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Assessment of AutoCAD Training Exposure and Self Perceived Proficiency Among UTHM Graduates

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Abstract

AutoCAD is a widely used Computer-Aided Design (CAD) application in engineering and technical disciplines. However, the level of AutoCAD proficiency among graduates may vary depending on the extent of AutoCAD training they received during their studies. This study aimed to determine the level of self-perceived AutoCAD proficiency, analyse the relationship between AutoCAD training exposure and self-perceived AutoCAD proficiency, and propose strategies for enhancing AutoCAD teaching and learning. The study involved UTHM graduates who completed their studies between 2022 and 2025. A quantitative cross-sectional survey design was employed, and data were collected using a structured questionnaire distributed through Google Forms. A total of 231 valid responses were analysed using IBM SPSS Statistics Version 27. The findings indicated that respondents had a moderate level of AutoCAD training exposure (mean = 3.5615) and a moderate level of self-perceived AutoCAD proficiency (mean = 3.5798). Furthermore, respondents demonstrated a moderate level of agreement with the proposed strategies for enhancing AutoCAD teaching and learning (mean = 3.5671). Spearman's rank correlation analysis revealed a statistically significant and strong positive relationship between AutoCAD training exposure and self-perceived AutoCAD proficiency ($r = 0.770$, $p < 0.001$). The findings suggest that greater exposure to AutoCAD training is associated with higher levels of confidence and self-perceived proficiency in using the software. Therefore, higher education institutions should continue to strengthen AutoCAD learning opportunities to enhance graduates' technical competencies and readiness for industry.

1. Introduction

AutoCAD is one of the most popular computer-aided design (CAD) applications used in engineering and technical professions. It is commonly used to produce technical drawings, design plans, and engineering documentation [1]. As digital technology becomes more prevalent in the engineering sector, AutoCAD is becoming a valuable engineering construction skill for graduates to learn when entering the workforce in various engineering-based careers.

AutoCAD is part of the engineering and technical programs in higher education institutions to teach drafting and designing skills. Students are exposed to AutoCAD through lectures, laboratory sessions, assignments, projects, and industrial training. These learning activities are intended to prepare graduates with the technical competencies required by industry and improve their ability to perform engineering tasks effectively [2].

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While graduates may have different levels of exposure to AutoCAD in their programs, their proficiency may also differ. Previous studies have reported differences in students' proficiency and perceptions of AutoCAD across academic levels, suggesting that training experiences may influence skill development [3]. Students are introduced to AutoCAD during their academic activities but little research has focused on the correlation between AutoCAD training exposure and self-perceived proficiency of the graduates at Universiti Tun Hussein Onn Malaysia (UTHM). If this information is not available, it is hard to assess the effectiveness of existing AutoCAD instruction and learning activities, and to suggest how they can be improved. Hence, this study is significant to offer evidence about the impact of training exposure on graduates' competencies and contributes to improving AutoCAD learning in higher education institutions.

Therefore, this study aims to determine the level of self-perceived AutoCAD proficiency among UTHM graduates, analyse the relationship between AutoCAD training exposure and self-perceived proficiency, and propose strategies to improve AutoCAD teaching and learning based on the study findings.

2. Methodology

This study employed a quantitative cross-sectional survey design to investigate AutoCAD training exposure and self-perceived AutoCAD proficiency among UTHM graduates who completed their studies between 2022 and 2025. Data were collected using a structured questionnaire distributed through Google Forms. A total of 231 valid responses were obtained and analysed using IBM SPSS Statistics Version 27. Descriptive statistics were used to determine the levels of AutoCAD training exposure, self-perceived AutoCAD proficiency, and agreement with the proposed strategies for improving AutoCAD teaching and learning. Spearman's rank correlation analysis was used to examine the relationship between AutoCAD training exposure and self-perceived AutoCAD proficiency. The overall research process is illustrated in Figure 1.

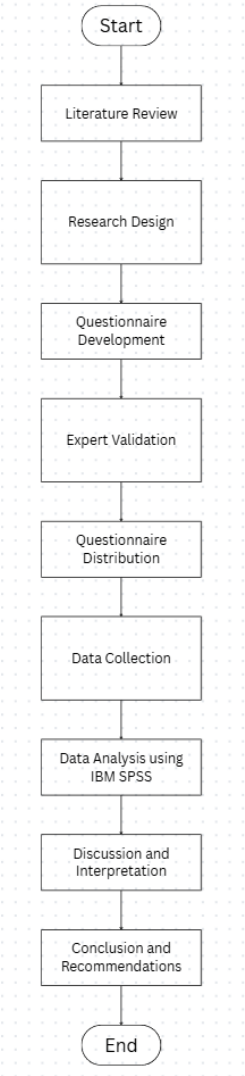


Fig. 1 Research Methodology Flowchart

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2.1 Research Design

A quantitative cross-sectional survey design was used because it enables data to be collected from a large number of respondents and analysed statistically. The study focused on UTHM graduates who had been exposed to AutoCAD during their studies. The survey approach was selected to obtain respondents' perceptions regarding AutoCAD training exposure, self-perceived proficiency, and strategies for improving AutoCAD teaching and learning.

