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# Elements of Digital Technology Needs Among Technical and Vocational Education Students

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**Abstract** This study was conducted to identify digital technology needs among final year students of Technical and Vocational Education (TVE) at the School of Education, Universiti Teknologi Malaysia (UTM)-. The elements selected for this study are the students' technical skills, attitudes and the availability of facilities. A questionnaire was used as a research instrument in this quantitative study. A total of 89 respondents were selected at random. The collected data was analyzed using the Statistical Package Social Sciences (SPSS) software version 26.0 to obtain frequency values, percentages (%), means, and standard deviations. According to the findings of the study, the need for digital technology among final-year TVE students is satisfactory, with the mean value for the entire research question obtained being 3.50 at a moderate score level. Therefore, the School of Education at UTM needs to increase the need for the use of digital technology to facilitate students in the teaching and learning process.

**Keywords:** Technical skills, students' attitude, element, availability of the facility

## 1. Introduction

Skills are the abilities or competencies that each student must master in order to hone their potential (Nur Syarafina et al., 2020). Effective learning methods combine teaching strategies and skills, particularly in subjects or courses that require skill application (Siti Hajar, Mohd Azaharin, Maimun Aqsha, 2019). Students who have skills or talents have an advantage because they can complete the assigned task successfully without the assistance of others (Che Suriani et al., 2021). Their talent and abilities must be continually developed in order to be useful in the future. As the country moves toward Industrial Revolution 4.0, skills are becoming increasingly important in qualifying graduates for employment (Nadhirah dan Yahya, 2021).

Students can learn various skills in the context of education in the Technical and Vocational (TVE) field (Irwan 2020). The TVE field provides technical skills which align with the current industry's needs (Irwan,2020). Students in the field of electricity and electronics, for example, can constantly hone their skills and perform practical work in the workshop to improve specific technical skills. Technical skills are essential for students as they are beneficial and prepare students with various types of knowledge (Irwan, 2020). In the Teaching and Learning (T&L) process, instructors can use multiple approaches to help students improve their technical skills. Due to the current Covid-19 pandemic, students and teachers are forced to conduct teaching and learning digitally. Digital T&L has proven that

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technical skills can be measured both physically and digitally(Stephanie,2021). This will indirectly have a more significant impact in today's world of education.

## 1.1 Research Background

The world is currently striving to accomplish the latest Industrial Revolution. As a result, today's syllabus includes the necessary digital skills to meet the demand. Students who do not understand a topic will fall behind and find it difficult to learn using digital technology, particularly if new students are introduced to various computer software right away (Stephanie, 2021). According to Kara (2018) in Nur Hidayah and Noor Banu (2021), individuals equipped with digital skills are a hot topic of discussion these days because information and communication technology is widely used. As a result, students must always be prepared to continue learning new things through the use of digital technology.

However, due to a lack of exposure to digital technology during the learning process, students are unable to use it effectively. There is no doubt that the current generation is skilled in accessing, communicating and having literacy in using digital technology, but if it is for educational purposes, they have to learn computer software, and they become indifferent and do not take the opportunity given to learn. A study by Tengku et al. (2019) states that students are more likely to use digital devices for entertainment and fill their free time without involving the learning process, leading to digital abuse. Therefore, students will be more interested in using digital technology if they are exposed to its requirements and constantly explore new learning processes.

It is common knowledge that TVE institutions require all students to venture into the field of technical skills. Due to the large number of students, the practical work must be done in groups. Students are more likely to practise using their methods or shortcuts. This does not mean that they do not listen to the explanation of the teaching staff, but they are more inclined to complete the practical work as soon as possible. The result of a practical project is more attractive to students than the process of making it (Azizi, 2010). This is because they want to see the final results of the practice, whether it is successful or not, even if the method used is incorrect. Such actions will cause students to misinterpret the true purpose of their practical work. With digital technology, students can easily access methods and working steps and use their devices without disputing others.

