UNLOCKING THE SECRET OF TVET DIGITIZATION

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Rafiuddin Rohani

TVET DIGITIZATION

TVET's secret

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PREFACE 1

In the name of Almighty Allah, we praise and grateful that this special manuscript is finally completed. Raising the theme of Technical and Vocational Education and Training (TVET) digitization among the POLYCC communities, this book has brought together the authors from several POLYCC to discuss and unlocked the secret of TVET. United Nations Organisation Education, Science and Culture (UNESCO) define the TVET is the formal and informal learning where it integrates the study of technologies and related sciences as well as the acquisition of practical skills, attitudes, understanding and knowledge relating to the occupations in various sectors of economics and social life. In line with this aspiration, TVET has been recognized with various names over the year such as apprenticeship training, vocational education, technical education, professional and vocational education, career education, workplace education and others. No matter what it is called, TVET gives the young people the opportunity to explore and learn from the basic up to the advanced levels across a wide range of institutional and working requirement as well as full fill the industry requirements.

This manuscript is trying to unlocking the TVET's secret as well as provide the methods and steps that can be carried out to execute the TVET learning in the endemic phase following the challenging COVID-19's phase. As an example, the main elements in the TVET implementation including the use of virtual methods in conducting the experiments have been highlighted to provide the interactive learning. Moreover, TVET's implementation also provide the opportunities and paradigm for the TVET's instructors to explore the technical knowledge based on internet of thing (IOT) as well as industrial revolution 4.0 (IR 4.0). It is the country's aspiration to produce and provide more TVET's graduates as it is believed can contributes to the country to be more competitive in the future.

Expectantly this manuscript can provide the inspiration to all TVET's citizens in facing the challenges of education in the future.

Chief Editor,

Normazlina binti Mat Isa, Ph.D

PREFACE 2

Considering TVET digitization, each chapter's goal is to address the abilities that TVET instructors need to develop and enhance their digital literacy. Therefore, it has been determined that there are 5 essential skills for TVET instructors to understand to develop their digital literacy which include browsing, searching, and filtering information; using digital tools; using presentation tools; using multimedia; and using online learning platforms. With the digitization of TVET and the deployment of virtual laboratories, it is anticipated that students will be able to continue their studies uninterrupted because crucial experiment work tasks can be completed online from home or another suitable location. Additionally, the interactive study process is not only entertaining but also a fantastic resource for learning, especially when the learning activities (or virtual laboratory activities) are integrated with clear educational components and objectives. These are significant reasons why it is crucial to stress the value of soft skills in TVET students, who will likely be the nation's future leaders. Additionally, the use of mobile devices makes it easier for TVET managers and educators to plan and regularly monitor their employees' activities and performance in the TVET industry. The teachers and students are astounded by how the revolution will improve TVET education in the future. Students will be more drawn to and inclined to participate in future TVET courses as a result. The key takeaway is that using mobile devices innumerably, whenever they want, everywhere they are, and at their own pace allows TVET students to acquire, grasp, and demonstrate the necessary competence. The best aspect of education in the digital age of the twenty-first century is how it mixes online and traditional classroom instruction, or blended learning. Students get the chance to learn from one another as they develop group-work abilities like leadership, teamwork, conflict management, and negotiation. This is critical because the presence of a strong educational application system can have a favourable influence on how well students develop their TVET abilities. Collaborative learning, technology empowerment, the development of problem-solving skills, project-based learning, maximising information, and communication technology (ICT) as a source of information, promoting reflection, fostering the development of thinking skills, and assessment are the components that online system is expected to cover and fulfil.

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CHAPTER 1: Digital literacy among TVET instructors

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1.0   Introduction

It is undeniable that there are numerous barriers and scenarios that TVET instructors have to face when it comes to digital literacy. Digital literacy is a person's willingness, behavior, and capacity to apply all digital elements, tools, and facilities effectively in locating, accessing, managing, integrating, evaluating, and synthesizing digital resources, developing new knowledge and theories, sharing in digital platforms, as well as being able to communicate virtually well, in a variety of situations and environments, to enable social activities and produce an appropriate response, can be interpreted as having digital literacy (Prior et al., 2016).

Technical and vocational skills are the main core in TVET education. Whereas TVET enables students to study a profession in accordance with the standards established by subject-matter experts for the job. As a result, there is a need for flexible and innovative educational delivery methods like digital learning, particularly for TVET oriented higher learning institutions (Masek et al., 2021).

Once the barriers and scenarios have been addressed, recommendations could be taken into consideration in order to curb the barriers. This is important as it would determine the skills which TVET instructors must comprehend in order to ensure the success of teaching and learning session in TVET institution in the midst of digitization of TVET. Among the skills which are deemed to be crucial for TVET instructors to comprehend to develop their digital literacy are browsing, searching and filtering information; using digital tools; presentation tools; multimedia and using online learning platforms.

2.0   Fundamental of Digital Literacy Among TVET Instructors

The theoretical framework of this chapter is best described through the Technological Pedagogical Content Knowledge theory (TPACK). According to Mishra & Koehler (2006), TPACK consists of 3 main components of teacher's knowledge which are content technology and pedagogy whereby these components interact and overlap with one another in order to result in an effective teaching and learning experience. Hence, this chapter and it's contains are developed based on TPACK theory to investigate digital literacy among TVET instructors.

All in all, based on the literature discussed, it can be said that digital literacy among TVET instructors, it's challenges and recommendations are related to TPACK theory. As mentioned in TPACK theory, teachers must possess knowledge of technology too and that there is a correlation between technology, pedagogy and content in order to have a successful teaching and learning session in the classroom. It can be observed that high level of knowledge in technology makes the teachers view teaching and learning in the classroom positively and at ease. Thus, it is hoped that all TVET instructors could be equipped with Technological Pedagogical Content Knowledge (TPACK) to improve their level of digital literacy to ensure efficient delivery of information in the classroom.
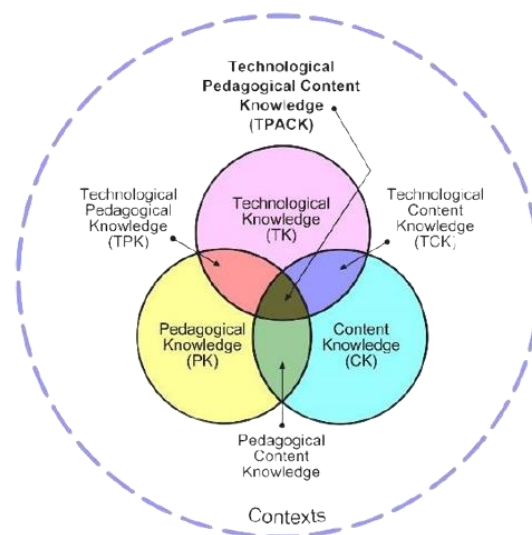
Figure 1. The TPACK model Source: (Mishra and Koehler, 2006)

3.0 Current Scenarios in TVET Institution

Undoubtedly, COVID-19 has greatly impacted survival, safety, health and the national education system. Movement control orders and enforced limitations have resulted in the realization of the importance of ICT infrastructure, especially in adapting teaching and online learning (PdPDT) in polytechnics and community colleges (JPPKK), Ministry of Higher Education, Malaysia (MOHE). Since education must be continued during a pandemic, addressing the problems of teaching and learning is crucial. TVET instructors are still working on the teaching plan's course curriculum. These issues are important because they directly impact how TVET materials are delivered. TVET instructors teaching strategies emphasize hands-on learning. Therefore, TVET institutions must acknowledge online or remote learning as a practical means of teaching and learning (Ismail et al., 2022).

According to Elias (2021), out of 6667 TVET instructors in polytechnics and community colleges in Malaysia, 87.1 % have online teaching and learning software and applications skills. Next, 81.4 % could use LMS platforms for teaching and learning process and only 53.3 % use Webex, Microsoft Team, and Google Classroom. Yeap et al. (2021) claimed that Malaysian TVET instructors need training in the fundamentals of e-learning since they lack of experience using the ICT facilities. To accommodate the new norm in teaching and learning process, TVET instructors also need to adjust their pedagogical approaches, techniques, methods, classroom management and evaluation. This is because they require time to develop lesson plans, enhance their IT abilities and develop their knowledge of online pedagogy and assessment techniques. These are crucial components for TVET instructors to engage students and conduct their courses through online learning effectively.

4.0 Essential Browsing, Searching, And Filtering Information

Due to the tremendous amount of data, information, and digital content available on the Internet and the World Wide Web, anyone can "possess" various pieces of knowledge at essentially no cost. But is this the case? Could we manage all this data? Could we obtain the appropriate information about the subject that is related to us as TVET instructors? Or, even better, Could we formulate the correct queries to elicit the facts, which we may transform into knowledge to share with students?

According to (Sánchez-Cruzado et al., 2021), TVET instructors only possess a low intermediate level of information literacy proficiency. Therefore, TVET instructors must develop skills in understanding a particular aspect of digital literacy, such as browsing, searching, and information filtering. They need to master the skills of accessing and searching for information online, expressing information needs, and finding relevant information for teaching purposes. TVET instructors must choose educational material wisely, manage many sources of information, and develop a personal information strategy.

Here are some of the most crucial things to remember when looking for information online:

- The availability of information online does not imply that it is accurate and trustworthy.
- Before believing the information on a website, always examine its credibility.
- Typos, syntax and spelling errors, and an abundance of ads indicate low-quality material.
- There are other sources with information on the same subject; do not just rely on the
- first one you discover.
- For more options, use "OR". Try to compare the terminology others may use to describe the same idea so you may acquire the correct information.
- Specify only reputable websites in search results. When looking for reliable information, this method occasionally works. TVET instructors could limit search results to websites of educational institutions by prefixing their search request with "site:edu" for instance.

As a result, the teaching and learning revolution has a new path thanks to the current era of digitization. A TVET instructor needs to be flexible and have some knowledge-finding tools to accomplish this. As TVET instructors today have a vital role in developing future human resources, continuous efforts must be made to ensure that they could improve in data and information literacy. To reach a better level of digital literacy in browsing, searching and filtering information, they should successfully increase their usage of digital technology and receive the necessary training (Rizal et al., 2021).

5.0   Using Digital Tools

The world is rapidly changing due to IR 4.0 and education in Malaysia now faced with the issue of ensuring that TVET students are prepared to fulfil the expectations of IR 4.0 sector. TVET instructors are required to use innovative teaching and learning methods in the light of IR 4.0. As a result, TVET instructors must adapt their teaching and learning strategies by using digital tools. Digital tools are applications, websites and other online resources that can facilitate the completion of tasks. Many of these could be accessed online without having to download it, allowing for access from both home and workplace. Digital learning tools which are used effectively in the classroom could improve TVET instructors' lesson planning, boost student engagement, and promote individualized learning. Using digital tools, TVET instructors could include text, graphics, audio, and video to develop an interactive experience. The use of digital tools in education is crucial now because they could make teaching and learning easier and transform the way we educate (Saljo, 2010). Table 1 lists various digital tools that TVET instructors may use to facilitate them in the teaching and learning process.

Table 1 Digital learning tools (Chauhan, 2018)

Digital Learning	Features	Activity
Edmodo	Quizzes administrate and give educational resources, monitor student achievement, and connect with parents, develop online collaborative groups	Pools Quizzes Notes Assignment Blogs Award Badges Online
Thinglink	to document and exchange observations and notes about actual places, events, and objects	Personalised visual content
ClassDojo	to enhance student behaviour through immediate feedback	Share a picture, a video, and a message on the class topic. Individual message
Animoto	to easily produce a high-quality video	Audio-visual materials
Projeqt	to produce multimedia presentations with dynamic slides that can incorporate, interactive maps, links, online tests, Twitter timelines, and videos	During a class session, teachers can share with students academic presentations which could be visually adapted to different devices

Therefore, the creativity and dedication of TVET instructors are required in adapting each of these digital devices according to the needs of the curriculum and students. When creating learning activities, TVET instructors must provide a clear structure so students are not left helplessly to manage their learning. However, TVET instructors must design learning activities that enhance social interactions because there is a severe shortage of social interaction in distance learning. A well-designed course structure is also necessary to make up for the lack of social interaction during distance learning utilizing digital tools (Langegård et al., 2021).

6.0   Presentation Tools

Nowadays, we literally live in a world that is highly dependent on technology and the level of dependency will only be increasing. Thus, it is vital for TVET instructors to be digitally literate to ensure the effectiveness of their teaching and learning session. One of the ways to improve digital literacy among TVET instructors is to work on their presentation tools comprehension as this could be widely integrated in the classroom. Corbel and Gruba (2004) said that TVET instructors must be confident in handling these presentation tools and capable of presenting it to the students in the classroom. Among the presentation tools which are available and could be integrated by TVET instructors are:

- PowerPoint
- Google Slides
- Apple Keynote
- Screencastify Submit
- Prezi Next
- Canva
- Pear Deck
- Haiku Deck
- Glogster
- Easelly

Thus, it could be concluded that continuous support should be given to TVET instructors as they work on to improve their skills in using varieties of presentation tools. Workshops and trainings could be provided to give more exposure of available presentation tools to them. As a result, this will enhance their digital literacy in teaching and learning session

in order to have a smooth transition from traditional method of learning in the classroom to the 21ˢᵗ century education.

7.0   Multimedia for TVET Instructors

Next, multimedia skill has been identified as one of the skills in digital literacy. According to Oxford Learner's Dictionaries; multimedia can be defined as the use of several different ways of giving information or several different materials such as the use of sound, pictures and film in addition to text on a screen. Multimedia is also defined as the uses of computer technology to create store and experience multimedia content (Singh, 2007). Therefore, it could be said that when TVET instructors plan to integrate multimedia in the classroom, it requires knowledge and skill of using pictures, audio, video and more. TVET educators must be capable of doing so by mastering multimedia skills. The application of multimedia in teaching and learning process in TVET institution is seen as a mean to make the learning process more interactive. Furthermore, it would also promote student's engagement with the integration of multimedia in the classroom. By sending TVET instructors to on-going training, it would equip them with comprehensive knowledge and skills of multimedia which are required when conducting lesson in the digitization of TVET. In addition to that, resources and facilities which are made available in TVET institutions need to be accessible and upgraded. Budhedeo (2016) said that facilities such as high-speed internet access should be made present in educational institutions as it is an essential aspect of TVET digitization. Similarly, in a recent study conducted by Mahdum, Hadriana and Safriyanti (2019) among Indonesian high school teachers who are teaching in rural district, as a policy-maker, the financial support for the schools should be provided by the government to provide adequate ICT equipment, facilities and infrastructure. In short, the ability to use multimedia in teaching and learning is a part of digital literacy and it could be developed among TVET educators by attending workshops and training and upgrading facilities in TVET institutions.

8.0   Using Online Learning Platform

Since the internet era, learning methods have continued to advance. Furthermore, to ensure that today's TVET instructors remain relevant, they must master the online platforms' teaching approach. Websites or software that enable online learning is known as online learning platforms. It allows students to study several subjects entirely online and remotely.

According to Yasak and Alias (2015), online learning is a major platform for teaching and learning activities in the general education sector. TVET instructors are unable to avoid the reality that mastering one of the online teaching platforms is vital, especially in light of the current Covid-19 pandemic issues. Distance learning needs to be implemented by TVET instructors to ensure that the teaching and learning process can achieve its objectives. The discipline of education known as remote learning focuses on the pedagogy, technology, and instructional system design used to educate students who are not physically present in the institution. The process of developing a similarly high-quality of educational experience that best meets the needs of students outside the classroom is known as distance learning. Instead of meeting in person for classes, TVET instructors and students communicate whenever they want by exchanging written or digital materials, or they could utilize technology that enables real-time communication. A hybrid or blended course of study includes on-site attendance for any purposes. This includes sitting for examination and distance education.

The following are some of the various online learning platforms that TVET instructors could incorporate:

- Curriculum Information Document Online System (CIDOS)
- Massive Open Online Courses (MOOCs)
- Google Classroom
- Microsoft Teams
- Blackboard
- My Guru
- Schoology
- Kahoot
- eduClipper

However, as it takes time for TVET instructors to prepare training materials and advance their technological knowledge, their preparation is crucial to mastering this online platform. According to (Yeap et al., 2021), collaboration among TVET instructors with instructors who are competent in ICT to create an online platform for classes which could help in this issue.

9.0   Conclusion

As for conclusion, this chapter aims to discuss about the skills which TVET instructors must comprehend in order to develop and improve their digital literacy in the midst of TVET digitization. Therefore, it has been identified that there are 5 vital skills for TVET instructors to comprehend to develop their digital literacy which are browsing, searching and filtering information; using digital tools; presentation tools; multimedia and using online learning platforms. It is hoped that this chapter could contribute to a better understanding of digital literacy among TVET instructors in Malaysia specifically, and in contributing to the future research in the same areas generally.

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CHAPTER 2: Shifting TVET teaching paradigm in time digitization

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"Men are only as good as their technical development allows them to be."

George Orwell.

1.0   Introduction

Human resource is a valuable capital in building and shaping the nation. Hence, nowadays the industry needs to employ human resources or workers with various skills to overcome the current challenge of economic growth in this globalization era. A skilled and semi-skilled worker is a contributing factor that can guarantee the positive economic development of the country. Malaysia is no exception in developing a capable human resource with excellent employability skills that can fill in the industrial needs and consequently helps national economic growth. A good education system can train individuals to obtain and expand knowledge, enhance critical thinking and develop hard and soft skills together with appreciating the values of cooperation and team works. To achieve this, Technical and Vocational Education and Training (TVET) institution is a key player in producing knowledgeable and highly skilled human capital by integrating elements of employment-ready technical skills and learning experiences in the curriculum. In contrast to the other types of education systems, the TVET system is generally providing related job-ready skills and the necessary certifications to meet regulatory requirements for specific job sectors or occupations.

Overall, the TVET education system can easily meet national skills gaps by providing a holistic system that enables this kind of agility, flexibility, and responsiveness through employment-ready and in-demand skills training. In Malaysia, a large budget allocation for technical and vocational education (TVET) has been provided by the government to reinforce TVET institutions to produce valuable human capital to meet up national industry needs.