2.2 Data Collection Method

Data was collected using a structured questionnaire consisting of four sections. Section A gathered respondents' demographic information, while Section B focused on AutoCAD training exposure. Section C assessed respondents' self-perceived AutoCAD proficiency, and Section D obtained respondents' opinions on strategies to improve AutoCAD teaching and learning. The questionnaire was distributed online through Google Forms, and a total of 231 valid responses were successfully collected for analysis.

2.3 Reliability Analysis

A pilot study was conducted to evaluate the reliability of the questionnaire. Cronbach's alpha was used to determine the internal consistency of the survey instrument. The results showed Cronbach's alpha values of 0.869 for AutoCAD training exposure, 0.906 for self-perceived AutoCAD proficiency, and 0.866 for improvement strategies. These values indicate good internal consistency of the questionnaire and support its suitability for data collection.

2.4 Data Analysis

The data collected were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequency, percentage, mean score, and standard deviation, were used to analyse respondents' demographic profiles and determine the levels of AutoCAD training exposure, self-perceived proficiency, and improvement strategies. Spearman's rank correlation analysis was performed to examine the relationship between AutoCAD training exposure and self-perceived proficiency among UTHM graduates.

3. Results and Discussion

This section presents the findings of the study and discusses the results based on the research objectives. The analysis includes respondents' demographic profiles, AutoCAD training exposure, self-perceived proficiency, the relationship between AutoCAD training exposure and self-perceived proficiency, and proposed strategies for improving AutoCAD teaching and learning among UTHM graduates.

3.1 Demographic Profile of Respondents

A total of 231 valid responses were collected from UTHM graduates who had prior exposure to AutoCAD during their studies. The demographic characteristics of the respondents are presented in Table 1.

Table 1 *Demographic Profile of Respondents (n = 231)*

Variable	Category	Frequency (f)	Percentage (%)
Graduation Year	2022	30	13.0
	2023	84	36.4
	2024	72	31.2
	2025	45	19.5
Employment Status	Employed	129	55.8
	Further Study	63	27.3
	Unemployed	39	16.9
Formal Training	Yes	159	68.8
	No	72	31.2

Based on Table 1, the highest number of respondents graduated in 2023, representing 36.4% of the total sample, followed by graduates from 2024 (31.2%), 2025 (19.5%), and 2022 (13.0%). This distribution indicates that most respondents were recent graduates who had relatively recent experience using AutoCAD during their studies. In terms of employment status, more than half of the respondents were employed (55.8%), while 27.3% were pursuing further studies and 16.9% were unemployed. Furthermore, 68.8% of the respondents reported receiving formal AutoCAD training during their academic studies, whereas 31.2% had not received formal training. These findings suggest that the majority of respondents possessed relevant academic exposure and practical experience related to AutoCAD, making them suitable participants for evaluating the relationship between AutoCAD training exposure and self-perceived proficiency among UTHM graduates.

3.2 Analysis of AutoCAD Training Exposure

The level of AutoCAD training exposure among UTHM graduates was analysed using descriptive statistics. The analysis was conducted to determine the extent of respondents' exposure to AutoCAD throughout their academic studies. The results are presented in Table 2.

Table 2 *Descriptive Statistics for AutoCAD Training Exposure*

Variable	N	Mean	Standard Deviation	Level
AutoCAD Training Exposure	231	3.5615	0.73811	Moderate

Based on Table 2, the overall mean score for AutoCAD training exposure was 3.5615, with a standard deviation of 0.73811, indicating a moderate level of exposure among UTHM graduates based on the mean score interpretation adapted [4]. This finding suggests that respondents generally had moderate exposure to AutoCAD through coursework, assignments, projects, and practical learning activities during their studies. The moderate level of training exposure may indicate that while AutoCAD was incorporated into various academic and practical activities, the extent of exposure varied among respondents. Therefore, providing more structured and continuous opportunities to apply AutoCAD in practical and industry-related tasks may further strengthen graduates' exposure and experience with the software.

3.3 Analysis of Self-Perceived AutoCAD Proficiency

The analysis was conducted to determine respondents' confidence and ability in performing AutoCAD-related tasks based on their learning experiences and practical exposure. The results are presented in Table 3.

Table 3 *Descriptive Statistics for Self-Perceived AutoCAD Proficiency*

Variable	N	Mean	Standard Deviation	Level
Self-Perceived AutoCAD Proficiency	231	3.5798	0.79857	Moderate

Based on Table 3, the overall mean score for self-perceived AutoCAD proficiency was 3.5798, with a standard deviation of 0.79857, indicating a moderate level of proficiency among UTHM graduates based on the mean score interpretation adapted [4]. This finding suggests that respondents generally demonstrated a moderate level of confidence and capability in performing AutoCAD-related tasks. The moderate level of proficiency may be attributed to the exposure gained through academic coursework, assignments, projects, and practical learning experiences during their studies. Although respondents demonstrated a satisfactory level of proficiency, the findings indicate that further improvement can be achieved through increased practical training and continuous use of AutoCAD. Therefore, strengthening learning opportunities and industry-oriented applications may help graduates develop higher levels of technical competency and confidence in using the software.