The world of technology is growing rapidly, forcing students, teachers and institutions to provide the use of technology in T&L. Nur Hidayah and Noor Banu (2021) stated that educational institutions such as schools and higher learning institutions are the central bodies which provide learning facilities for students. However, the institution is facing the problem of not being able to provide enough digital equipment such as computers, white screen boards and LCDs (Honney & Brunner, 1994). The study also stated that the teaching staff and students could not use the facilities to their full capacity due to the lack of digital facilities. As a result, the practical work has to be carried out physically, and the T&L is no longer a two-way communication.

## 1.2 Objectives

The following are the objectives of this study.

i. Identify elements of students' technical skills in the digital technology needs among technical students.
ii. Identify elements of student attitudes in need for digital technology among technical students
iii. Identify the elements of the availability of facilities in the digital technology needs among technical students.

## 2. Methodology

This study utilized a quantitative approach employing a survey and descriptive analysis. These methods determine respondents' opinions, attitudes and behaviour towards the studied issue. Respondents have provided statistical data that can be concluded through questionnaire instruments. The questionnaire instrument applied a 4 Likert scale and was distributed using Google Form.

The total number of respondents from the three courses is 120 students. According to Krejci and Morgan (1970), 89 samples were randomly selected for this research and their responses were processed into numerical data. This type of sampling aims to ensure that no bias occurs within the selection of the sample. Hence, the questionnaire was originally distributed to 120 students but only 89 data were taken randomly.

Before distributing the questionnaire to the respondents, the researcher conducted a pilot study with 30 students from the School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia. The number of pilot studies are sufficient to analyze the validity and reliability before the actual research because, according to Johanson and Brooks (2010), the minimum number of respondents for the pilot study is 30. For Cooper and Schindler (2011), the appropriate number for a pilot study is between 25 and 100 people. The data collected during the pilot study were not used for the research. The result of Cronbach's Alpha value obtained from the computer software SPSS version 26.0 is 0.738, indicating that the value obtained is high for validity and reliability.

# 3. Findings

## 3.1 Elements of Student Technical Skills

Based on the findings of the study as shown in Table 1, 4 had the highest mean value of 3.57. 56 students (62.9%) chose strongly agree, while 29 students (32.6%) chose agree. 2 had the second highest mean value of 3.55. A total of 56 students (62.9%) strongly agreed that they got a picture of the real situation in the industry when using computer software. However, 3 students (3.4%) disagreed with the statement, and 2 students (2.2%) strongly disagreed. The third highest mean value was obtained by 1, which is 3.52. Although 56 students (62.9%) believed that using digital devices provided them with a realistic picture of the industry, 8 students (9.0%) disagreed.

Three obtained the lowest mean value with the same value of 3.42. which is 3, 5 and 7. In response to 3, 10 students (11.2%) stated that they were not proficient in computer software related to the topic studied, compared to 47 students (52.8%) who were extremely proficient. In response to 5, 45 students (55.1%) strongly agreed that they can identify computer software compatible with practical needs, while 31 students (31.8%) agreed. In response to 7, 7 students (7.9%) and one student (1.1%), respectively, were unable to use various multimedia materials during project presentations. Finally, the overall mean value for the element of students' technical skills is 3.47, which is considered to be on the medium level.