Figure 1 explained about steps required in implementing digitalization. Digitization is the process of converting information from a physical format into a digital one while digitalization is the process of leveraging digitization to improve operational processes. Normally digitization and digitalization are used interchangeably and bear the same conceptual meaning. Digital transformation is the process of implementing a whole-of-system digitalization strategy for a system or institution.
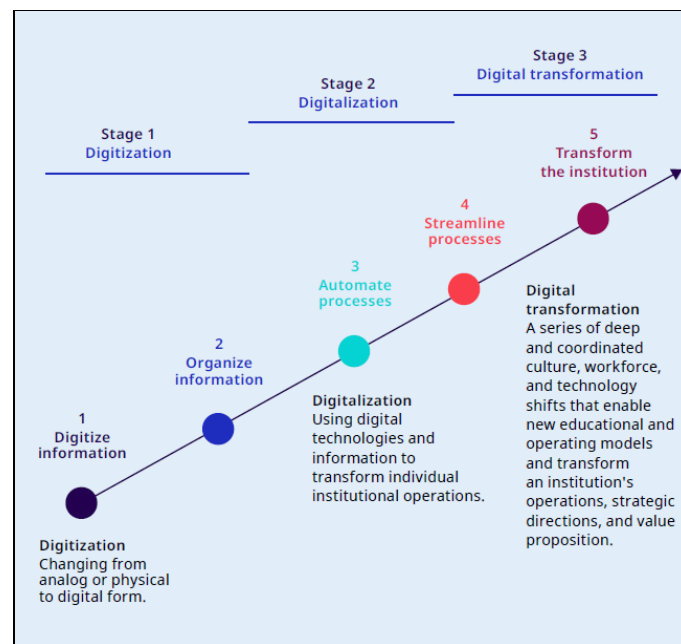

Figure 1: Stages in the implementation of digital strategies (Brooks & McCormack, 2020)

However, every TVET education system should examine, determine and come out with the most applicable approach for their digital transition according to their local needs and capabilities. The institution is commonly facing some shortcomings; budget, ever-changing policies and expertise although digital technology is already accessible and all set to be implemented in the system. Nevertheless, the scenario of adapting digitalization in our daily life is an undeniable reality and the efforts to enforce and visualize this vision need to be achieved by any means possible.

2.0   Factors Influencing Digitization in TVET Education

The current labour market landscape is gradually shifting to skill-oriented employment from knowledge-based or theoretical aptitude employment. Hence, the increasing demand for an employee with good hands-on proficiency has brought the importance of TVET education to the fore. TVET education is known for its important role in producing knowledgeable and highly skilled workers across a variety of job sectors and industries, especially in technical aspects. In the foreseeable future, advancement in technology requires a working environment to focus on the new digital economy. Thus, its diffusion into the TVET education system through digitization is vital so that graduates are relevant to the demands of employers and industries. There are several factors which lead to digitization in TVET education and here, three major factors have been highlighted and discussed. The three major factors influencing digitization in TVET are technology development, the fourth industrial revolution (IR 4.0) and pandemic COVID 19.

i. Technology Development

Through time, the evolution of science and technology has transformed the world of history and human lifestyle. The first revolution of the human world started with the introduction of steam and water power followed by the advent of power plants in the second industrial revolution (IR 2.0), these innovations and advancements have significantly changed the world and created a better life for a human being. Next is the Third Industrial Revolution which is also known as the digital revolution. During this revolution time, information technology and automation had been introduced to our daily life through the usage of electronic devices such as the computer and the invention of the internet.

This scenario has also reformed human interactions, labour market demands and also the entire community's lifestyle ecosystems, including education. Expansion of information technology precisely helps a smooth transition of digitization in TVET education, especially through the internet. The Internet can provide vast and unlimited access to information with just a few clicks away to all users (educators and learners) and it also creates a better platform and medium for borderless communication. Therefore, in recent years, technology has become a valuable resource to support teaching and learning for educators and it acts as an alternative option when traditional models of education are no longer applicable. Since technology has

become a more imperative tool in our daily life, it is important for education institutions especially TVET institutions integrate technology into the curriculum for better preparation for the 21st Century skills and career demands. The needs for digitization of the TVET framework caused by technological advancement are derives from the following factors:

a.   industrial automation

b.   the complexity of tasks and equipment

c.   multidisciplinary work procedure

d.   emphasis on the research and development sector

ii.   Fourth Industrial Revolution (IR 4.0)

The fourth Industrial Revolution (IR 4.0) is a new phase in the Industrial Revolution that focuses heavily on interconnectivity, automation, machine learning, and real-time data which transformed human lifestyle and working life with the internet acting as an essential requirement in the economy, political, educational and social sectors. This revolution comprises nine pillars which are (i) simulation and virtual reality, (ii) vertical and horizontal system integrations, (iii) internet of things (IoT) industry, (iv) cybersecurity, (v) cloud computing, (vi) additive manufacturing, (vii) supply chains, (viii) public data analysis and (ix) robot autonomous. As for IR 4.0 in the education sector, IR 4.0 is implemented through the usage of digital tools and the introduction of future education models by focusing on smarter, mobile, comprehensive and virtual education and skills development. Generally, Industry 4.0 is known as one of the major factors of innovation in TVET.

Hence, policies for digital TVET should be seen through a perception of this new revolution paradigm. It is crucial to note that there are several factors which caused TVET to react to IR 4.0 in terms of the digitization process. These factors are:

- Increase of automation of simple tasks and mid-level tasks through technologies such as artificial intelligence
- Increase in complexity and cost of equipment used in technical occupations
- the constant emergence of new technologies
- complex workflows and procedures involving multidisciplinary teams increase of flexibility

- increase productivity, efficiency and quality

- new research and development activities

- development of new skills and talent

Consequently, IR 4.0 revolution has witnessed a significant change from traditional learning methods to digitization learning in TVET education as students tend to learn by using blended learning methods, usage of a variety of applications and gadgets, learning through gamification, usage of a social platform such as WhatsApp, Facebook, etc. and learning using heutagogy, paragogy and cybergogy. Hence, by improving the responsiveness of TVET educational systems to this emerging trend, it allows the progression toward digitization in the TVET system. This shifting process requires collaboration and understanding between education, research and industry to allow TVET systems to execute their roles as a skills training providers for labour market needs.

iii. Pandemic COVID-19

The digitization of the education system especially the TVET system has evolved in a few recent years. However, the pandemic COVID-19 crisis has accelerated its importance and there is a need for both digital skills and new digital learning models to be implemented which brought the issue of digitalization of education to the top. Fast pace transition from traditional teaching and learning methods to digital and distance learning options has also been observed as almost all classes had to be cancelled and education institutions had to be closed too for quite some time. The pandemic crisis has shown the vulnerability of physical traditional learning methods and emphasizes the importance of alternative solutions through digitalization. Thus, all TVET institutions need to sustain online and distance learning options as an imperative act for the digitalization of TVET and skills development. As we know, distance and virtual learning methods can be conducted at any place and time and it becomes suitable options for educators to reach learners in this challenging time. Still, suitable and flexible solutions need to be developed as this shifting transition in the TVET education paradigm will affect all forms and levels of social groups, including the most vulnerable; low-income countries. The innovative solution needs to evolve into different types of options

involving high-tech, low-tech and even no-tech solutions along with solutions suited to a different level of digital literacy among learners so that it can be implemented in diverse interest groups. Nevertheless, the importance of digitalization has been heightened in various ways by the impact of the pandemic, as stated in the following:

i.   to enable data-driven decision-making and inform improved supply-side planning
ii. to improve quality, efficiency and reliability
iii. to enable an expansion of learning opportunities
iv. to increase access to and participation in the labour market through skills development
v.   to increase the credibility of the sector
vi. to enable linking different parts of a skill system

3.0   Engineered Approach TVET towards digitization to realize semi-professional students

Our world of education is experiencing a paradigm shift as the world is currently leaning more towards digital learning. There are various ways that students can instil interest in the world of TVET and they need to find the best method to meet the demands of the industry in the future.

i.   Creating the Internet of Things (IoT) based applications

Internet of things (IoT) is no stranger to the world of education in general and especially to all ICT users. The skills of the teaching staff are enhanced by constantly creating various teaching aids using the IoT methods. The development of the digital internet in Malaysia today is in line with the rapid pace of digital technology in the world which makes it appropriate for TVET students to be introduced to the use of IoT in learning methods. For example, instructors can assign practical assignments virtually and review them virtually or remotely making it convenient for both parties. The government have made various efforts to upgrade the quality of the internet in Malaysia by establishing wired and wireless internet connections almost throughout Malaysia to ensure that every citizen could get access to the internet.

Figure 2: IoT connection of devices to the internet (James Keevy, 2021)

Figure 2 shows a description of IoT as the connection of devices to the internet network that the average person knows about smart-home, smart-city or smartphone. This is an IoT world where data can be set up, controlled and collected for better management purposes.

IoT functions include smart homes, agriculture, industry, retail, healthcare, smart cars, smart cities, energy generation and even smart gadgets. The focus is on TVET education in Malaysia, for example, IoT in agriculture to monitor students growing chillies at home. They can use drones for field monitoring, water management, machines for routine operations and soil monitoring systems. Students can also be assessed remotely by using online methods such as video calls, google meets, teams, skype and so on. Therefore, the IoT approach is very important for TVET students as it will be beneficial for their careers. This will further boost the development of Malaysia's digital world and the TVET students remain competitive and will become highly skilled in managing technology during their career.

ii.   Simulation-Based Learning; Virtual Reality (VR)

For TVET students, the practice of practical learning needs to be given more emphasis so that they could get a better understanding and comprehension. They need to be introduced to the equipment and master the usage of each piece of equipment so they could skillfully handle it. Face-to-face learning methods are best for them to do hands-on, however, in the era of digital learning, is it still appropriate for us to still rely on face-to-face learning methods? This is a new millennium challenge for educators, in particular, to deepen the knowledge of

digitization and create applications that are simulation materials to help them to learn no matter where they are. Students are exposed to the risk of danger at each introductory session to the equipment compared to the use of equipment simulations. For TVET students, they are very excited if virtual reality learning is used as a new millennium learning method as they are more inclined to create new experiences with more realistic and engaging methods. VR tends to be real equipment and students seem to be able to use it realistically. Students will be more efficient when they try it many times and correct mistakes. Realistically, VR will enable students to continue to deepen their learning in a more in-depth and comprehensive manner without any barriers. This will allow students to continue to gain new experiences as well as acquire skills and hone existing skills. This simulated learning is important because new millennium students tend to be entirely technologically advanced. VR equipment gives students the freedom to make mistakes and can make corrections without hesitation. In addition, an engaging multimedia presentation will further increase the impact in terms of interest and understanding of VR methods for students. Indirectly VR will increase motivation as they can learn flexibly as it brings them closer to reality. The use of VR is interestingly applied in the world of TVET education.

iii.   *Flipped Classroom*

Interactive and conducive learning is a way to engage students in focusing on the subject they are studying. Students need to master each sub-topic in the curriculum to produce TVET students who are competitive and able to work realistically. The concept of the flipped classroom has been carried out in foreign countries in general and is still foreign in Malaysia. They need to focus on different learning methods that are face to face to the method of examining the study material outside the lecture room or at home. While in the lecture room, students need to have a discussion and debate the material. Students need to focus more on aspects of the application in real life. Students can combine ideas and materials with other students through digital tools. Instructors need to balance lecture room-based learning as well as on-the-job training so that students are closer to reality. The main things in a flipped classroom are:

   a.   Define scope and content

For each content in a given subject, it is necessary to give a determination of the scope that leads to the needs of the curriculum so that each of their discussions is the same and meets the

requirements of the question. Problem-based tasks given will also achieve the same learning outcomes if the time and scope have been set well. This makes it easy to see whether the learning is based on classmate discussions or based on case studies.

b. Prepare Materials

The most important thing is the selection of teaching content, whether video, text or audio to explain the topic. This is important to create students 'interest and escort them to finish the material with full concentration.

c. Choose appropriate activities in the classroom

Interesting activities that need to be created in the flipped classroom are first focused on the part before the lecture to attract the attention of students. Next for ongoing activities, it is necessary to consistently involve students and evaluate them. The last is a post-lecture activity where students can review the activities they have created.

Flipped classrooms are a great way to create a more realistic and effective learning environment.

4.0   Challenges and Impact in Digitization of TVET Education

In line with the fourth industrial revolution or IR 4.0, Malaysia needs to be ready in preparing human capital for the preparation of a high-quality workforce to be able to achieve the needs of the industry to face challenges in various fields whether from the field of disciplines, economics and industry. Among those who receive a direct impact is the field of education, especially at the tertiary level, especially in the field of TVET. Which, this field is a major contributor to the supply of skilled manpower to the country. To ensure that Malaysia continues to be able to produce graduates who are competitive with other developed countries, Malaysia should make changes in the education system holistically whether education at primary, secondary or tertiary levels. This is to ensure that the country is not left behind by the currents of world modernization. Apart from that, we do not want Malaysians to have a skill gap in the job demand if only people do not master the skills of the 21st century, especially Malaysian graduates. Therefore, all parties should be open-minded and together help in realizing

Malaysia's digitization efforts. This change can help further boost Malaysia's name in line with the names of other developed countries in the world.

The Great Wall of China cannot be built in a day. So, this effort must have some challenges to get something better for the best. In this part, the challenges and impact of the digitization of TVET education will be discussed. The topic is chosen that will be discussed are curriculum, skills IR 4.0, and security issues.
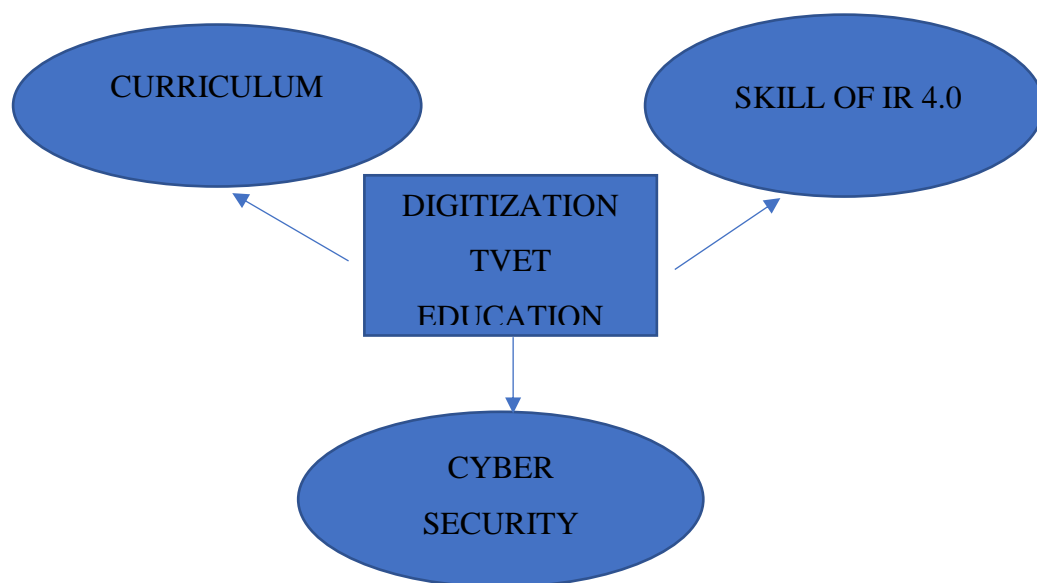

Figure 3: The summarization of three main components of challenges in digitization in TVET education.

4.1 Curriculum

The term industry revolution 4.0 (IR 4.0) was introduced by Germain in 2011. According to Hofmann and Rusch (2017), Germain declared the revolution as part of their high-tech strategies. Now, all tasks will be completed by humans. Soon, it will be changed. Everything will be done by machine. The labour market is impacted by this transition, which also alters how the modern worker looks. It prompts many experts to discuss the subject. Figure

3 shows the summarization of three main components of challenges in digitization in TVET education. It is important because there are still a lot of questions about how job profiles will change in response to these issues. Besides, companies nowadays have changed their business models to digitalised systems with the use of artificial intelligence, robotic cognitive computers, and the industrial internet of things. From this situation, the authorities should realise and take action to ensure the curriculum needs to be transformed and updated.

These revolutions are supported by underlying technologies like cybersecurity, sensors, actuators, RFID, RTLS, and mobile applications. These are all specifications for the workforce that industries in vocational education and training need for graduates to expertly fill job demands at a specialist level in the future. Finding technical content in the meantime to suit future labour market demands so that education is flexible enough to balance supply and demand before skills become outdated. For their future education, the new technology curriculum needs to include up-to-date technical material to satisfy the demands of technological development to ensure that TVET graduates can have a competitive chance of finding a job after finishing their studies, other popular programming languages and IR 4.0 technologies should also be taken into account. In line with all of the talks in IR 4.0, all of these changes necessitate the implementation of new teaching methodologies, including the digitization of training institutions advanced working experiences, flipped classrooms and others.

4.2   Skills Fourth Industry Revolution (IR 4.0)

Our country is currently confronted with the challenge of a lack of expert workers' abilities among graduates related to the revolution industry, as well as a lack of adequate skill sets to expedite students in the important fields of instants big data, robotics, 3-D printing and new software in new technology. These are some difficulties in gaining skills relevant to reaching IR 4.0. So, how should graduates acquire skills while simultaneously mastering IR 4.0 be addressed? As previously stated, the involvement of authorities at all levels is required to move forward with the industrial revolution. It has been suggested that the Malaysian educational system needs reform. Malaysia should redesign its higher education curriculum and strengthen government cooperation in the areas of soft skills and English proficiency, increasing the pool of competent people through industry and education, and closing the skill gap between job demand skills and presentation skills. Furthermore, it is recommended that

TVET institutions begin reforming the software learning process and become acquainted with network structure to master big data technologies.

