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Artificial Intelligence Technology Adoption in TVET: A Survey From the Perspective of Lahad Datu Community College Students

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Abstract

This study aims to examine the acceptance of artificial intelligence technology in Technical and Vocational Education and Training by Lahad Datu Community College students using the Technology Acceptance Model as the basic framework. The data collection process is done through the distribution of questionnaires using the simple sampling method. As a result, 82 responses were received from respondents. This amount is 20 percent more than the set target. In general, the results of the questionnaire analysis show that the acceptance of artificial intelligence technology in Technical and Vocational Education and Training among Lahad Datu Community College students is still at a moderate level. Therefore, efforts need to be coordinated so that the benefits of this technology can be used at a high level in accordance with the development of the world. Overall, the findings of this study provide input to the management of Lahad Datu Community College in particular to further increase the students' level of acceptance towards artificial intelligence technology in Technical and Vocational Education and Training.

Keywords: Artificial Intelligence, Technical and Vocational Education and Training, Lahad Datu Community College.

1. Introduction

Technology based on artificial intelligence (AI) has significantly changed many facets of contemporary life, affecting how people interact, communicate, live, learn and work (Thomas K. F. Chiu, Helen Meng, Ching-Sing Chai, Irwin King, Savio Wong & Yeung Yam, 2022). It enables digital machines to carry out actions generally performed by intelligent individuals, giving them the ability to reason and carry out particular tasks (Pannu, 2015). Because of AI's ability to evolve, it is now widely used and is constantly evolving in a variety of fields. The purpose of this study is to examine how AI systems are used to improve Technical and Vocational Education and Training (TVET) students' learning and training opportunities. The use of AI systems to provide learning and training to TVET students falls under the umbrella term of artificial intelligence technology in Technical and Vocational Education and Training (AITVET) in the context of this study. It basically makes use of AI's skills to speed up learning and problem-solving by bringing interactivity, engagement, and efficiency to teaching and learning sessions. Additionally, the incorporation of AI technology into TVET holds the promise of enabling instructors to deliver materials that are more effective than those used in traditional instruction.

The enormous potential of AI technology in education has been acknowledged by the United States, which has led to coordinated efforts and funding allocations for the creation of AI-powered learning channels. According to Ben Williamson and Rebecca Eynon (2020), AI has the potential to improve academic achievement by improving students' cognitive engagement and reducing educational inequities, particularly among the disadvantaged group of students. Though AI technology has many benefits, it is important to recognize that there may be difficulties that students run into when using it. The main goal of this study is to discover more about how Lahad Datu Community College (LDCC) students perceive and use AI technology, particularly in relation to teaching and learning. The Food Processing and Quality Control Certificate is one of the TVET programs offered by LDCC. This program aims to provide students who have earned the Malaysian Certificate of Education with the skills necessary to fulfil the needs of the labour market. Adopting AI technology is essential for LDCC because it not only fits the shifts of educational landscape but also significantly improves the skill sets that graduates need in the modern workforce. This study intends to offer insights into the effectiveness of AI integration in TVET programs and its impact on students' learning experiences by examining how AI technology is viewed and used by LDCC students.

2. Research objective

This study aims to examine the acceptance of AI technology in TVET among LDCC students. Specifically, this study has four objectives:

a. Identifying the perceived ease of use factor of AI technology in TVET among LDCC students.

b. Identifying the perceived usefulness of AI technology in TVET among LDCC students.

c. Identifying the attitude factor of AI technology in TVET by LDCC students.

d. Identifying the behavioural factor of AI technology in TVET by LDCC students.