**Table 1 - Mean score for the element of student's technical skills**

| No | Statement | Frequency/Percentage | | | | Mean | Standard deviation |
|---|---|---|---|---|---|---|---|
| | | SD | D | A | SA | | |
| 1. | I get a real picture of the situation in the industry while using digital devices. | 1 (1.1%) | 8 (9.0%) | 24 (27.0%) | 56 (62.9%) | 3.52 | 0.709 |
| 2. | I get a real picture of the situation in the industry while using computer software. | 2 (2.2%) | 3 (3.4%) | 28 (31.5%) | 56 (62.9%) | 3.55 | 0.674 |
| 3. | I am proficient in using computer software related to the topic studied. | - | 10 (11.2%) | 32 (36.0%) | 47 (52.8%) | 3.42 | 0.688 |
| 4. | I can follow practical procedures involving the use of digital devices well. | 1 (1.1%) | 3 (3.4%) | 29 (32.6%) | 56 (62.9%) | 3.57 | 0.620 |
| 5. | I can identify computer software that is suitable for practical work needs. | 3 (3.4%) | 6 (6.7%) | 31 (34.8%) | 49 (55.1%) | 3.42 | 0.766 |
| 6. | I am good at reading diagrams or circuits provided in computer software such as AutoCAD and Microsoft Visio. | 1 (1.1%) | 7 (7.9%) | 33 (37.1%) | 48 (53.9%) | 3.44 | 0.690 |
| 7. | I am able to use various multimedia materials during project presentations. | 1 (1.1%) | 7 (7.9%) | 35 (39.3%) | 46 (51.7%) | 3.42 | 0.688 |
| 8. | I can perform a simulation of practical work shown by the lecturer. | 2 (2.2%) | 3 (3.4%) | 34 (38.2%) | 50 (56.2%) | 3.48 | 0.676 |
| 9. | I was able to perform the practical work simulation within the specified period. | 2 (2.2%) | 8 (9.0%) | 26 (29.2%) | 53 (59.6%) | 3.46 | 0.755 |
| 10. | The computer software helped me a lot in completing the practical work that was carried out | 3 (3.4%) | 7 (7.9%) | 28 (31.5%) | 51 (57.3%) | 3.43 | 0.782 |
| | | | | **Overall Average Value** | | 3.47 | 0.705 |

## 3.2 Elements of Students Attitude

Based on the findings of the study as shown in Table 2, 8 has the highest mean value of 3.54. A total of 57 people (64.0%) strongly agreed that they enjoy using computer software to create graphic animations, whereas 5.6% and 2.2% of students disagreed and strongly disagreed with the statement, respectively. Following that, 4 received the second highest mean value of 3.53. 23 students (25.8%) agree with the statement, while 57 students (64.0%) are eager to learn new computer software. However, 8 students (9.0%) are uninterested in learning new computer software, and one student (1.1%) is extremely uninterested. The third highest mean value is 3.52 on 6 and 7. In response to 6, 60 students (67.4%) were able to complete the practical work using the simulation, while three (3.4%) strongly disagreed that the simulation encouraged them to complete the practise. In response to 7, 55 students (55.8%) and 25 students (28.1%) said they were very likely and likely to use computer software to create a schematic diagram, respectively.

With reference to Table 2, 2 obtained the lowest mean value of 3.46, where seven students (7.9%) did not complete the simulation step by step. A total of 52 students (58.4%) strongly agreed that they always followed the simulation in the correct order, step by step. Finally, the overall mean value obtained is 3.51 at a moderate level.

**Table 2 - Mean score for elements of student's attitude**

| No. | Statement | Frequency Percentage | | | | Mean | Standard Deviation |
|---|---|---|---|---|---|---|---|
| | | SD | D | A | SA | | |
| 1. | I am more inclined to carry out practical work involving the use of computer software and digital tools. | 3 (3.4%) | 6 (6.7%) | 24 (27.0%) | 56 (62.9%) | 3.49 | 0.771 |
| 2. | I always follow the simulation steps one by one without skipping. | 2 (2.2%) | 7 (7.9%) | 28 (31.5%) | 52 (58.4%) | 3.46 | 0.739 |
| 3. | I don't give up easily when the simulation run is not successful. | 2 (2.2%) | 7 (7.9%) | 25 (28.1%) | 55 (61.8%) | 3.49 | 0.740 |
| 4. | I am always interested in learning new computer software. | 1 (1.1%) | 8 (9.0%) | 23 (25.8%) | 57 (64.0%) | 3.53 | 0.709 |
| 5. | I am more inclined to use computer software when the lecturer runs the simulation. | 3 (3.4%) | 5 (5.6%) | 25 (28.1%) | 56 (62.9%) | 3.51 | 0.756 |
| 6. | The simulation that was shown encouraged me to complete the practical work. | 3 (3.4%) | 8 (9.0%) | 18 (20.2%) | 60 (67.4%) | 3.52 | 0.799 |
| 7. | I prefer to use computer software to create a schematic diagram. | 1 (1.1%) | 7 (7.9%) | 26 (29.2%) | 55 (61.8%) | 3.52 | 0.693 |
| 8. | I prefer to use computer software to create a graphic animation. | 2 (2.2%) | 5 (5.6%) | 25 (28.1%) | 57 (64.0%) | 3.54 | 0.708 |
| | | | | **Overall Average Value** | | 3.51 | 0.739 |