Technical proficiency is required for IR 4.0. Meanwhile, technical competency necessitates learning to work with various data types, grasping and mastering the process, collaborating with others, successfully communicating, and initiating new ideas. This is crucial so that the graduates' marketability, employment gaps, and self-skills can be improved. It also helps them break into the global job market. As a result, the country will have graduates and a well-rounded workforce that is technologically advanced. That is why they must constantly improve their potential and acquire the most up-to-date competent skills themselves, as technology evolves. If not, it can be difficult to locate people with the right mix of technical skills. As mentioned by Byrnjolfsson and McAfee (2014), at the most abstract level, it is indicated that talents and jobs requiring creative endeavours and social connections are the most likely to demonstrate the most resistance to change in the next years. Hence, the policy work on future skills necessitates a three-pronged approach that includes:

a) By surveying future technology, it is possible to anticipate skill needs as well as areas of deskilling.

b) The teaching of transversal or generic skills, particularly learning-to-learn abilities, would allow people to adapt to future changes in the labour market through continuing and lifetime learning

c) Enhancing educational systems' responsiveness to developing trends, necessitates tight collaboration among education, research, and industry for TVET systems to deliver skills training in emerging areas

4.3 Cyber Security Issues

Information is one of the most valuable assets for everyone, especially higher education institutions. It must be protected from security threats. Most of the integration across multiple institutions in IR 4.0 is done online, it has become the most difficult aspect of adopting IR 4.0 is the danger to information technology security. This will also put consumers at risk of security breaches, data leaks, and cyber theft. There is a need to increase the campus network's risk posture and security efficacy. It necessitates the identification of operationally critical threats as well as the assessment of vulnerabilities for risk level measurement via the campus network's

continuous network monitoring. To overcome this problem. The authority has invested a large budget to ensure this effort applicable to help and secure the information of institutions. Here is some model that can be recommended to protect their information. For instance, OCTAVE (Operationally Critical Threat, Asset and Vulnerability Evaluation), FAIR (Factor Analysis of Information Risk) FAIR is built to address security concern weaknesses, NIST RMF (National Institute of Standards and Technology's Risk Management Framework) covers a series of activities related to managing organizational risk, TARA (Threat Agent Risk Assessment) is a risk assessment framework to helps companies to manage risk by distilling the possible information about security attacks. However, there is no process in place to help organisations determine which model is best to use within their organisation. All models have their weaknesses. At least, it must have them, to ensure that the information will be secure and will be protected. Hence, customers will trust the network system.

5.0   Conclusion

In conclusion, digitization in TVET education became a broad issue. The world had already given more attention to it. Every country and industry needs to shift to follow this requirement. The skilled and semi-skilled worker is a contributing factor that can guarantee positive economic development of the country. Meanwhile, human resource with excellent employability skills can fill in the industrial needs and consequently helps national economic growth. In this chapter there are three major factors were discussed influencing digitization in TVET technology development, the fourth industrial revolution (IR 4.0) and pandemic COVID 19. To attract student interest from conventional class learning to online class learning, some way was introduced.

There are IoT-based applications, simulation-based learning; virtual reality (VR), and flipped classrooms. Interactive and conducive learning is a way to engage students in focusing on the subject they are studying. And the last topic discussed in this topic is about challenges and impact. They are three main challenges that were discussed. They are curriculum, skill IR4.0 and cybersecurity issues. The curriculum is a very important matter that needs to transform to shift the paradigm of Malaysian TVET education. After that come skills that everyone needs to be capable of to get the competence skill to develop their potential for their

future. Hence, Malaysia will produce many competent workers that are capable to improve, innovate and challenge others industries country in the world.

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CHAPTER 3: Empowering the skills before starting to learn law in a TVET Education: 4 Simple Steps

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3.1 Introduction

We have to enroll for law courses for this semester? NOOOO!!!!!

'Studying law is difficult'...

'It is impossible to score an A in law because we are not law students'...

When I asked junior and senior students and even fellow lecturer co-workers who had studied law, they will say that…

LAW IS HARD...

Learning law is already difficult using a traditional face to face learning method, now how do I learn and excel in my law subject during this endemic era?

For in this era, because of the outbreak of COVID-19 which has made a major impact on the method of teaching and learning where everything is forced to be digitized, be it the notes, exercises, lecture class and even the system of marking and filing the student's worksheet.

Having studied a degree in law and masters in comparative laws whilst teaching law for nearly 11 years now. I admit that studying law has its ups and downs but getting A in your studies is not entirely impossible. You just need to know the tricks of studying it.

In practicing these tricks, we can divide the steps into three steps namely before enrolling in the law course, during study and before the final exams. However, for this part, I will only emphasize the skills before you enroll in law courses in your institution.

STEP 1: positive mind set

MIND OVER MATTER…

Have you ever heard about that idiom? It would simply mean that when you conquer your mind, you will conquer and overcome your problem.

Merriam Webster Dictionary defines mind over matter as; "a situation in which someone is able to control a physical condition, problem, etc., by using the mind".

If you can conquer your mind, it is a sign that you have developed mental toughness (MT) which refers to an inner focus and commitment to rise above challenges when facing adversity. The challenge in this context is to excel in a law subject even though you are not a law student, and it is an unpleasant situation for you as a student to face through. It is viewed as one of the most important psychological attributes in determining success in sport and preferably, in your academic success.

One of the methods in conquering your mind and enhancing mental toughness is by developing the sense of mind positivity. Positive thinking interventions emphasize on improvement of the individual abilities to confront negative situations and focus on positive skills (Stallard,2008). A research done in 2015 towards more than 6,000 Australian students has scientifically proved that a positive attitude can boost academic performances.

Another upgraded research has also been done in 2018 where the researchers at the

Stanford University School of Medicine found that having a positive attitude about math was connected to better function of the hippocampus, an important memory center in the brain, during performance of arithmetic problems. It shows that there is an important link between liking the subject and academic success.

Now, how do we change our perception of the law subject from negative to positive?

There are lots of ways in which negative thinking can be changed drastically and one of the methods is by applying a well-known Malay saying "*Tak kenal maka tak cinta*" which would literally translate as 'Not knowing is hence not loving'.

Thus, in knowing law for the purpose of loving it better, you can develop your sense of love by doing what your interest takes you. If you like watching movies which vary from western to Korean or Chinese movies such as Law and Order: Special Victims Unit (SVU) Victims Unit, Innocent Witness, The Innocence, Miracle in cell No.7 and lots more to be chosen. One of the benefits of watching these kinds of movies is it will heighten the motivation to uphold justice and prevent others from taking advantage of your weakness. To do so, you need to learn law to protect yourself.

In simple words, in excelling in the law subject, you must be a lawyer and you must think like a lawyer. There is no such thing as forgiving all the injustice that was imposed upon you and you need to step up for your right.

This is where the skills of analyzing the situation and critical thinking is very important which will be explained more on the next step.

STEP 2: proper equipment - laptop/tab & hard copied legislations & software pdf editor

Give me six hours to chop down a tree, and I will spend the first four sharpening the axe. - Abraham Lincoln.

This quote emphasizes the importance of being prepared in whatever you do. As a student who is now registered for a law course, there are several preparations that need to be done.

1.   Main reference books

It is very important to have a copy of your course outline to check the main reference books that are going to be used by your lecturer. The course outline might have listed a few books, but the trick is you only just need to ask your senior the main book referred by the lecturer to be used in class.

It is essential that you have a copy of that book because usually the main reference of notes points, cases and legal authorities are all in the same place so that when you start the process of study, you are at the same pace with the lesson given by the lecturer.

I know that being a student with a lack of financial resources to buy textbooks is quite expensive. So, the easiest, fastest, and cheapest way to get it is by buying the item preloved by your seniors who's not going to use it again.

Other than that, you can find preloved books via carousel and mudah.my which offers the original books with an affordable price.

Among the benefits of using a preloved book are that the book is already highlighted with the important points to be learned and if you are lucky, the previous owner already jots down the explanation in simple terms for a law student beginner for you to understand.

2.   *Legal statutes*

The second item that you need to have is the legal statutes which consist of the Acts and Enactments that is used as the main reference in your subject. It is advised to buy a newest edition since the nature of law is always changing and I'm afraid that you will miss the latest amendment of the law if you buy it preloved. Usually, the price range of the legal statutes is affordable ranging from RM6-RM12 only.

It is important to have a hard copy of the legal statutes because you will need to flip through the pages everyday for the entire semester! It is important to familiarize with the legal statutes because it is your main helper throughout your final exams.

However, if you are in a hurry and the nearest bookstore does not have enough stocks of the legal statutes, you can buy it online via Lazada or Shopee apps. If the postage took some time, you could download the soft copy from the most trusted website from the Attorney General's Chambers of Malaysia which is: https://lom.agc.gov.my/. This website contains the most updated legislation including the amendments that have been passed by the government up to 836 Acts and till date, the latest Act is the Geographical Indications Act 2022 which was passed on 18 March 2022.

3.   *Computer basic equipment*

One of the advantages of learning law courses is that it does not need high end technology like IT students or architecture students that need a specific range of equipment to learn properly.

A simple laptop with standard specification is enough to enable you to use Microsoft Office and surf through the internet and download PDF editing apps is sufficient to help you through

all the semesters. The cheapest in store with a standard specification price range is from RM1000 – RM1500.

If you want to add another gadget but not as important as having a computer which is quite heavy, you may add a tablet to your list. Personally, I would prefer a tablet that would fulfill my need of using Microsoft Office, ability to scribble notes using a pen and can be used as a second laptop by adding the external keyboard and mouse. There are lots of choices in the market such as the Apple I-pad, Huawei Mate pad and Samsung Galaxy Tab. Among all the choices, the cheapest gadget and the most affordable accessories is the Samsung Galaxy Tab S6 Lite for RM1300.

STEP 3: Organizing your digital notes & lectures

"A good system shortens the road to the goal."
— Orison Swett Marden

By practicing what we have learnt in our first step in a positive mindset and attitude, we have already determined our goal to be successful in our law subject. Now, it's time to have a system to organize all our notes and materials of study.

Organization itself is a life skill. If you have already mastered the art of organizing throughout your primary and secondary school, your tertiary education in a TVET Education will be like a breeze and it will better equip you to apply practical skills for the future.

However, according to research made to the students at University of Oregon by David T. Conley, Ph.D., professor of education in the College of Education, the reality is 47 percent of college students feel their high school did not teach them the organizational skills required to do well in college. Although most of the students (87 percent) agree that better time management and organization skills would help them get better grades. Still, 50 percent of students do not use a single system (software usage or handwriting) to manage all their contacts, assignments, lecture notes and research. According to Gambill, J. M, who found the

link of similarities between the students in three separate schools having low grades is related to students who were not organized for learning.

Whether it is time management, or the ability to plan and prioritize, these principles can be applied in many ways throughout your studies and beyond. As a vocational student, being organized means finding what you need, when you need it.

The traditional approach of organizing amongst all tools is the binder which was the

most effective organizer. Probably because it accomplished such basic necessities for organizing where students had a specific place for homework, they could find returned assignments to review for tests, and they had paper with them for note taking.

However, in the digitization era where all lecture notes and lectures, exercises and assessments are converted into a digital form that can be processed by a computer, the traditional method is falling behind in the steps of a successful organization. It is impossible for a student who lacks financial resources to print all the notes and exercises which can be costly. This is where the usage of technology equipment is applied.

1. *Organizing files in a computer*

Now you're ready to start organizing, but how? The best way to organize files on a computer will vary based on your organization and its needs. In my opinion, it is better to store the data according to the semester that you are in. When creating or saving a new file, take a moment to give it a good name, and place it in the right folder. Your future self will thank you. Another tip is by arranging the file according to a number of priorities. After that, shared drive folder structure best practice is to start with your broadest categories for your main folders, and then get more specific with subfolders. Here's what that could look like.
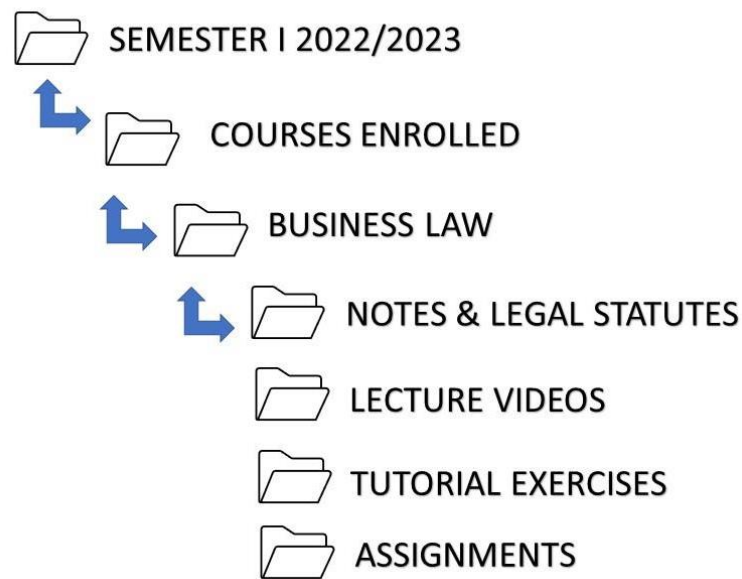
Figure 1: Proper organizing of files

It is important to note that you must be familiar with your own organizing system and make sure all the data is in the predetermined folder and reorganize the files that you have downloaded at least once a week. This is the best practice that I can advise by referring to the practice of most students where they would redownload the notes and Acts for each session of my class and that is time consuming and not cost effective as downloading files on the internet would cost them money to pay to the internet service provider companies.

I would also suggest that you clean the files at the desktop and leave only the file at the computer desktop for easy access. You also can use the function quick access in the computer to help to access the files faster. However, this tip has a disadvantage where if your computer is broken and needs to be formatted, the files at the desktop will also be wiped out. So, the next tip is very important.

2.   *Cloud drive storage*

Have you ever heard of the expression 'Don't Put All Your Eggs in One Basket'?

This phrase was said to be first used in the novel "Don Quixote"(1605) by the author Miguel Cervantes, where it was written "It is the part of a wise man to keep himself today for tomorrow,

and not venture all his eggs in one basket. At that time, eggs can be considered as a valued resource and if it is stored in a single area, if something bad happens to the egg, there will be no eggs left. It is a proverb that means don't concentrate all your resources in one area, because if that endeavor fails, you will be left with nothing.

As a student, your main resource is all your notes, assignment, and project. If you fail to organize your data properly, it might be missing forever, and you must redo it all over again from scratch.

Using a cloud storage service like Google Drive has plenty of benefits, such as easier file sharing and having a remote location to back up your files. But when compared to its competitors like DropBox and Apple's iCloud service, Google Drive's popularity is built on useful collaborative tools and built-in integrations with Google's suite of products and services. It also offers an acceptable data of 15GB of storage.

The first step in organizing digital notes and files is to create a free google drive account. If during your registration as a student, you are given a free student account for google mail or under Microsoft Teams, it is a better option because the data storage and benefits are higher as it is subsidized by the institution.

However, the google drive itself is very sufficient and popular to store data as a student as it's built to work seamlessly with Google. And one of Drive's best features is its integration with Google's office suite of cloud-native apps, which, if you have experience with Microsoft Office, will look familiar.

Most users will gravitate to these programs, which include Google Docs, Sheets, Slides, and more. Not only do they let you create and edit documents, but they're also equipped with intuitive tools that allow for real-time collaboration. Real time collaboration is frequently used in law classes as a tool to make discussion and collaborating to do projects more efficient but still following the rules of social distancing imposed by the government.

Figure 1.2 shows a breakdown of the most used Google Drive applications:

Figure 1.2 Google Drive applications (Source: G Suite Learning Center)

Step 4: English Proficiency in Legal Profession

Having second thoughts on choosing to study law or pursue a career as a lawyer due to your limited English proficiency?

You are not alone, after all.

Being a professional lawyer requires one to be competent to communicate clearly in courts and on papers, thus having excellent language skills is a prerequisite. In the Malaysian judicial system, English is considered as a primary language for communication. Hence, there is no doubt that mastering legal English is very important.
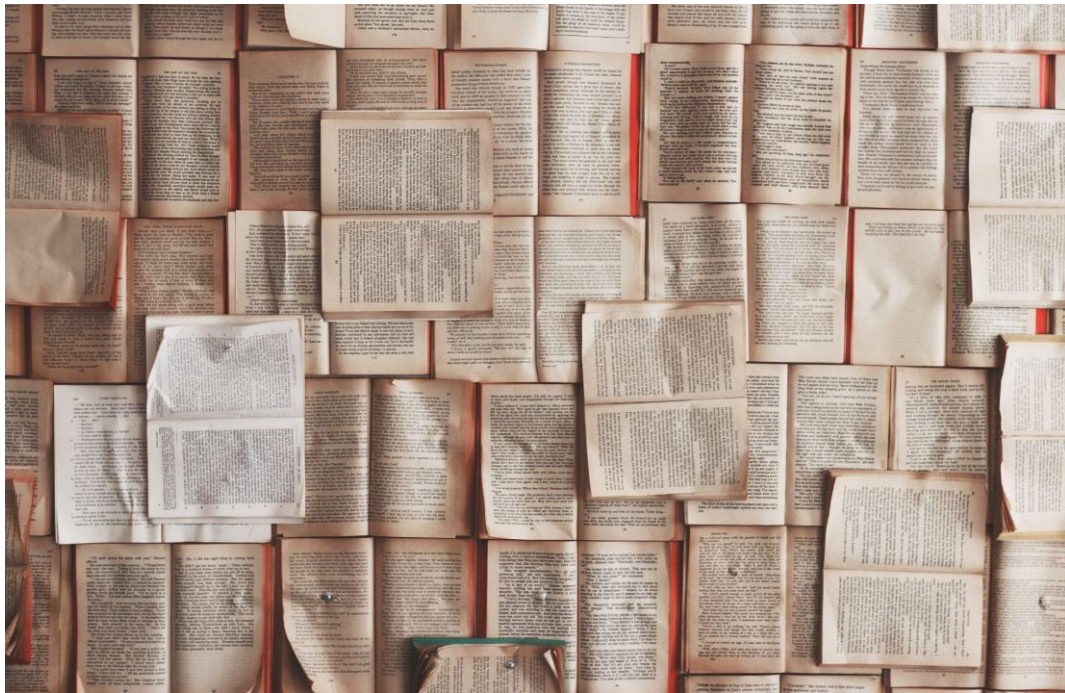
Figure 1.3 Photo credit to *www.unsplash.com*

3.2   Why is Legal English so Crucial for Lawyers?

Understanding the legal terms is so important if you are studying law. English has emerged as the common language in a globalised legal world. Without the fundamental skills in English, it is difficult for lawyers to progress further in their career. Apart from that, it plays a significant role in the study of law because the outcomes of cases depend on the interpretation that judges give to words, and because lawyers must choose the appropriate words to carry out their clients' requests. However, if you are still not comfortable communicating in English, here are some reasons why such concerns should not prevent you from pursuing a career in the legal profession.

i.   Consistent practice will always help you to improve your English.

