readiness among NEUST civil engineering students and highlight the relevance of aligning academic training with industry expectations to ensure graduates' employability and success in the workforce.

The data on the perceived importance of software proficiency for future careers emphasizes the critical role of engineering software skills in preparing civil engineering students for the workforce. The overwhelming majority of respondents

acknowledge the significance of these skills, recognizing them as essential for navigating the demands of the professional landscape. Furthermore, the high percentage of respondents encountering job postings or internship requirements mentioning software proficiency underscores the alignment between academic training and industry expectations, emphasizing the practical relevance of software proficiency in career advancement.

D. Software Preference and Familiarity

In this table, we explore the software preferences and familiarity of NEUST civil engineering students, focusing on the software they are most comfortable using. The results provide insights into the students' proficiency and preferences regarding engineering software tools, which are essential for their academic and professional endeavors.

AutoCAD emerges as the preferred software among NEUST civil engineering students, with a significant majority of respondents (72.7%) indicating that they are most comfortable using it. AutoCAD's widespread adoption in the field of civil engineering, particularly for drafting and design tasks, likely contributes to its popularity among students. Its intuitive interface and extensive features make it a versatile tool for various engineering applications, explaining its prominence as the preferred software choice.

While AutoCAD dominates as the most comfortable software choice, a smaller percentage of respondents also expressed familiarity with other software tools. Revit, a Building Information Modeling (BIM) software, was favored by 11.8% of respondents, highlighting its importance in modern architectural and construction practices. SketchUp, known for its ease of use in 3D modeling, was preferred by 10.9% of respondents, indicating its relevance for visualization tasks in civil engineering projects. Microsoft Excel, although not specialized for engineering tasks, was chosen by 4.5% of respondents, showcasing its utility for data analysis and management within the engineering context.

It's noteworthy that no respondents indicated familiarity with STAAD.Pro, SW Truss, BeamDesign, or other software options provided in the survey. This suggests that while AutoCAD remains the dominant software choice among NEUST civil engineering students, there may be opportunities to introduce and promote other specialized engineering software tools to enhance students' skill sets and prepare them for diverse industry demands.

Table 7: Software Preference and Familiarity

Question: Which software are you most comfortable using?		
Software	**Number of Respondents**	**Percentage**
AutoCAD	80	72.7%
Revit	13	11.8%
SketchUp	12	10.9%
Microsoft Excel	5	4.5%
STAAD.Pro	0	0%
SW Truss	0	0%
BeamDesign	0	0%
Other	0	0%

These findings provide valuable insights into the software preferences and familiarity of NEUST civil engineering students, which can inform curriculum design and software training initiatives to better align with students' needs and preferences.

AutoCAD is the most popular program among respondents, indicating its extensive adoption and use in the civil engineering field. The familiarity with AutoCAD shows that it is a fundamental tool for design and drafting. While other software solutions earn relatively low preference, their inclusion sheds light on the heterogeneous software ecosystem seen by civil engineering students, showing varying levels of exposure and familiarity across different platforms.

E. Support and Resources

In this section, we examine the perceived availability of resources and support for learning and using engineering software effectively within the civil engineering program at NEUST. The results offer insights into students' satisfaction with the support structures in place and highlight areas where improvements may be needed to enhance the learning experience.

Most respondents (54.5%) indicated that they feel there are sufficient resources and support available to help them learn and use engineering software effectively. This suggests that a significant portion of students perceive adequate support from the institution in acquiring and mastering software skills essential for their academic and professional development. The availability of resources such as computer labs, software licenses, instructional materials, and faculty support may contribute to students' positive perception of the support system.

However, it is concerning that a notable minority of respondents (11.8%) expressed dissatisfaction, feeling that there are insufficient resources and support available. This indicates potential gaps or limitations in the current support structures within the civil engineering program, which may hinder students' ability to fully engage with and benefit from software-related learning opportunities. Addressing these concerns and providing additional support where needed is essential to ensure that all students have equitable access to the resources and assistance necessary for their academic success.

Furthermore, a significant proportion of respondents (33.6%) were unsure about the adequacy of resources and support available to them. This uncertainty may reflect a lack of clarity or communication regarding available resources, or it could indicate that students have not fully explored or utilized the support services provided. Improving transparency and communication about available resources and support channels

can help alleviate uncertainty and empower students to seek assistance when needed.

Overall, these findings underscore the importance of continuously evaluating and enhancing support mechanisms for software learning within the civil engineering program at NEUST. By addressing students' concerns and ensuring the availability of comprehensive support resources, the institution can better facilitate students' acquisition of engineering software skills and promote their academic success.

Table 8: Support and Resources

Question: Do you feel that there are sufficient resources and support available to help you learn and use engineering software effectively within your civil engineering program at NEUST?		
Response	**Number of Respondents**	**Percentage**
Yes	60	54.5%
No	13	11.8%
Unsure	37	33.6%

These findings provide valuable insights into students' perceptions of the support and resources available for learning and using engineering software within the civil engineering program at NEUST, highlighting opportunities for improvement and optimization.

Analysis of respondents' impressions of available resources and assistance suggests a positive perspective, with the majority expressing trust in the adequate resources to support their study and use of engineering software within the civil engineering curriculum. This notion of adequate support emphasizes the role of institutional resources and faculty aid in enabling student learning and skill development in software applications. However, the presence of doubt among certain respondents implies that resource allocation and support systems could be improved to guarantee fair access and greater learning experiences for all students.

5. Conclusion

In conclusion, the survey provides valuable insights into various aspects of civil engineering students' experiences with engineering software at NEUST. The demographic analysis reveals a balanced representation of gender and a diverse distribution across age groups and academic years, highlighting the inclusive nature of the sample. The findings underscore the significant role of engineering software in academic pursuits, with AutoCAD and Microsoft Excel emerging as prominent tools used frequently by students. While many respondents have received formal training in software, disparities in exposure suggest the need for equitable access to educational resources. The collective recognition of the critical importance of software skills for future careers underscores the alignment between academic training and industry demands. Furthermore, preferences for interactive learning methods emphasize the value of hands-on approaches in skill acquisition. Despite variations in software familiarity, AutoCAD remains the preferred choice among respondents, reflecting its widespread adoption in the field. Overall, the positive perception of available resources and support indicates the institution's commitment to facilitating effective learning experiences. These insights can inform curriculum development, instructional strategies, and resource allocation to better equip civil engineering students with the necessary software competencies for success in their academic and professional endeavors.

A. Recommendation

Based on the assessment of NEUST civil engineering students' understanding of engineering software, the following recommendations are proposed to improve overall performance efficiency and effectiveness:

- Formal Training Sessions on Engineering Software: Incorporate formal training sessions on engineering software applications into the curriculum. This will provide students with practical skills and enhance their proficiency in utilizing essential tools relevant to their field.
- Curriculum Enhancement with Online Communication Tools: Integrate online communication tools into the curriculum to facilitate collaboration and streamline communication among students and faculty. By incorporating these tools early on, students can develop essential digital communication skills vital for their future careers.
- Feedback Mechanism: Establish a feedback mechanism to assess students' understanding of engineering software. Regular surveys or assessments can help identify areas for improvement and tailor training programs accordingly.
- Seminars and Workshops on Software: Host seminars and workshops led by industry experts to supplement formal training on engineering software. These sessions can provide students with insights into real-world applications and best practices.
- Continuous Improvement: Treat the integration of engineering software learning as an ongoing process. Continuously review and update the curriculum to ensure alignment with industry standards and emerging technologies, thereby preparing students to effectively navigate modern engineering practices.

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