## 3.3 Elements of Facilities Availability

This part focus to the availability of facilities for digital technology requirements as in Table 3.10 obtained the highest mean value of 3.65. A total of 62 students (69.7%) and 24 students (27.0%) agreed that the institution provides free computer software to students such as AutoCAD and Microsoft software. Only 2 students (2.2%) and 1 student (1.1%) disagreed with the provision of free software by the institution. Next, the second highest mean value is 3.61 which is on 6. The digital facilities provided helped students understand the practical lecture, with 61 students (68.5%) strongly agreed with the statement and 3 students (3.4%) disagreed. The third highest mean value is on 8 with a value of 3.54. A total of 57 students (64.0%) found the layout of the facilities in the workshop focused on the use of digital technology such as LCD and white screen board. A total of 3 students (3.4%) found that the layout does not emphasise on the use of digital technology.

With reference to Table 3,-9 had the lowest mean value (3.40). Eleven students (12.4%) found that the workshop does not provide digital devices that are compatible with the course being studied. On the other hand, 28 students (31.5%) agreed and 49 students (55.1%) strongly agreed that the workshop provides digital devices compatible with the course studied. Finally, the overall mean value for this section is 3.52, which is considered moderate.

**Table 3 - Mean score for element of facilities availability**

| No. | Statement | Frequency/Percentage | | | | Mean | Standard Deviation |
|---|---|---|---|---|---|---|---|
| | | SD | D | A | SA | | |
| 1. | The digital devices provided are sufficient for the use of all students. | 1 (1.1%) | 8 (9.0%) | 25 (28.1%) | 55 (61.8%) | 3.51 | 0.709 |
| 2. | The tools and facilities provided are in good condition. | - | 6 (6.7%) | 30 (33.7%) | 53 (59.6%) | 3.53 | 0.623 |
| 3. | The computer facilities provided are constantly maintained and improved. | 1 (1.1%) | 5 (5.6%) | 39 (43.8%) | 44 (49.4%) | 3.42 | 0.654 |
| 4. | I found the facilities provided such as computers and other hand tools can facilitate the teaching and learning process. | 1 (1.1%) | 7 (7.9%) | 25 (28.1%) | 56 (62.9%) | 3.53 | 0.692 |
| 5. | The digital facilities provided aided me in understanding theoretical teaching. | 2 (2.2%) | 3 (3.4%) | 32 (36.0%) | 52 (58.4%) | 3.51 | 0.676 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6. | The digital facilities provided aided me in understanding the practical lectures. | 2 (2.2%) | 3 (3.4%) | 23 (25.8%) | 61 (68.5%) | 3.61 | 0.668 |
| 7. | The tools provided are compatible with digital technology needs. | 2 (2.2%) | 5 (5.6%) | 27 (30.0%) | 55 (61.8%) | 3.52 | 0.709 |
| 8. | I found the layout of the facilities in the workshop focused on the use of digital technology such as LCD and white screen boards. | 3 (3.4%) | 3 (3.4%) | 26 (29.2%) | 57 (64.0%) | 3.54 | 0.724 |
| 9. | The workshop provides digital devices that are compatible with the course studied such as Arduino Uno. | 1 (1.1%) | 11 (12.4%) | 28 (31.5%) | 49 (55.1%) | 3.40 | 0.750 |
| 10. | The institution provides free computer software to students to facilitate the learning process such as AutoCAD and Microsoft software. | 1 (1.1%) | 2 (2.2%) | 24 (27.0%) | 62 (69.7%) | 3.65 | 0.586 |
| | | | | **Overall Average Value** | | 3.52 | 0.679 |

## 4. Discussion

The results of the analysis on the first research question, which is the element of students' technical skills in the need for digital technology, are moderate. This is because students still rely on physical attendance. In terms of technical skills, they still rely on hand tools on average. Despite the fact that the country is moving toward Industrial Revolution 4.0, students are still plagued with technical skills that should be physical. According to Azman (2015), many students are unaware that their knowledge of digital technology includes technical skills. As the name implies, digital technology does not use hand tools, and students are not required to physically attend the workshop, but technical skills are still included in the T&L. Some students disagree with the statement that using digital devices and computer software allows them to get a sense of the real situation in the industry. This demonstrates that they are not yet prepared to join an industry that is increasingly reliant on digital technology.