Your desire to study law is always there, but one thing that hampers you is your lack of English command. So, having deliberate and consistent practice might do wonders for your language skills. Practice makes perfect!

ii.   Multilingual lawyers are in more demand

Your fluency in several languages should make you happy! The ability in multiple languages has been seen as a valuable asset among lawyers especially in Malaysia. In fact, many law firms are employing multilingual lawyers.

iii.   Do your best!

There are several success stories of lawyers and law students who excelled in the law field despite being weak in English proficiency. Even with linguistic limitations, they were able to succeed in exams or even work for charitable causes. You should never let your negative mindset (English language disadvantage) stop you from pursuing your dream career in the law field since you will never know how much more you are capable of.

Let us now talk about the realistic measures you could take to overcome your struggles in English.

3.3   Ways to practise!

Step 1: Recognise and Accept your Weaknesses

Two circumstances might be encountered by a non-English speaker:

You were not raised in an English-speaking environment - Therefore, you are not comfortable enough using the language

You have reached a certain degree of English proficiency, however, you are afraid of people who might judge you for making mistakes or having a negative mindset of your English ability.

You are familiar with the ideal sound of good English. You are also aware of your English skill level. However, when we are too stressed thinking on how to use English perfectly, you will somehow end up struggling to communicate the language effectively. Likewise, feeling continuously conscious about your limitations, which affect your self-esteem, will eventually lead to having lack of confidence in your capacity to work or perform.

Hence, instead of worrying much about your limitations, embrace them and let them inspire you to become a better one. Every mistake you make is the process of room for improvement. Move forward and focus on the task at hand.

Step 2: Deliberate Practice

Speaking

No doubt that speaking drill is the best way to improve your speaking skill. There is no other way that one can master the English language without having speaking practice. Surround yourself in an English speakers community. Apart from that, try to take part in any public speaking or debate competitions. Well, you might be nervous at first, but slowly, you will develop the confidence level in you, and of course, it helps to widen your English language capacity.

Writing

Writing skill is undoubtedly important in mastering English, as well as in law study. You have the resources and time flexibility to enhance your writing skill. Start practicing to write and it is necessary to have someone to proofread   your writing. You can get helpful feedback from a proofreading procedure that enables you to identify the precise grammatical faults and errors you frequently commit. From there, you know which part or area that you need to improve more. You will be taken aback when you see how much you have improved.

Do not be concerned with the 'legalese', the intricate technical terminology used in legal documents. If it is used excessively, it may lose its simplicity and precision in which it clashes with the original goal. Many have emphasised the need for clear language in legal drafting to convey the intent and function of the document. You might even be surprised to learn that very few lawyers try to compose in plain English.

Step 3: Understand the purpose

For law students, it is important to understand the goal of law tests, which is to convince your examiner that you are capable of identifying legal issues and applying laws precisely. In other words, mastering exam-taking strategies is more important than having perfect grammar.

Nevertheless, typos and grammar mistakes which might be slightly accepted in literary writing for a law school exam, are actually not tolerated in practice. Since you have chosen yourself as someone who will write or talk about the law, you have to present yourself to such a professional standard. Any legal document must express the intent and function in full, intelligible detail.

3.4 Conclusion

It is true that learning law in a TVET Education school as a non-law student with no prior legal training might be difficult and elevate your level of struggle in comparison to other courses. However, the struggle will allows you to have a useful set of skills that is a useful tool for your student and career growth and continuously for your lifetime. Remember, students who have chosen clever strategies to assist them achieve the highest results are the smartest; they are not the ones who spend more time studying. You can try some of the suggestions and see how well they work for you even if this is not a one-size-fits-all approach.

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CHAPTER 4: Transforming an engineering practical work to a virtual laboratory

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4.1　Introduction

Nowadays, people from various fields such as business, sports and politics have started using the internet to spread their activities. Organized programs are easier to deliver to the general public. It is easier to use the internet rather than the conventional approach. In the education world, the use of internet as a medium of exporting the knowledge has also been applied for a long time since there are fields that actually study the internet network methods such as multimedia and computer science. Moreover, the internet also been used widely in the area like mathematics, statistic and engineering where there are activities can be set up in the online platform. Since Covid-19 hit the world, peoples are stuck with the social distances as they only can do their work through the online method. Several terms such as e-learning and distance learning are often used interchangeably by the media and policy discourse. However, this terms have to be clearly understand as there are important differences between them. According to (Arora, 2011), online learning or sometime known as e-learning is defined as the use of digital materials to support the learning process.

This situation is does not necessarily take place at a distance where it also can be used in a physical classrooms to complement the traditional teaching methods. Otherwise, in some situation the conventional method can also combined with the online learning method , in which case it is called as blended learning. In the other hand, a distance learning is refers to a learning process that is performed away from a classrooms or he workplace. Conventionally, this involved the offline course wherein the students responsible to the class via post. In today

practices, it involves mainly the online education , with the instructor can gives lessons and assigns work digitally. As to this fact and along with the Covid-19 situation, the e-learning concept seems like to be more practical to successfully run the class. The same situation goes to conventional lab implementation where the physical lab have to be transformed to the virtual lab. Align with this situation, most of the instructors among the educators have create the laboratory and experiment in the virtual environment. Several software have been developed to ensure and compliment the experiment technical requirement. In TVET implementation, the element of internet networking is one of the step to execute the learning process. As it is in the face to face instruction, the online and distance learning cover a broad range of courses ranging from the university courses delivered online and shorter non-formal training focused on specific skills.

Therefore, in the current pandemic of coronavirus – COVID-19 has created a great uncertainty in many area of lifestyles, including the research and education. In traditional laboratory-based disciplines including biochemistry, molecular biology is significantly affected by the laboratory closures (Vasiliadou, 2020). Generally, hundreds of practical sessions in academia have been suspended without any clear indications for at least years of 2021 to 2022. It is a very challenging situation which causing the extreme stress and anxiety in the academic world. This is because of the experiments are a vital part of sciences where the students can gain valuable experience in various techniques and develop the necessary skills for their future employments in the real industry work and academia environment. Therefore, to overcome this stress and at the same time to be ready with all the challenges using the online method to run the experiments. This is because the virtual laboratories cannot replace the entire elements in the traditional laboratory procedure. The settings of virtual and physical work especially have to be work together whereas the students have the ability to perform the experiments online without any time limitations, receive the instant feedback, familiarize with the health and safety regulations as well as they can repeat the experiment procedure and generate data for their assessment and analysis. Besides, they also can engaged with the technology and prepare more productively for their physical laboratories.

4.2   The overview of virtual lab implementation

The World Health Organization has stated that the novel SARS-CoV2 disease is now a communicable illness that is being spread by a novel coronavirus around the world as of early 2020. (Amir, L.R., et. al, 2020). The virus typically spreads when someone touches

contaminated surfaces through droplets, particularly from an infected person's sneeze, cough, or exhale. The majority of economies have been forced to close due to the COVID-19 outbreak that began in Wuhan, China in 2019. According to estimates, this pandemic will cause the global Gross Domestic Product (GDP) to decline by roughly 3 percent, or nearly USD 9 trillion. Although the COVID-19 situation has not yet resulted in a financial catastrophe, it is obvious that it has had a significant impact on economies all around the world. A Movement Control Order (MCO), which completely closed down practically all of Malaysia's industries, including agriculture, fishery, education, construction, mining and quarrying, manufacturing, and more, was implemented from March 18 to March 31, 2020, to stop the spread of this epidemic in Malaysia. Nevertheless, the MCO was further extended to June 9, 2020, with some conditional changes to enable the return of some economic sectors with the proper Standard Operating Procedures (SOP). There is currently no vaccination to stop the COVID-19 pandemic.

Industries play a crucial role in Malaysia's TVET (Technical Vocational Education and Training) ecosystem, which produces qualified graduates who are advantageous to both the country and business. It is crucial for policymakers to comprehend how the business community views Malaysia's TVET concerns in order to develop competitive TVET plans. Physical segregation has been mandated by the government for all Malaysians, including educators, in order to aid in the control of the pandemic and prevent the infection from spreading prematurely. This policy caused the traditional offline teaching and learning methods to be replaced by the online teaching and learning methods. For both lecturers and students, online teaching and learning, particularly in higher education institutions during the widespread Covid-19, poses a significant problem. As a result, education has undergone major change as e-learning has grown in popularity and remote learning has been used at higher levels (Li & Lalani, 2021). E-learning, according to Amir, L.R., et al. (2020), is defined as learning that makes use of information and communication technologies (ICTs). The change from face-to-face instruction to online instruction has an effect on how professors and students interact with one another. The effectiveness of the process must take precedence over all other considerations since greater work should be put into it by both sides. The governance of TVET, graduates' soft skills, the teaching staff's qualifications, and public perceptions of TVET are considered to be Malaysia's primary problems and obstacles. Strategic plans and reforms for future skill development can then be successfully implemented to meet the demands of industry and advance the growth of the country.

Online teaching and learning practical works are such enjoyable and successful activities for professors or students who are fully equipped and current with e-learning technologies. Without having to meet in person, they can work remotely. Naturally, this will cut down on the amount of time needed for self-preparation, which is great for introverts. Of course, there will be fewer or perhaps no issues with students arriving late for class due to traffic, etc. Time seems more manageable when taking lessons online. With so much material at their fingertips, students can easily expand their understanding of a particular subject in an online class by finding their own supplementary information. Online teaching and learning will be fully utilised by professors who are excited about e-learning. Students' interest in a particular subject or class increases as a result of the lecturers' usage of e-learning apps like Kahoot, Flipped Classroom, Edmodo, Evernote, and many others, which make online teaching and learning more engaging and fun for the students. According to Dr. Amjad, a professor at The College of Jordan who uses Lark to instruct his students, "It has altered the style of teaching. In particular during this pandemic, it lets me to communicate with my students more effectively and efficiently through chat groups, video conferences, voting, and document sharing. On Lark, my pupils also discover that communication is simpler. Even after the coronavirus, I'll continue to use Lark since I think traditional offline study and online learning can coexist harmoniously. Li and Lalani (2002). Virtual laboratories offer remote access to labs using simulation in several fields of engineering and science. It spark pupils' curiosity and encourage them to do experiments. Through remote experimentation, this would assist individuals in understanding both fundamental and sophisticated concepts and offer a comprehensive learning management system built around virtual labs where students and teachers can access a variety of learning resources such extra web content, video lectures, animated demonstrations, and self-evaluation.

The benefits of online teaching and learning that we have so far described are not without drawbacks, though. Few acknowledge that the impulsive and rapid transition to online learning will lead to an impoverished client involvement due to lack of planning, limited transmission capacity, and lack of preparation (Li & Lalani, 2021). We can see that the obstacles that lecturers and students will confront in this online learning environment will vary depending on their backgrounds. The issues were the reliability of the web connection and the instructor's familiarity with quickly available internet-based pedagogical tools, like video conferencing software (L. D. Lapitan et al., 2021). Students who live in an urban region with decent digital equipment will experience fewer issues than those who reside in a rural area with

poor internet coverage. Any engineering college must have modern lab experiments and adequate lab facilities.

Even though e-learning technology has drastically advanced since the Covid-19 pandemic first hit the world, not all professors have been able to adapt to it efficiently. In addition to having proficiency with blended learning technologies, instructors must develop ways to enhance contact with their students and keep them engaged during online classes. Without a question, the COVID-19's widespread use has altered the educational landscape globally. Since the abrupt switch from traditional face-to-face classes to online learning regardless of teachers and students' status, the broad has not only not hindered student flexibility but has also accelerated learning progress and experience.

Due to the prevalence, two crucial factors—academic approach and teachers' time management when handling students' assignments—have relocated (Barron, M., et. al, 2021). Since standard offline methods of teaching and learning do not depict a distant learning environment, pedagogical adjustments have shown to be essential. Every home has turned into a classroom where most of the time there isn't a supportive setting for learning, therefore speakers need to change their hones and be creative to keep students hooked in regardless of the type of channel used in their delivery tactics. The general public has also rectified how teachers should divide their time between teaching, interacting with students, and administrative tasks (Barron, M., et. al, 2021).

According to a study by Zhai and Du (2020), the difficulties caused by COVID-19 that students worldwide must deal with may eventually result in poor mental health, which may ultimately lead to unacceptably poor overall well-being. In addition, the transition from traditional offline teaching and learning to online strategies has tested the adaptability of teachers and students. Furthermore, given that online education and learning might last longer than planned, this has prompted questions about its long-term suitability.

The COVID-19 epidemic has definitely given the building industry new duties and difficulties. There are numerous contemporary devices, equipment, programmes, and the construction sector can use software to encourage productivity the technology's applications allow data gathering and transfer in real-time for efficient making decisions about all construction-related segments procedures and methods. The shifting nature of the construction

sector implies that construction management's tasks are expanding and becoming more complex. It is simple to illustrate that issues with construction management are the main obstacle to productivity, efficiency, profit, and client happiness. Construction consultants now have more responsibilities than in the past. Without consulting construction managers, it will be challenging to increase productivity, improve communication, and assure greater accountability for project execution.

4.3   Implementation of Virtual Lab: Case Study

In the most general terms, a virtual laboratory is a computer-based activity where students interact with an experimental apparatus or other activity via a computer interface. Seen as an attractive and easily accessible technology, virtual labs are used to enhance students' understanding throughout the learning process. The use of virtual materials and learning resources in a shared virtual learning environment by instructors and students from different places while engaging with one another is another benefit of a virtual lab. With the use of related software, a regular computer or handphone, and an internet connection, students can carry out the necessary laboratory experiments, which is the main goal of virtual labs.

The science and engineering behind the experiments that students are expected to do can be practiced by using virtual labs, which also helps them understand these subjects more thoroughly. Additionally, with the use of virtual labs, expensive equipment may be shared throughout the nation, giving students access to expensive experiments they otherwise wouldn't have had. Virtual labs may provide certain features that a physical lab does not, such as the ability to incorporate quizzes and provide access to supplementary learning materials within the simulation. The quality of learning can be enhanced by using virtual labs to help students better comprehend both theoretical and practical concepts. Virtual labs are able to open up a wide space for making mistakes compared to physical labs because making mistakes is part of the learning process (C Sunanda, 2022).

Students faced problems in completing laboratory experiments when the colleges closed during the Covid-19 pandemic and were replaced with an online classes mode to complete the syllabus. In order to conduct the teaching and learning process during this Covid-19 pandemic, it is decisive to use relevant and efficient software. For teaching to be effective, instructors must be able to give lessons with the help of teaching tools such as using virtual

labs. Comparing interactive multimedia teaching approaches to traditional ones, the rate of student success can be increased (Othman, 2007).

In virtual labs implemented on electrical engineering experiments, there are some web-based simulation tools that aid the students in learning as well as carrying out various experiments related to the circuits. Various online circuit simulators offer great help while dealing with electronics projects and circuit design such as Circuit Cloud, PartSim, DoCircuits, 123D Circuits and Spectre Circuit Simulator. Some simulators are available at no charge but there are also those that need to be purchased. Besides that, there is also various software related to circuit drawing, circuit design and analysis as well, such as Livewire, Matlab Simulink, Proteus, PSpice, MultiSim and others. Some of which are open source, some are licensed but free and some are demo or student versions.