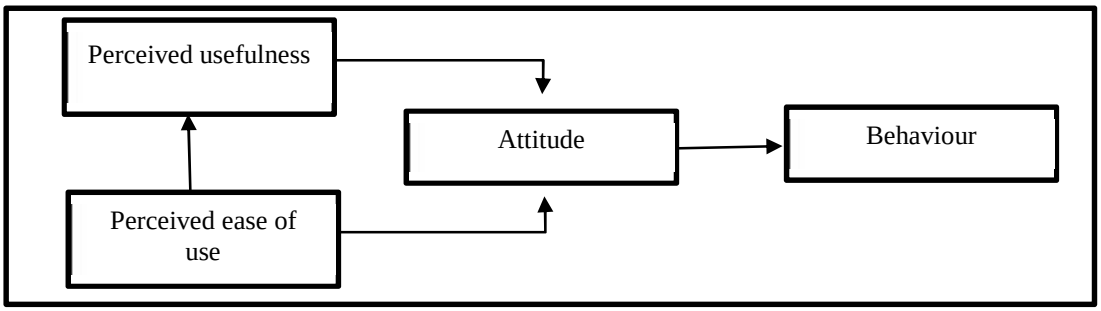
3. Literature review

Artificially Narrow Intelligence (ANI), Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI) are three different types of AI technology that span a range of capabilities (Aliff Nawi, 2019). Although these categories could be used in education, ANI now rules the field, signalling a paradigm shift with significant ramifications for educational quality (Ben Williamson, 2018). According to the studies conducted by Zhao Linga, Chen Lijiaoa, Liu Qinga, Zhang Mingyaoa, Copland Henryc, 2019; Arzu Deveci Topal, Canan Dilek Eren, and Aynur Kolburan Gecer (2021), the incorporation of AI into education improves academic performance. This is due to the improvement in educational management efficiency (Kuo, 2020) and the streamlining of teaching and learning process (Lazar Krstić, Veljko Aleksić & Marija Krstić, 2022). In comparison to traditional approaches, AI technology also enables more interactive and adaptable learning experiences (Wei Cui, Zhen Xue & Khanh-Phuong Thai, 2018). According to S. N. Ikwumelu, Ogene A. Oyibe, and E. C. Oketa (2015), adaptive teaching is an instruction that would be modified accordingly to meet the requirements, abilities, and learning preferences of each student. Evidence shows that adaptive teaching utilizing AI technology improves students' academic performance, particularly in arithmetic as shown by Yilmaz's (2017) study.

Additionally, AI technology offers helpful direction and improves the calibre of pupils' scientific writing (Nam Ju Kim, Min Kyu Kim, 2022). It can mimic human abilities like thinking, listening, communicating, and decision-making (Delic et al., 2019; Yuya Chiba, Takashi Nose, Taketo Kase, Mai Yamanaka & Akinori Ito, 2018). As a result, students can attain predetermined learning goals through independent, in-depth learning that would cater to their unique requirements, skills, and learning preferences (Horace Ho Shing Ip et al., 2019). Additionally, the length of teaching and learning process is reduced by AI technology's ability to adapt to the students' different level of skills (Giorgio Quer et al., 2017). The study makes use of the Technology Acceptance Model (TAM) to gauge how well LDCC students are accepting AI technology. Raafat George Saadé, Fassil Nebebe and Weiwei Tan (2007) developed the well-known concept known as TAM to explain how people use technology and the factors that affect its adoption. It provides a solid theoretical framework for studies pertaining to digital education and has been successful in foretelling technology acceptance and associated variables (Darayseh, 2023). Perceived usefulness and perceived ease of use are two TAM characteristics which serve as important predictors of internal model trust (D. Davis, 1989).

The foundation for the study's topic is shown in Figure 1, which covers the use of AI technology in education, how it affects teaching and learning process as well as how the Technology Acceptance Model is used to gauge LDCC students' acceptance of AI technology.