Although the use of digital technology is not new, some students are not proficient in using computer software for the topics they are studying. Although lecturers and other teaching staff have attempted to explain computer software and simulations, as well as demonstrate how to translate the diagrams or circuits provided, the students remain inept. This demonstrates that students' technical skills in the use of digital technology must be improved in order for them to adapt to courses or subjects that require the use of digital technology. Eliza et al. (2020) explain that an individual's level of understanding and acceptance varies. Students must, however, adapt to the changes in order to be self-sufficient. This clearly demonstrates that students must work harder to improve their technical skills involving the use of digital technology. They can ask friends or lecturers to explain the use of digital technology in greater detail. This is also to ensure that they are adequately prepared when they enter the industry.

The analysis results for the second question, which is an element of students' attitudes toward the need for digital technology, are moderate. This demonstrates that students' attitudes evolve in tandem with their technical abilities. When they are more likely to perform a simulation, they are indirectly able to improve their technical skills. When students are interested in creating a simulation, they will work hard to achieve the desired results. Therefore, it is not easy for them to give up when the simulation is not successful because they do realize that by trying, they will get a positive result (Zaiha, 2014). Hence, students should be interested in using digital technology to complete assignments or practical work.

In addition, this research question is at a moderate level because there are students who have not yet accepted the use of digital technology as a necessity in their subjects. Based on the results obtained, some students dislike using computer software when the lecturer conducts digital simulations. Students will then fall behind in many areas, leading them to develop negative attitudes toward the use of digital technology, leading them to believe that digital technology is irrelevant for T&L. Students must overcome the problem of boredom by always attempting to grasp the essence of a subject involving digital technology.

The analysis results for the fourth question, which is the element of providing facilities for digital technology needs, are at a moderate level. As can be seen in workshops such as metal workshops, which still use a workshop layout that is conducive to the use of digital technology such as LCD, the facilities provided have not changed to the dominant use of digital technology. The availability of the facility is critical in ensuring that students can use digital devices in a balanced manner. Good facilities are also necessary for instilling in students the attitudes and technical skills necessary to always use digital technology. However, the results revealed that the digital devices provided cannot be used by all students due to inadequacy, poor maintenance, and a large amount of equipment in poor condition. Providing adequate facilities and needs for all students is an important component in ensuring that students fully

understand the lesson (Azwan, 2015). Every student should be given the opportunity to use digital devices in order to learn more effectively.

The digital facilities provided can help students in understanding theoretical and practical teaching and this preparation is compatible with digital technology needs. This is evident from the results for part C, where almost all students agreed with the statement. When a course involves the use of digital technology and computer software, the institution must provide the facilities as best as possible so that it can help students in terms of theoretical and practical learning. Robotics and Mechatronics courses, for example, require students to use digital devices to convert schematic circuits into physical circuit connections. As a result, the institution must provide such facilities so that students can perform well in the practical. This is also supported by Nur Syarafina et al (2018), who state that the school and teaching staff must meet the learning needs of students in accordance with the objectives and syllabus. It also applies to educational institutions because students are still in the learning process.

## 5. Conclusion

Overall, all parties must recognise the importance of digital technology in T&L. From this study, average result is at a moderate level. There are numerous enhancements that can be made to meet the demands of digital technology. Despite the fact that the respondents were final-year students with prior experience with digital technology, the results were only moderate. Ultimately, studies like this one must be conducted on a regular basis so that improvements can be made as needed. As a result, students must prepare themselves to constantly expand their knowledge of digital technology and explore its applications in order to stay current with current technology.

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