3.4 Relationship Between AutoCAD Training Exposure and Self-Perceived AutoCAD Proficiency

Spearman's rank correlation analysis was conducted to examine the relationship between AutoCAD training exposure and self-perceived AutoCAD proficiency among UTHM graduates. This analysis was performed to achieve the second research objective of the study. The results are presented in Table 4.

Table 4 *Spearman Correlation Between AutoCAD Training Exposure and Self-Perceived AutoCAD Proficiency*

Variable	Spearman Correlation Coefficient (r)	Sig. (2-tailed)	Strength of Relationship
AutoCAD Training Exposure and Self-Perceived AutoCAD Proficiency	0.770	<0.001	Strong Positive Relationship

Based on Table 4, the Spearman correlation analysis revealed a correlation coefficient of r = 0.770 with a significance value of p < 0.001. Based on the correlation coefficient interpretation adapted [5], this result indicates a strong positive relationship between AutoCAD training exposure and self-perceived AutoCAD proficiency among UTHM graduates. The finding suggests that respondents who experienced higher levels of AutoCAD training exposure generally reported higher levels of proficiency in using the software.

The positive relationship may be attributed to the opportunities provided through lectures, assignments, projects, laboratory activities, and industrial training, which allow students to apply AutoCAD in different learning situations. Continuous exposure and practical experience may contribute to greater familiarity with the software, improved technical skills, and increased confidence in performing drawing and design tasks. Therefore, increasing students' exposure to AutoCAD through structured learning activities may contribute positively to the development of their technical competencies and professional readiness.

However, the relationship identified in this study represents an association between variables and should not be interpreted as direct causation. Other factors, such as personal interest, learning motivation, and previous experience, may also influence graduates' proficiency in AutoCAD.

3.5 Proposed Strategies for Improving AutoCAD Teaching and Learning

This section presents the descriptive analysis of respondents' suggestions for improving AutoCAD teaching and learning. The analysis was conducted to identify the level of agreement among UTHM graduates regarding strategies that could enhance the effectiveness of AutoCAD education. The results are presented in Table 5.

Table 5 *Descriptive Statistics for Proposed Strategies for Improving AutoCAD Teaching and Learning*

Variable	N	Mean	Standard Deviation	Level
Suggestions for Improving AutoCAD Teaching and Learning	231	3.5671	0.78653	Moderate

Based on Table 5, the overall mean score for the proposed strategies to improve AutoCAD teaching and learning was 3.5671, with a standard deviation of 0.78653, indicating a moderate level of agreement among respondents based on the mean score interpretation adapted [4]. This finding suggests that graduates generally agreed with the proposed strategies for enhancing AutoCAD education. The moderate level of agreement reflects the need for continuous improvement in teaching approaches, learning resources, and practical learning opportunities.

The findings indicate that improvements in AutoCAD education can be achieved through increased practical learning activities, enhanced access to software and learning facilities, improved teaching methods, and stronger alignment between academic learning and industry requirements. These strategies may help students gain more meaningful learning experiences and strengthen their technical competencies before entering the workforce.

Overall, the findings suggest that respondents recognised the importance of continuously improving AutoCAD teaching and learning practices. Such improvements may contribute to the development of graduates who are better prepared to meet industry expectations and adapt to the increasing use of digital technologies in engineering and technical professions.

4. Conclusion

The purpose of this study was to investigate the AutoCAD training exposure level and self-perceived AutoCAD proficiency among UTHM graduates. The findings showed that the level of AutoCAD training exposure among the respondents was moderate (mean = 3.5615), while their self-perceived AutoCAD proficiency was also moderate (mean = 3.5798). The results indicate that graduates had moderate levels of exposure and proficiency in AutoCAD, suggesting that there is still room for improvement in their technical skills. A statistically significant

and strong positive relationship was identified between AutoCAD training exposure and self-perceived AutoCAD proficiency ($r = 0.770$, $p < 0.001$), indicating that respondents with higher levels of AutoCAD training exposure generally reported higher levels of self-perceived proficiency. In addition, the respondents showed a moderate level of agreement with the proposed strategies for improving AutoCAD teaching and learning (mean = 3.5671). The findings highlight the importance of continuous AutoCAD exposure through academic and practical learning activities, as well as improvements in teaching methods, learning resources, and industry-related learning opportunities. Overall, this study provides useful insights into the relationship between AutoCAD training exposure and self-perceived proficiency among UTHM graduates and highlights the importance of strengthening AutoCAD teaching and learning to better prepare graduates for industry requirements.

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Author Contribution

The authors confirm contribution to the paper as follows: study conception and design: Hijjaz Danial Azizan and Nurdalila Saji; data collection: Hijjaz Danial Azizan; data analysis and interpretation of results: Hijjaz Danial Azizan and Nurdalila Saji; manuscript preparation: Hijjaz Danial Azizan. All authors reviewed the results and approved the final version of the manuscript.

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