The following case study discusses Livewire as one of the virtual labs to design and carry out simulations of electronic circuits. Livewire is a sophisticated software package for designing and simulating electronic circuits. Switches, transistors, diodes, integrated circuits and hundreds of other components can all be connected together to investigate the behaviour of a circuit. There are no limits to what can be designed and there are also no worries about loose connections or defective components. Being able to help build circuits quickly and easily is one of the features of Livewire's live user interface. Simply gather the necessary components and connect them using Livewire intelligent wiring tool. Final adjustments to the circuit can be made by moving the components (Ibrahim, Yahya, Hanafi, & Omar, 2019). Figure 4.1 1 shows the getting started screen of Livewire.
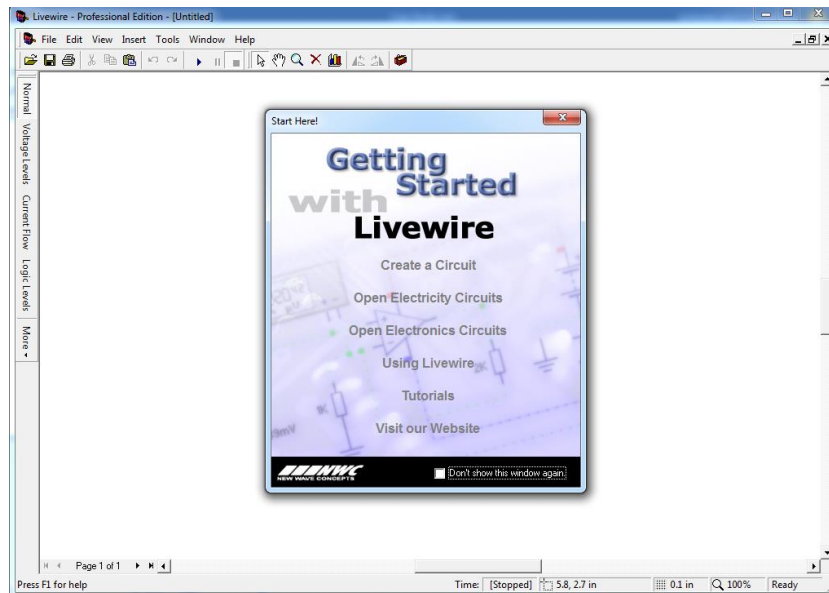
Figure 4.1 : Getting started screen of Livewire

Moreover, Figure 4.2 shows the main elements of Livewire which consist of menu bar, toolbars, design sheet, gallery and status bar. The menu bar is used to access the range of tools and features in Livewire. Toolbars provide quick ways to perform tasks in Livewire. Most toolbar buttons correspond to a menu command. The design sheet is where objects are placed and edited. The Gallery provides quick access to components where objects can be dragged from the Gallery to the design. The status bar is a small bar that describes the currently selected command or button.
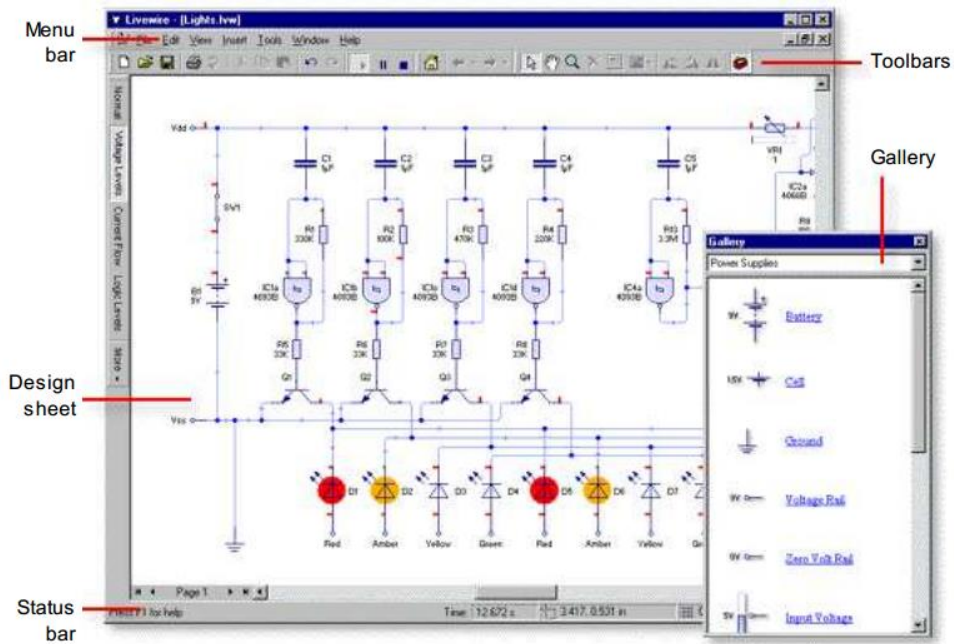
Figure 4.2: The main elements of Livewire

Circuit diagrams are drawn using circuit symbol components connected together with wires and components can be added using the gallery as shown in Figure 4.3.
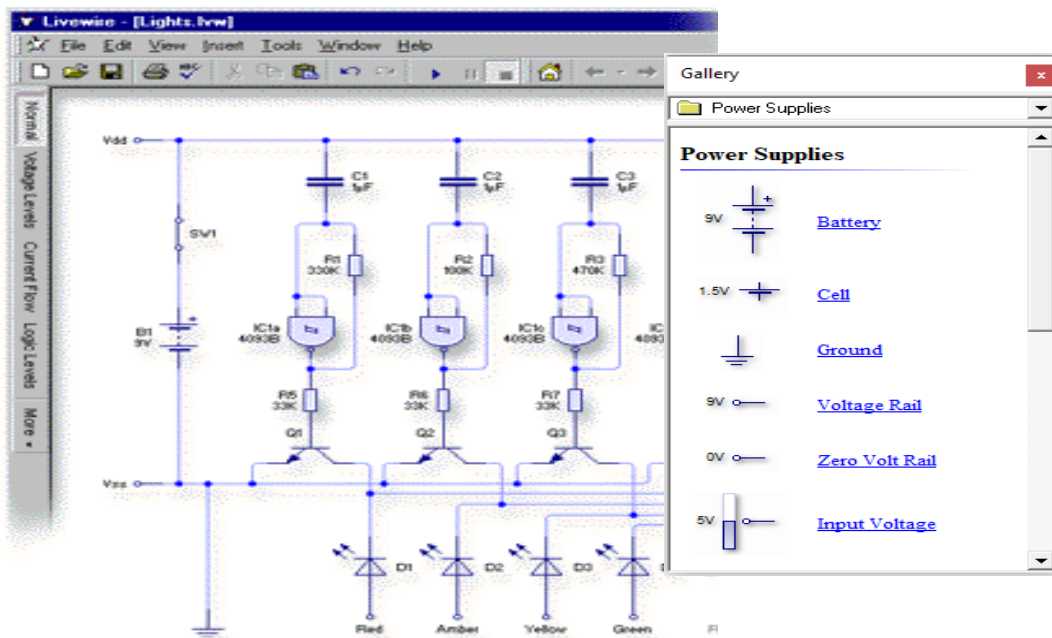
Figure 3: Drawing circuit diagram

Simulation is the process by which Livewire determines what is happening in the circuit. As the circuit simulates, the animation is used to show the circuit working, where voltage levels, current flow, charge and logic levels can all be shown on screen as Figure 4.
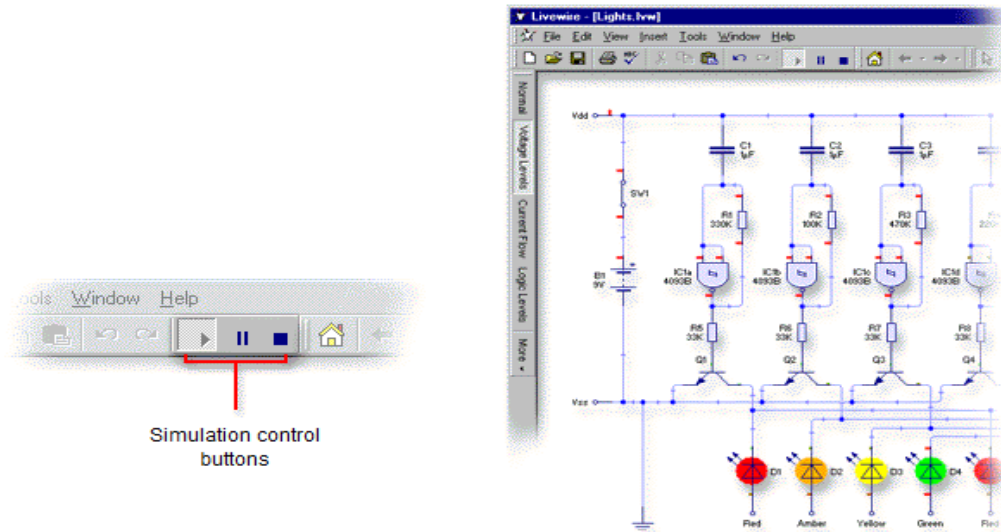
Figure 4: Simulating circuit and using circuit animation

For more precise results, the use of a wide range of virtual instruments, such as multimeters and oscilloscopes, to generate and measure signals as shown in Figure 5.
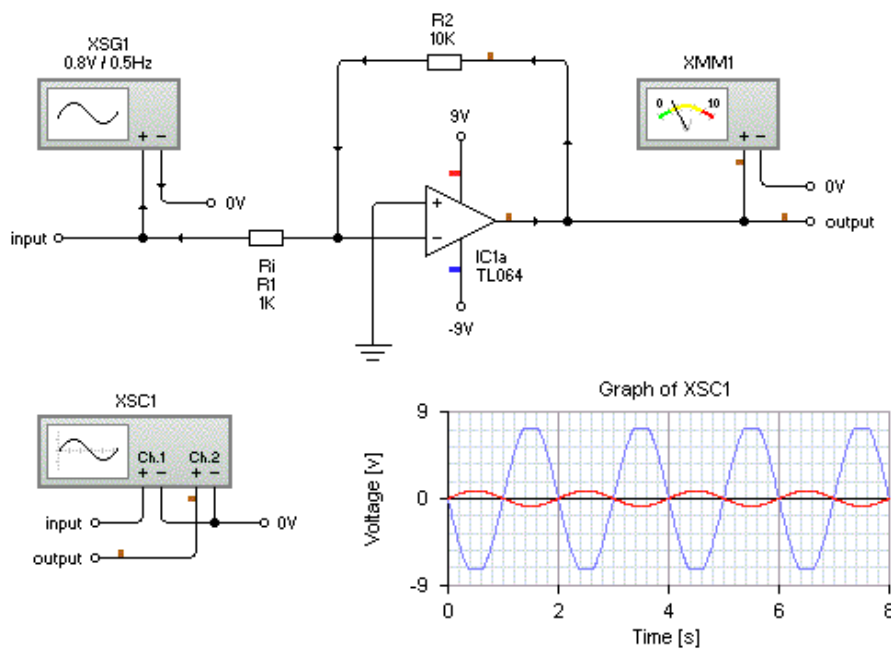
Figure 5: Using virtual instruments

Figure 6 shows how the Livewire works from drawing circuit diagram, wiring the components together, simulating circuit, used animation to illustrate what is happening in the circuit and using virtual instrument which is oscilloscope to record voltage signals over time.
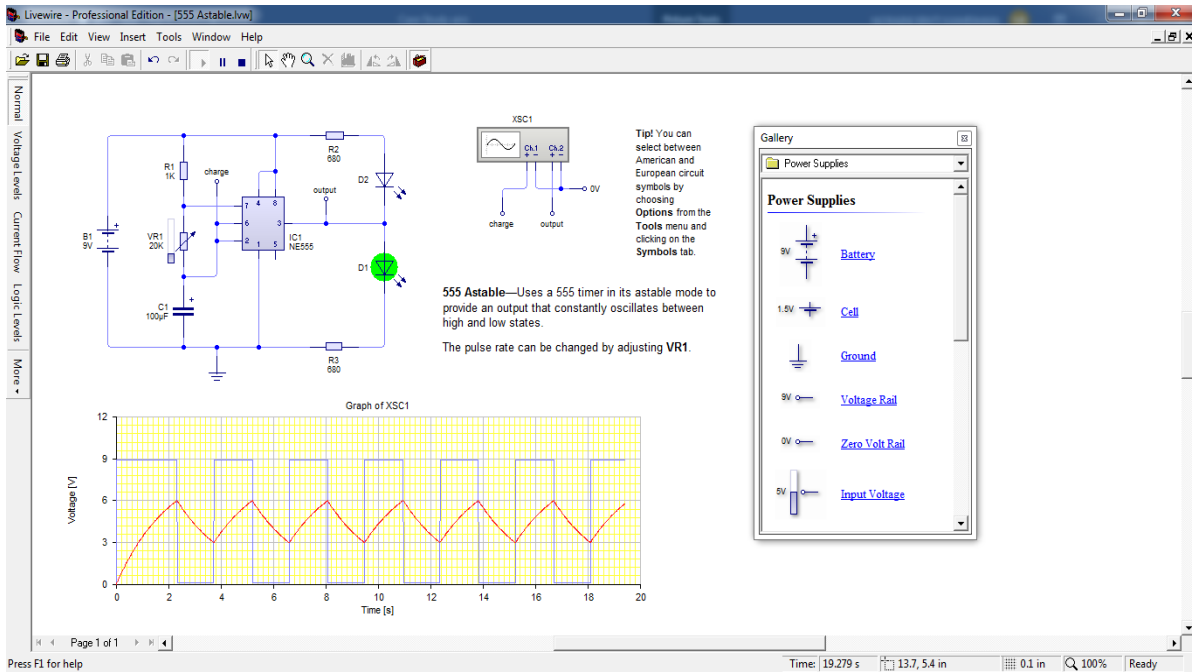
Figure 6: Simulation of an electronic circuit with Livewire

Conducting laboratory experiments helps students understand engineering concepts which are an important part of the teaching and learning process in engineering education. The learning process of students experienced significant changes when virtual labs were introduced in engineering education. The concept of experimentation can be understood by students with the availability of virtual labs that provide content-rich learning materials. Livewire offers a simple user interface where circuits can be built in no time because existing components and built-in wiring tools are designed to be intelligent. Hence, by getting experience from virtual labs, the students can avoid common mistakes such as improper handling of equipment in the physical laboratory. Virtual lab experiments are direct to use, and also helpful in allowing students to gain the engineering concepts, principles and procedures thoroughly (Radhamani, et al., 2014).

4.4 Conclusion

As a conclusion , virtual laboratories have the advantages as it can provide a powerful solution in tertiary education for the students both in undergraduates and postgraduates during the COVID-19 pandemic. Along with the TVET digitization, the transformation of traditional laboratories activity into the virtual laboratories implementation it is believed that the students can progress to their studies without any disruption since important experiment work task can be performed online at home or their comfortable place. However, the most important thing is we have to be more aware about the pros and cons of the online learning as well as the virtual lab implementation. Performing the virtual lab in a relax, informal and friendly environment is more exciting and interesting from the students point of view. In addition, the study process which full of interactive activities is not only a fun, but also it provide a great source of learning especially when the learning activities (or virtual laboratory activities) are incorporates with as specific educational components and outcomes. Thus, the instructors of the engineering students can started to choose the teaching method using the concept of virtual experiment which have to adapted with the interactive learning activities.

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CHAPTER 5: The challenge of teaching soft skill in the digital age among TVET students

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5.1   Introduction

In the current era of digitalization, the difficulty of educating and applying pure values is something that is impossible, especially for educators and teachers. The rise of the era of borderless technology, makes it very difficult for educators in particular to control and apply noble values in the minds and personalities of students.

As we know, TVET students consist of those aged in the range of 15 to 25 years. At this age, good personality formation is very important. This is because they need to be prepared to face the much more challenging real world of work.

Soft skills are better known as basic skills that should be possessed to produce a successful and moral generation. One's success should not be measured by the thickness of the academic certificate one possesses, but on the contrary, if this success is not supplied along with soft skills, surely one will not succeed tremendously.

Soft skills are better known as basic skills that should be possessed to produce a successful and high moral generation. Most successful people have high self -motivation as well as high mental and spiritual strength.

5.2   Soft skills as a basic shield in the formation of an outstanding personality

The soft skills identified as important in the workplace include communications, teamwork, motivation, problem-solving, enthusiasm, trust and a critical factor to success in business. According to Velasco (2012), the wrong decision about a candidate's knowledge and skills can be costly to an organization. This happened due to resulting effects on business outcomes such as worker behavior, engagement, safety, productivity, and withdrawal.

Individuals born into different generations have differing communication styles. The Millennial group, which includes individuals born in 1980 through 2000, has grown up in the age of connection to each other through technology. Arguably, the availability of technology may have contributed to their lack of soft skills.

Generation Z, which spans individuals born during the years of 1993 through 2005, has only known technology. They are inclusive, with the majority of the members owning a cell phone. Electronic communication has replaced some face-to-face conversations as the preferred mode of communication, which can result in individuals lacking soft skills.

Nowadays, when I.R 4.0, IOT, and digitalization era, the difficulties in developing the soft skills in TVET student is a big challenge, since they love virtual or video as their medium in communication. This situation leads them in lacking soft skills.

5.3   Soft Skills Needed for the 21st-Century Workforce

The new world includes diverse work groups who can have the talent to interact globally with different cultures. The ability to use interpersonal communication skills is critical for employees to work with and recognize team members. The workforce mixture is changing. There is a combination of individuals from multiple age groups including individuals nearing retirement, included in the mix are people of different ethnicities and genders.

Anthony and Garner (2016) agreed that educators should prepare college students for employment by increasing the prospects for teaching soft skills in all courses. Understanding

an individual's emotions is an aid in suitable communication response. Without emotional intelligence and communication, negative workplace behaviours may occur.