Figure 1: Technology Acceptance Model



4. Research methodology

The main goal of this study is to examine and empirically analyse how LDCC students perceive the adoption of AI technology within the context of TVET. TAM is used as a theoretical framework to comprehend the students' attitudes and behaviours towards the adoption of AI technology in their educational environment. LDCC students who are enrolled in the current classes are the target population for this study. To acquire responses from the student population, standardized questionnaires are administered as part of the data gathering procedure. The respondent pool for this study consisted of 82 students in total. It is important to emphasize that convenience sampling was used in this study, which involves choosing participants based on their accessibility and desire to participate. This strategy was selected due to its applicability and viability within the parameters of the investigation. The sample size determination table by Robert V. Krejcie and Daryle W. Morgan (1970) was used by the researchers to establish the right sample size for the population of 82 pupils. Based on the size of the population, this table offers suggestions for choosing an appropriate sample size. A sample size of 68 respondents was thought to be adequate for this research. 68 people were thus the objective of the questionnaire distribution operation.

The data gathering stage was carried out over the course of one month, from 6 February to 7 March 2023. This window of time enabled a thorough collection of feedback from the participants. The distribution of the questionnaires was a resounding success. The population of 82 students had a response rate of 100 percent since every single one of them offered input. Based on the sample size determination table, it has been established that the response rate was higher than the initial minimum objective of 68 respondents. The robust and representative dataset that results from this high response rate strengthens the validity and trustworthiness of the study's conclusions. This study uses a preset scale created by Jamil Ahmad (2022) to interpret the data collected using an average mean value interpretation approach. This scale, as shown in Table 1, provides a structured framework for evaluating and classifying responses in accordance with the determined average mean values. It supports the methodical examination and interpretation of the survey's findings.

Table 1: Interpretation of the average mean score.

Range	Mean score
1.00 – 2.33	Low
2.34 – 3.66	Medium
3.67 – 5.00	High

5. Result and discussion

This section's discourse is divided into six different categories. The overall goal is to improve and streamline the data analysis procedure while making sure that the findings reached are accurate, thorough, and scientifically sound.

5.1 Informant profile analysis

Table 2 presents a thorough analysis of the respondents' profiles, giving a nuanced understanding of the demographic traits and educational backgrounds of the study's participants.

Table 2: Informant Profile

Items		Total	Percent
Gender	Male	35	42.68
	Female	47	57.32
Semester	One	17	20.73
	Two	34	41.48
	Three	9	10.97
	Four	22	26.82

Table 2 provides crucial information on the 82 respondents who participated in the study in terms of their demographics. 35 responses (42.68 percent) of these respondents identified as male, while 47 respondents (57.32 percent) did the same for female. A further indication of the respondents' varied academic backgrounds is the

distribution of responders by academic semester. Following is a breakdown of responses by academic semester: In the first semester, there were 17 participants (20.73 percent), the second semester had 34 participants (41.48 percent), the third semester had 9 participants (10.97 percent), and the fourth semester had 22 people (26.82 percent). Based on their varied levels of academic exposure, the research participants may offer a variety of perspectives and experiences to the study, and this distribution is crucial in comprehending these perspectives and experiences. In conclusion, the informant profile analysis in Table 2 reveals important demographic details about the study's respondents, demonstrating a gender-balanced representation and a variety of academic backgrounds. These specifics are essential for deciphering and placing the research findings in their proper context in the parts that follow.

5.2 Acceptance of AI technology

Table 3 provides a concise yet comprehensive study of the respondents' acceptance of AI technology.

Table 3: Acceptance of AI technology

Factor	Mean	S.D	Level
Perceived ease of use	3.60	0.584	Medium
Perceived usefulness	3.88	0.609	High
Attitude	3.52	0.526	Medium
Behavior	3.40	0.662	Medium