One of the important aspect need to be consider is controlling emotional behaviours. The strategy for dealing with emotional behaviours depends on the situation. Although people get upset and have bad days, their feelings should not affect their ability to deal with the customer. The relationships with the customers are important. An individual with high emotional intelligence are better well-appointed to handle work stress and emotionally charged issues in the workplace, which results in a higher view of quality by the customer. Losing a customer due to inappropriate emotional behaviour of an employee has the potential to negatively impact sales. Figure 1 show the good communication skills, is the most important soft skill need to have. Verbal communication is important to relay the understanding of the difficulty of gaining new business due to the competitive nature of the industry. The requirements of the workforce include the ability of the worker to communicate effectively and instantly. The coordination and accuracy in communication skills give an advantage for TVET student in selling themselves during interview.
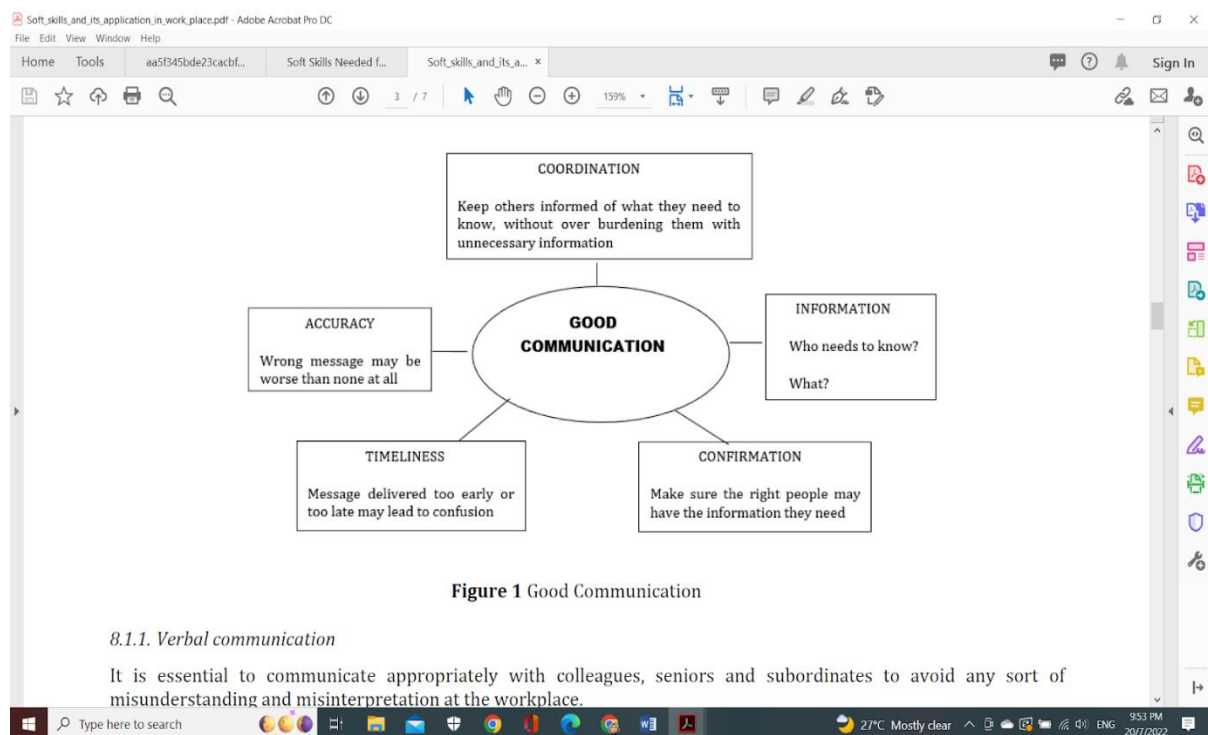
Figure 5.1 : A good Communication skills, (Source : S. Vasanthakumari, 2019)
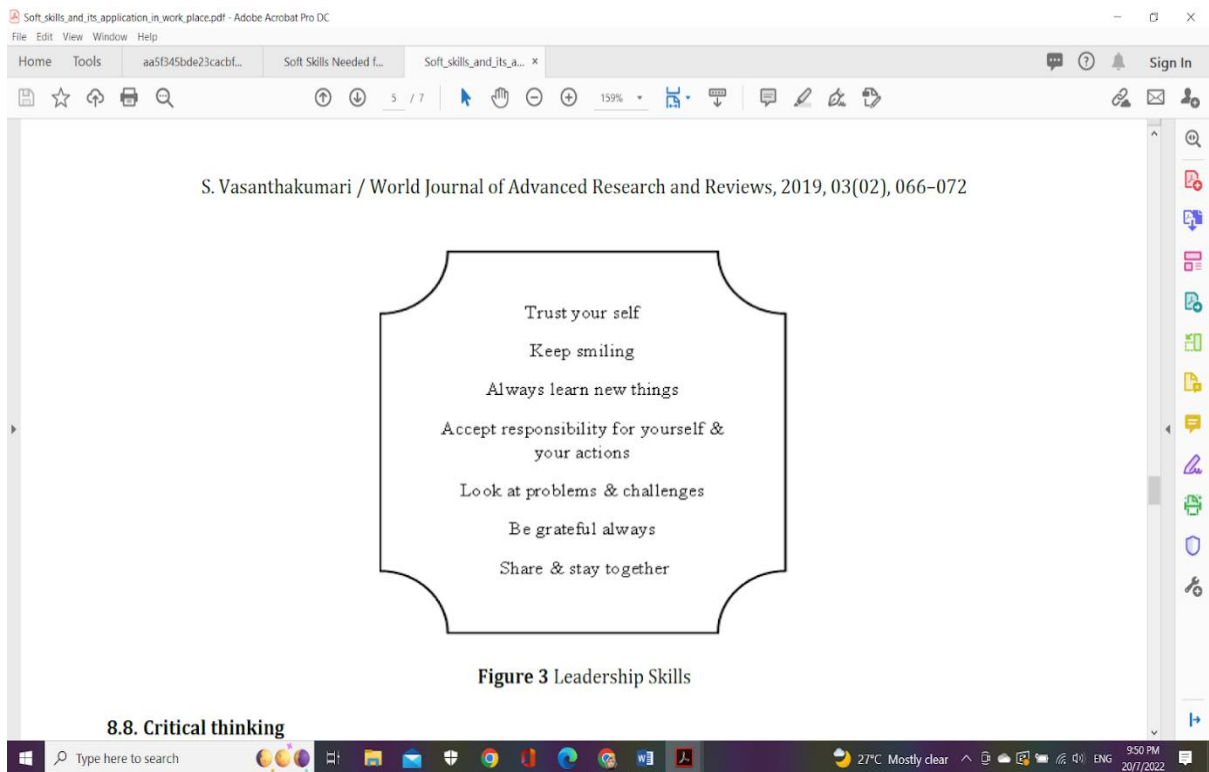
Figure 5.2 : The Leaderships , (Source : S. Vasanthakumari, 2019)

One of the difficult soft skills to implement among TVET student in the digital area is leadership. Leadership is the ability of an individual or a group of individuals to influence and guide other members of an organization. Leadership involves making difficult decisions, creating a clear vision, establishing achievable goals and providing followers with the knowledge and tools necessary to achieve those goals. Figure 5.2 give an additional step to become a good in developing leadership. The good leader is found and required in most aspects of society, from business to politics to region to community-based organizations.

5.4   Important of soft skills

Studies by Harvard University reported that 85% of success at the work place is attributed to Soft skills and only 15% to technical skills. This percentage is surprising, but the is fact. Another surprise, a public interest study conducted by McDonald's in UK predicted over half a million people will be held back from job sectors by 2020 due to lack of soft skills. Soft skills are shaping human beings' personality.

Most of educator's dream is that graduates, especially from tertiary education institutions, or TVET student should not only be experts in a certain field but matured personalities with a well-balanced, rounded off education. However, this specific is reflected in soft skills, not in hard skills. During the last decades in many societies, the mastering of hard skills was rated first and soft skills were considered as "nice to have", the perception has been turned upside down.

As mentioned before, good communication skills can easily be used to cover up a lack in hard skills. A formal approach to the problem would be to integrate soft skills subjects into a programme's curriculum. On lower levels a course that requires students to do a project or research and need to present their results to the class afterwards has been proven as being quite effective. On graduate level a course on management skills, including e.g. some communication skills together with the management of time, conflict, cultural issues, and of major importance, oneself, has in practice been well received by students.

However, very often the curriculum is already overloaded with hard skills courses, making it almost impossible to add or substitute courses. Furthermore, other lecturers might be ignorant of the meaning of soft skills and hence, do not support dedicated courses in this regard. A very smart way of offering soft skills training to students is to embed it into the teaching of hard skills.

This way, no changes to a programme's curriculum are necessary; instead the alteration will be reflected in the lecturers' teaching methodology. An increase in group discussions, letting students do presentations can be applied throughout a course. This approach to practicing soft skills requires some re-thinking and re-planning of existing hard skill courses. Considering the fact that during the last decades in society the perceived importance of soft skills has increased significantly, it is of high importance for everyone to acquire adequate skills beyond academic or technical knowledge.

Educators have a special responsibility regarding soft skills, because during students' School and University time they have major impact on the development of their students' soft skills. Besides raising awareness regarding the importance of soft skills and encouraging students to improve their skills, lecturers should actively practice soft skills with their students. A very effective way of doing this is to include soft skills training into the teaching of hard skills. As a positive side effect the lessons will become more attractive, which in turn will increase the success rate of learners.

5.5   Conclusion

Human life today is said to be based on the passage of time. The factors of the passage of time have been a challenge to human beings to meet the needs each other's lives. Life in this modern age has become more complex where other than of basic necessities, the importance of money and material things has been at stake live. Humans are never satisfied with what they have so they can be risking ethics simply to pursue dreams and enjoy life materialistic which is the priority of modern life.

These is a big why, we need to highlight the important of soft skill in TVET student, since they are the future generations or leaders of the country. The existence of various tricks, such as scammer, hackers, thus requiring the existence of cyber security to control their unethical actions. The lack of soft skills is the cause of this becoming more prevalent nowadays, despite the increase in the education level of the society.

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CHAPTER 6: Initial cost in digitalization education

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6.1   Introduction

The increase application digitization in education is demanding among users all over the world. Education practitioners try their best to adapt education with digital tools in the market through self-learning or any courses offered to ensure they able to deliver education compatible with current technology at any possibilities.

Digitization in education is not a new concept in Malaysia. It has long been implemented in line with the discussion in the National Education Development Plan. It coincides with the needs of educational implementation in the era of the fourth industrial revolution. In the Malaysian Education Development Plan 2015 - 2025 (Higher Education) it has also been specifically stated in the 9th Leap which explains in detail related to global online learning. Therefore, here it can be seen how important digitization is in education where it includes and provides advantages in terms of wider access for the accessibility of education and subsequently improves the quality of teaching and learning. Next, with the implementation of digital education, this also allows the atmosphere and learning system to be adjusted according to the needs of the students.

The implementation of digitization in education for Technical and Vocational Education and Training (TVET) has also been implemented for a long time. It starts with online module access and the use of a number of applications to support free online learning. In the National Higher Education Strategic Plan (PSPTN) the National e-Learning Policy (DEPAN) 2.0 has also been launched which has provided a framework for the provision of quality e-

learning where it has outlined 5 main pillars in terms of infrastructure, organizational structure, curriculum and content, professional development and acculturation. This has included as a whole how the digitization of education in TVET institutions also needs to be implemented so that the graduates produced are able to compete with the industry which of course requires skilled workers who are more intellectual and think creatively in addition to being able to use technology optimally.

Due to the challenges of the COVID-19 crisis, all higher education institutions, especially polytechnics and community colleges, are also affected by the need to take the initiative to implement distance education. Therefore, in order to empower and ensure that the implementation of learning continues, educators are required to implement online learning. As soon as the Malaysian Government declared the Movement Control Order (MCO), the Ministry of Higher Education (KPT) has activated the Teaching and Learning (PdP) mode online to all Higher Education Institutes (IPTs). Begin the challenge faced by educators in terms of teaching materials, facilities and also internet accessibility. Not only educators, students also face the same problem where internet accessibility in some areas is quite difficult.

Touching on the issue of digitization in education, it has been raised to ensure the sustainability of digital education can be implemented properly and effectively. Among the issues and challenges seen is in terms of cost allocation in its implementation. (The digitization of TVET and skills systems) There are various concerns in terms of the cost of implementation depending on the level of development of the country itself, especially in certain areas (3). This is because students who study at HEIs, especially Polytechnics and Community Colleges, come from various localities and different living standards. Some of them live in urban and rural areas. In addition, they also consist of various groups such as B40, M40 and M40. Among those that require costs as preparation in digitizing learning, especially TVET, is covering the provision of equipment such as smartphones or computers, accessibility of internet access and also infrastructure readiness.

If seen from the context of providing equipment, there are several challenges that have to be faced by the instructor as well as the instructor. One of the most important tools in preparing oneself in the era of digital learning is the smartphone. It is the most basic equipment apart from laptops, computers or tablets which are much more expensive. There are a number of families, especially those with an affected income, who will prioritize basic needs over

educational needs. Therefore, the students involved will fall behind in the learning session and affect the instructor in terms of achieving the learning objectives at that time.

Initial cost in digitalizing education requires process that is gradually transferred from conventional physical face-to-face classes to online virtual classes. In order to facilitate adaptation and new ideas from the educator, technology moves, the cost of technology will flow currently along while technology embracing advancement.

Malaysia Digital Economy Blueprint (MyDigital) launched by Malaysian Prime Minister on 19th February 2021 that aims for every Malaysian to involved in digitalisation and drive Malaysia towards Digital Economy nation (Economic Planning Unit 2021). MyDigital blueprint is aiming to achieve digital accessibility for students in rural areas. The Department of Statistics Malaysia (DOSM) exposed that each Malaysian access internet has weigh up by 5 percentage points to 91.7 per cent in 2020 contrast to 87.0 per cent in 2018. However, it also outlines that a polarity still exists in internet accessibility between rural-urban population around 15.0 percentage. For that reason, a well-planned intervention needs be managed to ensure that no individuals, especially students in rural areas, are missing out in the digitalisation process. Therefore, some estimates costs involve the planning should consider.

Online learning quickly becoming typical as it grows. Educator, parents and institution. spend a certain amount of energy, time and money for online learning needs. Transformation from physical presence in the classroom into online learning involves cost of energy, time and money especially in the initial cost. The initial cost is naturally high and will be reduced due to maintenance and upgrades only. It will be reduced gradually and will recur on maintenance and upgrade costs only. Fluctuation of cost might happen because adaptation of current prices that change with technological developments affect the price of equipment and the needs.

At present, the method of learning is to focus on either fully virtual, blended learning or hybrid learning. Based on Oxford Dictionary, definition of Blended Learning is a style of education in which students learn via electronic and online media as well as traditional face-to-face teaching. Blended learning focuses solely on incorporating distance learning with traditional instruction, while Hybrid Learning focuses on incorporating any possible way of learning technique for the best to deliver the content of education either online or offline.

6.2   Cost

The cost of energy, time and money in the process of adapting to the latest technology. A lot of time is required at the beginning of the process of gaining the skills to use the necessary technology to enable learning to take place.

Based on The Costs of Online Learning, Tamara Butler Battaglino (2012). "Online learning offers new resource-allocation possibilities in the long term, but it is accompanied by a number of unique start-up costs, including content development and acquisition, hardware, software, storage, servers, and more. For a state or district looking to price out a new virtual or blended school, the costs associated with online learning before a single student enrols can easily reach the millions.". This shows that online learning requires a relatively high start -up cost, yet it is a good long -term investment in line with the current era and for example geographical or pandemic issues that started in 2019 and still fluctuate until 2022. This investment seems worthy of the current situation. This will drive future cost -saving efforts in the future.

The initial cost of providing equipment to implement online learning occurred when the Covid-19 pandemic in 2019 was swallowed up especially by parents, students and educators by adapting the current facilities in their residence as a huge step for online learning in a predicament of stay at home to the whole world's pandemic.

Online learning potentially to save costs since there are free products and services over the internet as the margin cost of reproducing and delivering digital goods is decrease to zero. This budget does not consider the expenses associated with research, development, marketing, sales, infrastructure overhead, quality control, and administration. This can be proven through references Are the Costs of 'Free' Too High in Online Education? by Michael A. Cusumano 2013. "Digital goods and services such as software products, newspapers, magazines, books, music, video, and even college classes may have close to zero marginal costs and" gross margins "of up to 99% ".

Consider that the free offer is the method of promotion to encourage to use the application or system on the internet. There are hidden costs that must paid to get fully utilise or to continue use after certain period of time. As well as the Evolution of Platform Thinking, Communications (2010) wrote that "Their products are really "free, but not free." They subsidize one side of the market to gain users and make money from other parts".

6.3 National Planning

The Malaysia Digital Economy Blueprint visualize that Malaysia look forward to the regional digital economy leader and achieve comprehensive, superintend and viable socioeconomic development.

Figure 6.1 : The Identified Key Thrusts And Strategies In The Malaysia Digital Economy Blueprint

Refer to Figure 6.1, the Phase 1 (2021 to 2022) target to boost adoption with regard to build up the digital foundation demand for the rapid and smooth implementation of Phase 2 and Phase 3. In Phase 2 (2023-2025), the focus transpose to navigate digital evolution and incorporation across the digital economy, point up comprehensiveness among the people and all levels of businesses. Phase 3 (2026-2030) will chart the track for strong, sustainable development in the next decades, locate Malaysia embellish regional market grower for digital products and digital solutions provider.
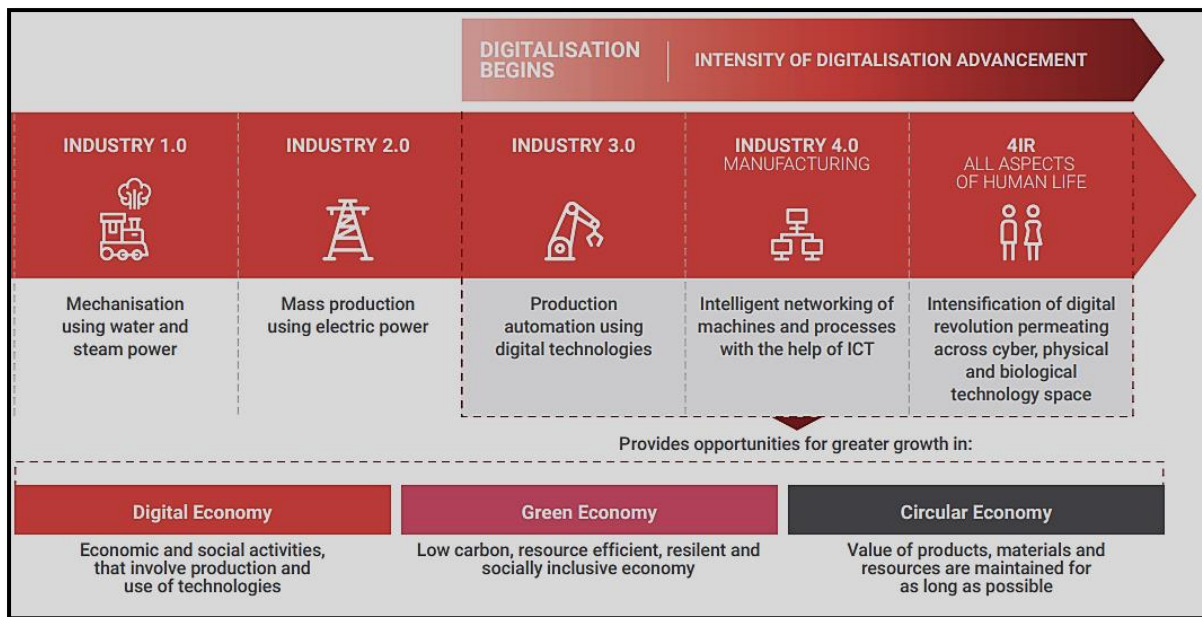
Figure 6.2 : Evolution of Industries

Referring to Figure 6.2, the evolution of industries has now been towards 4IR, however how far we could adapt to the technological transformation that involves the cost of energy, time and money. All these costs are borne together, some are borne by themselves and there are also hidden costs that become a package on the profits to be received. Our readiness to embrace costs is by making expected estimates reckoning to clarify readiness to cover cost for development and progress to penetrate into more profitable technologies.

6.4   Impact

Amidst impacts of digitizing education is that digitalizing education attraction able to bring the youth to enjoy the benefit available facilities and utilized for online learning. Digital learning is able to attract students to attend classes. "Specifically, the students' low level of online learning attendance produced positive and statistically significant effect on their perspective of the effectiveness of online learning", Digital Divide in Education during COVID-19 Pandemic, Sarimah Surianshah (2021). Furthermore, online learning able to overcome geography distance issue and reduce cost economize.

6.5   Conclusion

Since Malaysia has forward-thinking awareness and planning towards digitization along with the published guidelines issued in 2021, that is the Malaysia Digital Economy Blueprint (MyDigital). So, it can be concluded that the cost covered will be reduced accordingly based on how fast this transformation can move forward.

Sooner or later, technology is rising, and education to generations continues and move along with methods that are best suited to current technology. Challenges will remain and the most important thing is our effort in live through transformation by educating ourselves to be literate according to current technological developments.

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CHAPTER 7: Implementation of mobile devices in tvet digitization

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7.1   Introduction

The constant changes that happen in this technology-driven world are mostly supported with the presence of digitization process. Digitization process had started way back in the Third Industrial Revolution and was emphasized further to embrace the Fourth Industrial Revolution (IR 4.0). It becomes more significant during the pandemic of Covid-19 and continuously influential in this endemic situation. This is because the digitization process provides the opportunity for ones to deliver or access anything that is in the digital form in the virtual world at anytime and anywhere. So, the question that surely prompt us at this point will be "*What is Digitization*?".

Digitization merely refers to the process of transforming physical information or data to digital form. This can be seen as simple as converting the notes from a paper to a digital form and as advance as in running a business in the digital market. There are many approaches that can be utilized to perform the digitization process. For instance, documents such as notes, books or even magazines can be easily scanned via the conventional scanner or with scanning applications in order to digitize them. The goods and services can also be transformed to digital platform through vastly existing applications and platforms, which also provide the ability for instant communications and tracking between the providers and users.

So, the transition into digitization process is experienced by various fields, including the education system generally as well as the Technical and Vocational Education and Training (TVET) sector, specifically. This aspect was also reported by United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2020. TVET is an education stream that focusses on the sufficient knowledge and adequate skill sets to equip their students for the technical career. This means that the competent graduates from TVET sectors contribute to the economic growth and development of a nation. Therefore, it is important and crucial to ensure that both the educators and students in the TVET sectors are well-versed and aligned with the digitization process. As said by Marc Prensky, "kids are rockets, which makes the educators

rocket scientist." Thus, it is important for the TVET educators to facilitate and maximize the digitization knowledge and platforms to ensure the TVET students can adopt and adapt digitization in their technical career path.

However, some studies had shown that the TVET institutions in Malaysia were still utilizing the conventional and traditional teaching and learning (T&L) approaches because the skill sets among students require more time and hands-on practices (Anuar et al., 2021). In order to tackle this issue, many recommendations were proposed such as distance and digital learning as well as development of mobile applications. These recommendations were aligned to emphasize on the skills-based T&L in TVET institutions. The most powerful tool that everyone has and can be utilized easily to cater for this objective is the mobile devices (Dianah et al., 2020).

Mobile devices had transformed from being a lifestyle symbol to a need in this technology-driven world. They are widely being used by students from all levels to aid their studies. So, the role of mobile devices in the digitized education, especially in the TVET sector are getting more significant. There is a list of mobile devices that can be employed for digitized T&L process such as smartphones, iPods, tablets and wearable technology (Dianah et al., 2020). Based on a study conducted by Karim, R A et. al, the students at tertiary education system in Malaysia use smartphones, mobile phones, Personal Digital Assistance (PDA), tablets and other devices at the rate of 79.2 %, 16.9 %, 1.5 %, 0.8 % and 1.5 %, respectively and visualised in Figure 7.1 (R A Karim et al., 2020). The reported numbers strongly deduce that almost all the students in the tertiary education pursue mobile devices and the implementation of mobile devices in T&L can materialise the TVET digitization process.

Therefore, the upcoming sections will further discuss the power of mobile device in TVET digitization as well as the integration of mobile devices in TVET system to support the digitization process.
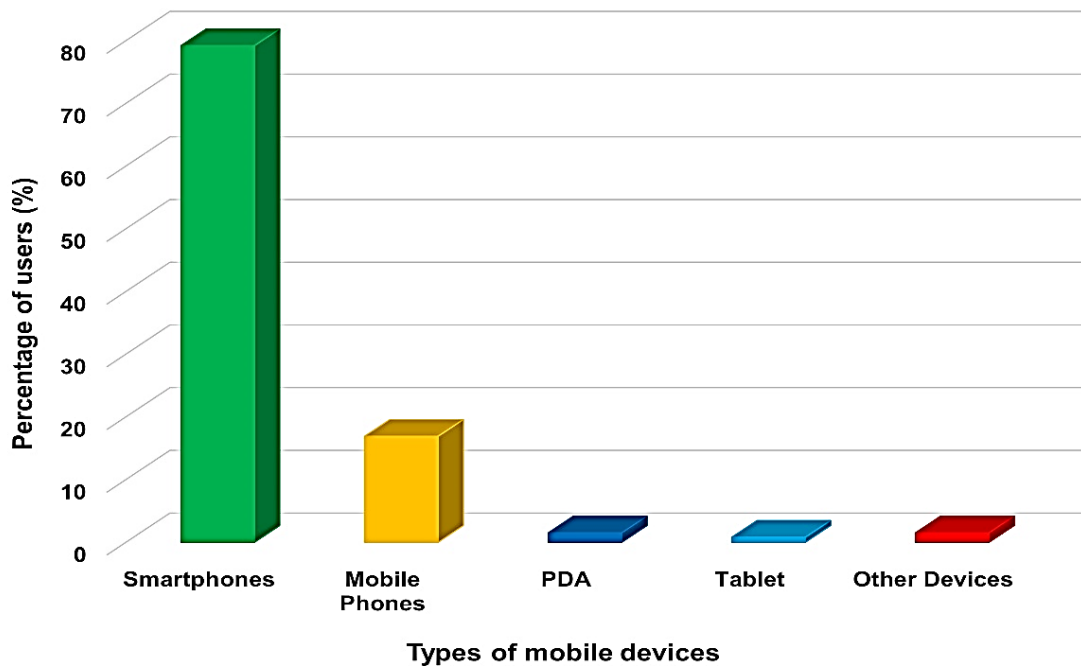
Figure 7.1   Types of mobile devices that are used by tertiary students

(Source: Adaptation from (R A Karim et al., 2020))

7.2   Contribution of Mobile Devices in TVET

In the recent years, the implementation of ICT has been widely introduced in the technical and vocational education (TVET). The usage of ICT able to penetrate in all kinds of field of TVET but there are some inadequacies on it. ICT usage is not fully utilized and explored in TVET especially in the large scales industries. The usage of mobile devices has been widely used in the society including TVET. It includes young and adult students. Skiba in 2014 stated that 79% of tertiary students have mobile devices who are updated to the date which have newly new functions and applications. By this, the mobile devices have giving lot of progress to the development of TVET. As in previous time, the TVET are being conducted in manual which commonly involved the usage of human driven devices. As the evolution of world which focussed on Industrial 4.0 where the usage of machines focussing on Internet of Things and digitisations, the usage of mobile devices will be utilized maximum. There will be a lot of applications and software will be developed to embark and fulfil the needs. The machines nowadays can be handled and manage remotely as the mobile devices will be the

remote for these machines to be working. In this chapter we will be looking on how the mobile devices can be giving contributions in TVET.

Firstly, the contribution of the usage of mobile devices in TVET, the students can be prepared to imply new technologies in the digitization and the usage of technology as these are all the things that being implied in Industrial Revolution 4.0 especially in working life. The mobile devices as being mentioned before is one of the things commonly used in the industry nowadays as it is a common tool in general use. Jones et al. 2010, the younger generations nowadays are in need something that can facilitate and help in gaining experience in their working life. This have been shown by mobile devices as mostly in them gave cloud storage services as it allows the machine to be monitored and be use remotely. The mobile devices in recent years does not imply this as the mobile devices do not have the technology to take command in handling and monitoring the machines. As the time evolves, the usage of machines getting complicated and sophisticated, it is also the mobile devices. In TVET, students must adapt to the evolution of these machines.

Then, one of the contributions of mobile devices is they are exposed to the up-to-date learning. In the 80's students will look up into books and encyclopaedias to find information regarding on the course they are in. It's a waste of time as the students have spent a lot of time in finding books and topics which is related to their field. Having mobile devices in TVET education allows students have the instant access to latest news, information, statistics etc. Virtually every question regarding on their course is at their fingertips as there are well connected to the things that evolving around them and being informed the most up-to-date information. For example, if a student wants to find the procedure on how to make a cake, by typing through their mobile devices they get the answer straight away regarding on the topic they are searching to.

Then the usage of mobile devices is the alternative to the textbooks. Textbooks provided limited sources of information as it is limited to the total number of pages. To put all the information needed it involves a lot of cost, the bulkiness of the textbooks increased as it is hard for students to carry it around. In TVET, most of the books sold in the market are expensive and thick where there are a lot of diagrams and sources being put into the book. Somehow, the students who come from the low-income families cannot afford to buy those books. One of the shortcomings of the textbook is the textbooks does not provide the students

with the latest information regarding on the TVET courses. So, to overcome this, having digital textbooks in their mobile devices will keep them well organized and bring easiness to them to access to their materials. In addition, the usage of mobile devices which have digital textbooks inside it will help the students on the updates and offering more vivid, helpful, creative, and cheaper than those heavy books.

7.3   The Implementation of Mobile Devices in TVET Digitization

An interesting fact that was shared by Digital 2022: Global Overview Report is that at the beginning of 2022, almost 67.1 % of world's population use a mobile phone, which reflect as 1.8 % of increment from the previous year. This statistic strongly notifies us about the power of mobile devices in this era. Since the previous sections had disclosed the need and the contributions of employing mobile devices for TVET digitization, now we will explore and share some of the approaches that were proposed and taken in order to integrate mobile devices in TVET sector, especially in Malaysia.

i.   TVET Management System

As all of us know, digitization in the TVET management system was established long time ago with the development and application of effective, thorough and extensive digitized systems such as web-based portals, mobile applications and various digital materials that disclose regarding the information of TVET institutions as well as the offered programs. This information could be accessed by anyone easily at anytime and anywhere.

Nevertheless, as we are heading towards supporting IR 4.0, those digitized systems were improved and further aided with more mobile-based applications. This is also because the revolution in the mobile technology eased many people to develop and utilize the mobile application platform for management. Similar situation is experienced in the TVET sector as many mobile based applications were development to aid a systematic and simpler approach for TVET management. It is a worthful investment and effort to integrate mobile devices that focuses on the management aspect of TVET because it plays an ultimate role in ensuring the sustainability of TVET.

For instance, let's have a look into students' enrolment into the TVET institution. Adequate amount of information regarding the programs offered in TVET institution as well as the added values that can be obtained from the TVET system must be delivered to the prospective candidates in order to guide and help them with their selection. An integration of mobile devices in this aspect would beneficial and influential because at the current situation, almost everyone has at least one mobile device. An interesting work regarding mobile application for students' enrolment in the TVET institution, especially for the community colleges in Malaysia was introduced and named as Digital Promotion Kit (D'CCU) in 2020 (Abu Hassan et al., 2020). This mobile application can help the users to narrow their search to either by types of programs that are offered or by location of community colleges throughout Malaysia. The best part is that this application can be accessed either online or offline. Adding to this, another application was developed to monitor and report the records for life-long learning programs (*Program Sepanjang Hayat – PSH*), which is part of the performance index for polytechnics and community colleges in Malaysia. This application is known as *MobAs@PSH* that help and ease the management in monitoring and achieving their targets in the TVET sector (Abu Hassan et al., 2021). These are some efforts that were taken by the management and educators toward digitizing TVET by using mobile devices.

ii.   Teaching and Learning (T&L) Approach

Besides the management aspect, mobile devices are also widely used in T&L approaches. Many of us surely wonder, how can we emphasize on the skill development, which is the key element of TVET when we employ mobile devices. Though it may be seen as impossible, but many research works had proven it otherwise. Which means, skill development in TVET sector can be highlighted by integrating mobile devices. This is clearly shown in the report by (Dianah et al., 2020), where 70 % of TVET students from 11 polytechnics in Malaysia preferred digital learning tools and platforms that can be easily accessed by their mobile devices. Although engineering respondents from this study preferred the conventional T&L approach, which is 'chalk and blackboard', surprisingly it was discovered that they prefer this method only to enhance their understanding in the classroom. So, how the mobile devices are actually being embedded into their studies?

Firstly, the digitized notes and lecture materials can be shared across the students in more retrievable manner, whereby the students can access them countlessly to get desired information pertaining their studies. This can be done as simple as sharing them in the messaging platforms such as WhatsApp or Telegram and even in the customized applications or systems developed by their educators or institutions that can be performed by using mobile devices. The flexibility that comes along with this approach allows the students to enhance their understanding repetitively and have clear foundation pertaining their subject matter. They can also directly engage with their educators or peers to clarify any doubts or concerns regarding their lesson immediately and conveniently. A group discussion and forum are also possible with these platforms. All these recommended learning styles and approaches are definitely doable with the implementation of mobile devices.

On the other hand, the usage of mobile devices in TVET can expanding the teaching and learning sessions of TVET happens outside of the classroom. They can search information and materials to related TVET field anywhere and anytime through the expansions of learning sessions outside the classroom. Then, they can use this mobile device as research tools especially in project based and group work. They simply can use applications and software such as google meet, zoom or Webex to communicate and discussed on their topic. Plus, this will make students become more excited and happier when doing the discussion.

Furthermore, interactive manner of substance delivery such as relevant animations and videos able to cultivate their interest on the topics and prepare the students virtually prior to the hands-on session. As an example, study on TVET students' perception regarding digital mind map had shown a positive feedback when the students believed and agreed that this digitized approach actually stimulated their technical skills as the learning process became more easier and faster (Rafidah Abd Karim & Mustapha, 2022). Besides that, development of mobile applications such as implemented in Information Technology subject for TVET students can also contribute to TVET digitization and skills development (Ahmad et al., 2020). These digitized T&L methods can be utilized to the fullest with employment of mobile devices because those digital mind maps can be saved and shared to the others.

Moreover, utilization of mobile devices is becoming more convenient and manageable because the TVET educators themselves can explore and develop mobile-based applications at open-source platforms to aid their T&L process. One of it, is the Thunkable platform to develop any necessary mobile application for education purpose. Thunkable platform provides

opportunity for one to develop mobile apps by using drag and drop method. It allows us to design the interface of the prospective mobile apps with easy and doable manner. Content integration is possibly by embedding them from the Google Sites. This method is known as the hybrid mobile apps development. So, TVET educators have the freedom to finetune their technical skill-based materials and content that can be integrated in the mobile apps. Thus, sharing these materials and contents through mobile apps enable the access of vast number of people, whom are interested in the respective TVET topics. This directly resolve the limitation in TVET digitization, whereby TVET students can have repetitive views and access to enhance their understanding which later reflected in their technical skills. Figure 7.2 shows the simple integration between Thunkable and Google Sites for hybrid mobile apps development.

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│ │❑ Design interface and│ │     │ │❑ Content development│ │
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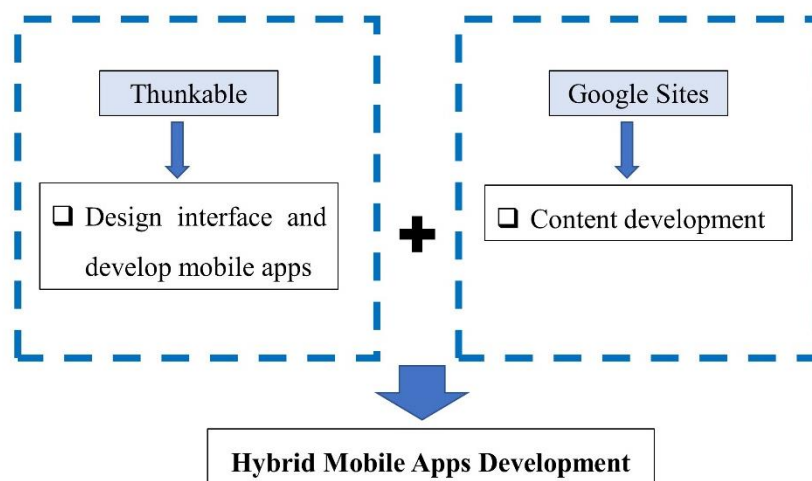
Figure 7.2   Hybrid Mobile Apps Development

Besides that, mobile devices also provide the opportunity for formative assessments during the T&L through gamification such as Kahoot and Quizizz (Dianah et al., 2020). T&L gamifications through mobile devices are possible because as mentioned earlier, almost all of the students has at least one mobile device. Formative assessments through mobile devices can cultivate the interest among the students to explore about a topic. On the other hand, these formative assessments can help the students to evaluate their understanding about the subject matter as well as contribute for student-centred learning. Students tend to practice and perform well when they are able to comprehend and demonstrate their knowledge well.

7.3   Conclusion

In the classroom, the effectiveness of teaching and learning is based on the attentiveness and the students' performances. This also imply to TVET educations. The learners should have the high self-esteem to become successful in TVET education. The implementation of mobile devices brings confidence to students as they will enjoy and able to imply what they have learn. Moreover, implementations of mobile devices also ease the TVET managements and educators to organize and continuously monitor their tasks as well as their performances in the TVET sector.