Table 3 summarizes major aspects of AI technology acceptance by providing mean values and standard deviations for four crucial variables: perceived ease to use, perceived usefulness, attitude, and behaviour. Each of these elements is crucial in understanding how the respondents in this study have reacted and used AI technology. Perceived usefulness stands out as the factor with the highest mean value, recording a score of 3.88 and a standard deviation of 0.609. The respondents clearly view AI technology as being very helpful in the context of their educational experience as evidenced by the high mean score. The standard deviation, which measures response variability, reveals a mediocre degree of agreement among participants assessing the value of AI technology. In contrast, the behaviour component has the lowest mean (3.40) and lowest standard deviation (0.662). The fact that the respondents' real behaviour in embracing AI technology may not be as pronounced as their perceived usefulness is suggested by the relatively lower mean. The higher standard deviation suggests greater response dispersion for this aspect, suggesting a wider variety of replies from respondents regarding how they use AI technology. Perceived ease of use and attitude have mean values of 3.60 and 3.52.

5.3 Perceived ease of use of AITVET

The idea of perceived ease of use in this case refers to students' perception that AI technology is easy to use and problem-free (Davis, 1989). Table 4 shows the results from relevant respondents.

Table 4: Perceived ease of use of AITVET

Factor	Mean	S.D.	Level
AITVET easy to use	3.78	0.721	High
AITVET able to complete tasks	3.68	0.928	High
AITVET easy to understand	4.18	0.803	High

Table 4 details how respondents felt about three different AITVET themes: "AITVET easy to understand," "AITVET able to complete tasks," and "AITVET easy to use". The respondents' perspectives and experiences with AI technology in the context of TVET are critically reflected in each of these areas. According to its highest mean score of 4.18, the factor "AITVET easy to understand" is the one that respondents find to be the most appealing. This high mean indicates that respondents thought the theme "AITVET easy to understand" reflecting a positive opinion of the simplicity and

understandability of AITVET concepts. Although the consensus is favourable, the standard deviation of 0.803 indicates that there is some variation in the respondents' assessments.

The factor of "AITVET able to complete task" receives a considerably lower mean value of 3.68, on the other hand. This implies that respondents' opinions of AITVET's efficiency in completing tasks are somewhat less positive than those of the "AITVET easy to understand" theme. The greater range of responses implied by the higher standard deviation of 0.928 suggests that there is more variation in how respondents interpreted the theme in connection to task completion. With a mean rating of 3.78, the theme "AITVET easy to use" sits between the first two themes. This indicates that although respondents generally thought using AITVET was very simple, their opinions are not as favourable as those for the "easy to understand" theme. The modest amount of variability in replies on the use of AITVET is indicated by the standard deviation of 0.721. The results shown in Table 4 demonstrate that respondents generally had positive opinions of the AITVET themes, particularly the simplicity of the concepts. This shows that respondents saw the employment of AI technology in teaching and learning TVET as relevant and approachable. However, when evaluating the application of AI technology in AITVET, it is crucial to take into account individual differences and views, as shown by the variety of replies represented by the standard deviations.

5.4 Perceived usefulness of AITVET

Table 5 is an important tool for examining respondents' opinions and views on the perceived usefulness factor of AITVET.

Table 5: Perceived usefulness of AITVET

Factor	Mean	S. D	Level
AITVET improves efficiency	3.44	0.787	Medium
AITVET adds experience	3.68	0.928	High
AITVET improves performance	3.68	0.683	High

The findings on three different issues related to the perceived usefulness factor of AITVET are detailed in Table 5. These ideas conclude how AITVET is thought to be able to increase effectiveness, add knowledge, and enhance general performance in an educational setting. The first theme, "AITVET improves efficiency," obtains a mean score of 3.44 and a standard deviation of 0.787. This implies that participants view AITVET as a tool that enhances the effectiveness of their academic activities. The mean values for the second and third themes, "AITVET adds experience" and "AITVET improves performance," are both 3.68 with a standard deviation of 0.683 and 0.928. The results shown in Table 5 highlight the respondents' positive opinions of AITVET value in improving academic achievement. With the same mean score, the themes "AITVET improves performance" and "AITVET adds experience" stand out as being particularly favourably rated. This indicates that respondents consistently and strongly agree that AITVET has the potential to improve their academic performance and experiences. The theme "AITVET improves efficiency," while still being favourably viewed, has a significantly lower mean value and a moderate amount of response variability. However, this theme demonstrates that respondents view AITVET as a tool that can help them increase the effectiveness of their academic endeavours.

5.5 Attitude of AITVET

Table 6 provides a concise summary of the findings from the investigation of respondents' attitudes toward AITVET. The substance of the data was captured in a tabular format, which gives a comprehensive picture of the views regarding AITVET that were revealed by the study.

Table 6: Attitude of AITVET

Factor	Mean	S. D	Level
Adore to use AITVET	3.71	0.694	High
Fun to use AITVET	3.20	0.895	Medium
Easy to use AITVET	3.48	0.946	Medium

According to the information in Table 6, the study's findings offer important new information on how different topics are evaluated in the context of AITVET. The theme "Adore to use AITVET" is seen to have the greatest average mean value, coming in at 3.71 and with a standard deviation of 0.694. In contrast, the theme "fun to use AITVET" has the lowest number coming in at 3.20 and with a standard deviation of 0.895. Notably, the theme "Easy to use AITVET" exhibits an average mean value of 3.48 and a standard deviation of 0.946 for the intermediate average. These results offer a quantitative view of user satisfaction and preferences while delivering insightful information about how certain AITVET-related issues are seen and evaluated. The wide range of mean values and standard deviations highlights the diversity of user experiences and perceptions, pointing to possible areas for AITVET system enhancement and optimization. A greater understanding of user behaviours and preferences within the context of AITVET may be attained through additional analysis and interpretation of these findings, which will aid in the creation of more user-centric and efficient systems.

5.6 Behaviour of AITVET

The results of a thorough analysis of the respondents' behaviour towards AITVET are briefly summarized in Table 7. The behavioural characteristics connected to AITVET as seen among the study's participants are summarized in this tabular presentation.

Table 6: Behaviour of AITVET

Factor	Mean	S.D	Level
Level of use of AITVET	3.39	1.051	Medium
AITVET prospects	3.43	0.889	Medium

According to the data in Table 7, the findings exhibit the information on how respondents perceive the prospects for AITVET and how frequently they use AI. The analysis shows that the average mean value for the "level of use of AITVET" is 3.39 with a standard deviation of 1.051. In addition, the theme about AITVET's future prospects exhibits an average mean value of 3.43 and a standard deviation of 0.889. The combined computed values for both topics indicate that students use AITVET at a level that is considered to be moderate. This observation is consistent with the overall message provided by the research findings, which also show that the surveyed respondents generally hold a modest amount of optimism about the future of AITVET. These statistical results highlight the experimentally supported finding that AITVET holds a middle ground position among the student population under examination, in terms of its present applicability and promise for the future.

6. Conclusions

A considerable revolution has been ushered across a variety of disciplines, including TVET, because of the incorporation of AI technology. The adoption of AI technology within TVET has created new opportunities for students, particularly those within the LDCC, enabling access to learning that is more interactive, engaging, and quick. Previous studies have further supported the idea that using AI technology is now seen as a crucial reform aimed at raising education's overall quality. Through the use of adaptive learning approaches, their implementation has also been proven to have a favourable effect on students' academic achievement. The potential and openness of AI technology in the TVET setting, notably within the realm of LDCC students, who actively provide insights to LDCC management, are empirically highlighted by this study, despite its preliminary nature. Although LDCC students' overall adoption of AI technology in TVET is now at a moderate level, it is unquestionably a promising beginning. To fully realize the

promise of this technology, concerted efforts are required. To make sure that students at LDCC can make full use of AI technology, cooperation and strategic initiatives are required. Maximizing use is in line with the larger goal of improving TVET's effectiveness and quality, which will ultimately benefit both students and the educational system.

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