The evolution of mobile devices in TVET will not stop as day by day the innovation and implementation of mobile devices are revolving. The students and the educators are astonished on how the revolution will bring good future in TVET education. It is remarkable to implement and use mobile devices in TVET education. The transformation of TVET education become more enthralling and engaging as you ever imagined before. Hence, the students will more attracted and likely to involve in TVET education in the future.

The take-home message from this chapter is that the mobile devices give flexibility, freedom and excitement for the TVET students to learn, comprehend and demonstrate the required skill by using mobile devices countlessly at anytime and anywhere with their own pace. This indirectly cultivate the interest and critical thinking among the TVET students, whom will be future TVET practitioners that will be serving the nation.

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CHAPTER 8: Digitizing Educational Systems In Hospitality Programmes

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8.1   Introduction

The term "digitisation" is one of those overused buzzwords, similar to "big data" and "artificial intelligence." Digitization is the integration of digital technologies into everyday life by the digitization of everything that can be digitized. This fosters innovation and offers personalised education and lifelong learning for students, which is shown in their capacity to manage their workload and produce higher-quality service.

Since the Industrial Revolution 4.0 is still a relatively new phenomenon, there is still little awareness of it in the education sector. Technology integration into the classroom is part of the fourth industrial revolution. The majority of teachers employ a variety of teaching techniques, such as presenting lectures and incorporating practical tasks into cooking sessions. Different kids respond differently to these methods of learning. In order to comprehend the current way of facilitating learning, it is crucial to comprehend and acknowledge the teaching style of an academic. The academician themselves are accountable for delivering knowledge effectively.

Over time, there have been changes and evolutions in the learning environment, delivery methods, and curriculum. However, the pandemic has caused the Hospitality and Tourism Education (HTE) to move away from its traditional approaches and embrace change in every aspect. It is well known that industries are experiencing disruptions to their routine business operations and procedures as they adjust to the pandemic and the most recent technological advancements. This so-called "digital disruption" has enabled new business models and the ability to deliver services with premium value in fundamentally new feasible ways.

8.2   Hands-on VS Digital Learning

Hands-on learning is where teachers work closely with students to increase their knowledge, abilities, and values via focused reflection and hands-on experience. Kinesthetic learners who learn by doing and through examples are most suited for this form of learning. Experiential learning, in which students immerse themselves in a subject to learn, is also known as hands-on learning.

Any learning that uses technology is referred to as "Digital Learning" in the broadest sense. Digital learning, therefore, encompasses anything that incorporates digital platforms, tools, systems, and applications by learners. This implies that online courses, doing internet research, viewing online videos, or interacting with their teacher face-to-face while utilising digital tools and gadgets in a traditional classroom are all examples of digital learning.

Knowing that the world is promoting digitization for our future and paperless concept, education level is moving forward with technologies through students. Nowadays, new entry-level must-have digital skills include data entry, web-based communications, research, sending email, etc. (Heena & Bansal, 2022). Technical and Vocational Education and Training (TVET) is one of the best ways to gain the goal of developing staffing in the future endeavor.
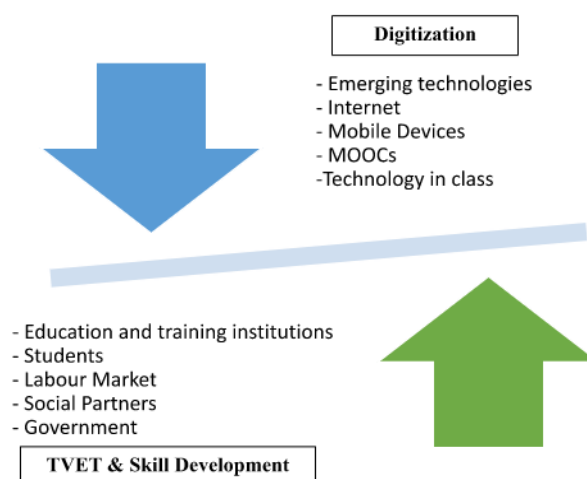
Source: Grech and Camiller (2017)

For students with various majors, notably hospitality students, hands-on learning will help them acquire multiple abilities. For instance, the culinary students learn starting with *mise-en-place*

until how to plating in a plate. They frequently begin the day with a 15-minute planned scramble as culinary students, gathering and measuring all the items required for the meals they cook that morning.

This preparation, known as *mise en place*—French for everything in its place—might initially appear to be a pointless chore, but it develops into a practice that all cooks should pick up. It is easier to teach and guide them hands-on rather than through digital learning. In addition to critical thinking, they must attend classes to work on machines, which is challenging to accomplish off-campus. To sum up, it is critical to develop students' skills while also boosting their self-confidence so they may succeed in the real world.

Digital learning has the flexibility to be used at anytime and anywhere, which is one of its main benefits. It will also assist students with special needs as they frequently struggle to do experiments using their hands. The students might face issues, including network access because most platforms require a secure network connection to enable their use. Some students may experience problems using the platform for their home-based online experiments. However, some could find digital learning to be more beneficial.

Compared to hands-on learning, using electronics in digital learning is more economical from an economic standpoint. The use of electronics plummets all these costs since each student only needs to buy one electronic device, including a computer, access all materials, complete tasks, and interact with other students at a low cost due to the platform's assimilation of all teaching resources.

8.3   Digital Skills Set

The higher education ministry argues that conventional teaching and learning does not provide sufficient environment for innovation and technology development. Sustainability in the hospitality sector requires a variety of abilities. Students must be able to listen, interact, and relate to others skillfully as well as learning computer skills, which is fundamental for all job types, since most businesses depend on technologies. With computer skills, they would be at advantage in being hired into the hospitality industry.

Despite being a wide and imprecise notion, "digital readiness" is built on a foundation of specific digital abilities. Digital skills can also be listed to few main items but not limited to

these categories, as example Operation & Application, Inquiry & Innovation and Online Communication, Collaboration, and Research. Generally, for operation and application, the students may demonstrate utilize technology to facilitate personalized and interactive learning, and demonstrate competency when using common technology equipment, displaying fundamental abilities like recognizing basic computer icons and saving documents and changing file sizes.

For Inquiry & Innovation, this is where the students utilize technology tools to gather, arrange, and visualise information, then create original digital artifacts to educate and inform audiences. Students are aware that real-world data is gathered, organised, processed, analysed, and visualised using spreadsheets, databases, and other digital tools of a similar nature. The usage of word processing, multimedia and visual mapping can be maximized for interactive learning, which ensure the digital readiness of each students.

Digital abilities are widely regarded in the workplace now and will be essential in the future. Not just those who work in IT will need to be aware of this transformation as the digital era spreads into many facets of our life. Today's employment market is demanding more and more digital abilities, such as the ability to respond to emails, access firm data on Google Drive, and even modify website code. However, it is getting more challenging to determine which digital talents you may or may not require in the current workplace. There is no standard for deciding which professions require Excel skills and which do not.

These findings demand immediate attention because they show that rural female students are still among the disadvantaged group. However, gender differences in digital skills only differ along three dimensions, as opposed to the gender differences among urban students, which differ along five dimensions. While gender-based skill gaps were more common in metropolitan areas, they were often just slight differences in rural areas, where they were deemed more important. The disparities may result from the fact that fewer rural female students received ICT (Information and Communications Technology) training than rural male students.

Table 1: Findings on Digital Skills Users according to Gender by Ahmad, Mohd Ayub, & Khambari, 2019

Skills		Gender	n	Mean	SD	t	Sig-t	η^2
Computer operational		Male	134	3.51	.491	3.96	.000	.05
		Female	156	3.28	.544			
	Urban	Male	95	3.54	.497	3.86	.000	.06
		Female	112	3.25	.556			
	Rural	Male	39	3.45	.478	1.25	.215	
		Female	44	3.31	.516			
Internet operational		Male	133	4.3	.699	3.85	.000	.05
		Female	150	3.98	.706			
	Urban	Male	94	4.33	.689	2.89	.004	.04
		Female	107	4.06	.654			
	Rural	Male	39	4.24	.726	2.63	.01	.06
		Female	43	3.79	.8			
Information Navigation		Male	132	2.98	1.34	-2.64	.009	.02
		Female	151	3.36	1.12			
	Urban	Male	93	3.00	1.36	-2.81	.005	.04
		Female	107	3.49	1.11			
	Rural	Male	39	2.92	1.29	-.471	.639	
		Female	44	3.05	1.07			
Social		Male	135	4.09	.767	-.656	.512	
		Female	154	4.15	.791			
	Urban	Male	95	4.02	.793	-2.1	.038	.03
		Female	109	4.24	.721			
	Rural	Male	40	4.26	.677	1.86	.066	
		Female	45	3.94	.912			
Creative		Male	135	3.38	1.05	3.86	.000	.05
		Female	156	2.93	.912			
	Urban	Male	95	3.33	1.06	2.64	.009	.04
		Female	112	2.96	.917			
	Rural	Male	40	3.50	1.01	3.08	.003	.07
		Female	44	2.86	.905			
Mobile		Male	133	4.22	.715	2.49	.013	.03
		Female	154	4.01	.733			
	Urban	Male	93	4.20	.739	1.47	.144	
		Female	111	4.05	.732			
	Rural	Male	40	4.25	.663	2.4	.019	.06
		Female	43	3.89	.731			

8.4   Curriculum Design

The definition of curriculum is a whole educational experience offered as a course of study. Modules or courses, which can also be defined as a collection of syllabus or course topics, make up its constituent pieces. Students of Hospitality and Tourism Education (HTE) go on several educational paths depending on how their curriculum is structured. Students will graduate from tourism and hospitality courses with a range of perspectives, attitudes, and competencies because of the various perspectives implemented in the courses, and explains how curriculum design requires making decisions about which components to include or exclude (Mason, Williams, & Cranmer, 2009).

Universities frequently create their own curriculum, but strangely, after covid-19 affected the world, it changed. However, digital learning was already being employed in curriculum design prior to the covid-19 outbreak, particularly for the theoretical portion and in other courses, but not notably for the practical components of culinary and hospitality programs. Because of this, students and lecturers use fresh approaches to integrating digital learning into practical lectures in order to keep up and graduate on time.

Currently, some hands-on learning has shifted to digital learning, which causes some students to struggle with comprehension, particularly in the tourism and hospitality industries, which require a lot of hands-on learning. It can be difficult to conduct practical classes or evaluations while the movement control order (MCO) is in effect because the semester is still in session. Solhi, & Razak (2020) cite online teaching and learning methods should continue to be the norm until the Covid-19 situation is under control. As most classes are taught online, digital learning develops from hands-on learning in this way. Learning tactics change as a result of the COVID-19 epidemic. For instance, the Langkawi Tourism Academy@Kolej Komuniti Langkawi allows students to film videos of their work assignments and send them back to the lecturer in order to make the learning process more engaging. Other online interactive resources that can be utilised including Google Classroom, Kahoot, Padlet, and Canva. Additionally, the incorporation of digital learning into the curriculum could aid students in preparing to brand themselves within their digital skills.

8.5   Perspectives

Comparing and contrasting the views of students or parents, academics, and industry stakeholders on TVET and the impact of COVID-19 on the hotel tourism and academic sector.

8.5.1 Students/parents' Perspectives

Although the Government invested a lot of time and money in TVET, the results don't appear to live up to expectations (Chang, 2015). In comparison to other ASEAN nations or even more industrialized nations, the enrolment rate for TVET is still very low (UNESCO, 2015). Along with the parents' and students' misperceptions about skill development, there are

numerous issues that demand the authority's quick response. Compared to other popular courses, TVET education is typically students' last choice, and some students who receive bad grades frequently give up on their studies. Since the majority of online classes during the COVID-19 outbreak required strong internet connectivity, some students have difficulty sharing data, particularly with family members. Additionally, certain assignments, particularly those involving cooking, require culinary students to use their own funds to purchase some of the necessary supplies.

Most face-to-face lessons continue to be held after the government declares the COVID-19 endemic and in order to promote TVET to the general public, the Ministry of Higher Education (MOHE) has been tasked with creating a new strategy for Technical and Vocational Education and Training (TVET) to rebrand the stream in order to change parents' perceptions of TVET as being irrelevant or of second-class education. That is why the government announced the new initiative which is a part of the recently established Program Dermasiswa B40 TVET offers a sponsorship program to pursue studies in TVET to families under the B40 category.

8.5.2 Academia Perspectives

In Malaysia, TVET instructors are primarily concerned with teaching, learning, and training as well as the organization, management, creation, delivery, and assessment of the educational program. TVET instructors who are qualified must exhibit professionalism, knowledge, skill, a large social network, and a positive disposition (Ismail et al. 2018). The majority of the academic sector should undergo some modifications during covid-19, especially the department of hospitality and tourism, where online classes should be prepared in place of in-person ones. Most of the lecturers explore things, especially regarding IT to make teaching and learning more engaging and compel students for paying attention. Furthermore, the Polytechnic and Community College Education Department (JPPKK) came up with the idea of a webinar TVET ReNORMS 2021, where the polytechnic and college communities around Malaysia get together to discuss and share the innovative process of teaching and learning through digital.

8.5.3 Industry Perspectives

Overall, there are a tonne of opportunities in the travel and hospitality sector. TVET is essential for preparing the students for the workplace. It provides the technical knowledge, and practical skills required, which ultimately ensure a better future ahead. Apparently, covid-19 has affected the hospitality and tourism industries by forcing the company to downsize. Many employees have been forced to resign from their jobs. Thus, in order to stay in business during and surviving even after this pandemic, hotels and restaurants frequently hire non-local workers as a result of the unavailability of trained human resources. Currently, the industry is primarily composed of people who are less qualified due to the inadequate education and training system. In practically every sector of the Malaysian economy, this has led to significant skills deficits. By teaching people the fundamentals of hospitality and tourism through in-depth academic study and a more focused skill-training process, TVET offers them specialized work (Azmi & Salleh, 2021).

In addition, TVET students are currently quite popular because of their technical or hard skills. Although most hotels and restaurants accept TVET students for employment, there are certain issues with their soft skills and digital skills especially communication, public relation, and computer skills. The truth is that the institutions are already aware of this issue and constantly propose the idea of educating students in terms of soft skills and digital skills; nevertheless, how the student applies after graduation is up to them.

8.6   Conclusion

Disruptive technologies including software appliances, augmented reality and virtual experience have recently made the digital environment of the Hospitality and Tourism Industry (HTI) more complex. The expansion of technology highlights the demand for a fresh set of digital skills among workers, further complicating the shortage of employable skills now present in Malaysia's hotel and tourism sector. Regardless, the needs of the industry and what is taught in the classroom must be in line with what demanded by industry as well as business leaders.

Hospitality and Tourism Education (HTE) must respond to this shifting educational environment and adapt while also resolving numerous internal academic problems that have gotten worse over time. We cannot claim that the importance of traditional classroom learning has been degraded by digitization, despite the fact that it has undoubtedly affected our educational system. The best component of education in this 21st century digitalization is how it combines both elements of traditional classroom and online learning or what we called blended learning. Nevertheless, how we respond to it will determine whether and how digitisation particularly in HTE develops as an opportunity for the future, or a threat to our methods of learning.

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CHAPTER 9: Visual Analysis Tools For Attractive Presentation

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9.1   Introduction

In this decade, a powerful method in analyzing data is very important to show a technical visual analysis presentation. Visual analysis is a technique for comprehending art that focuses on the visual components of an artwork, such as color, line, texture, and scale. It is, in the strictest sense, a description and justification of the visual structure itself. According to Grace Doherty Library of Centre College (2022), the observation, processing, and comprehension of the visual decisions made when making an object are all parts of visual analysis. While people are tended to see a visual analysis presentation, a constructive graphical appearance need to be presented that support their analytical results to audience. The most important thing is, researchers, educators or analyst need to understand the data that can help them to see all possible solutions.

Some people experiencing with data analysis tools, but few have the ability to perform an attractive presentation. At the time they want to present statistical data or reports, they also facing in visual design issues. What people need are visual analysis tools that help them to transform conventional method to current technology. For this chapter, we are focusing on six tools that been used in as visual analysis tools for attractive presentation. The tools are Weka 3.8.6, Power BI, Power Point, Microsoft Excel, Prezi and Powtoon. The most important is, there are 5Cs that need to be included in visual analysis; Content, composition, context, connection, and comment as shown in Figure 9.1. On each tools or software been used, all of this component needs to be included to perform attractive presentations.
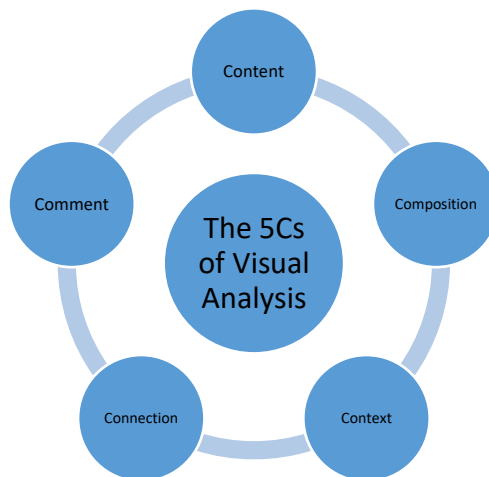
Figure 9.1 : The 5Cs of Visual Analysis

9.2 Implementation of Visual Analysis Tools

Visual analysis tools have been developed to assist people in a variety of domains in more effectively exploring, understanding, and making decisions based on their information. Making a successful tool involves balancing analytic power and tool complexity, both of which impact ease of learning (Hetzler, et.al, 2022). In this chapter, six software will be presented as a visual analysis tools for attractive presentation.

1. Weka 3.8.6

In order to make a pre-processing in the big data, Weka is one of the open source software that is very comprehensive. It includes data pre-processing, implementation of Machine Learning algorithms, and visualization tools. It also applies different machine learning algorithms (Glisic et. al., 2022) that could compare various outputs in a short time. In addition, the software is user friendly in obtaining output such as mean, standard deviation, range, median, plotted chart and other statistical data.

No.	1: country Nominal	2: year Numeric	3: sex Nominal	4: age Nominal	5: suicides_no Numeric	6: population Numeric	7: Outlier Nominal	8: **ExtremeValue** Nominal
4...	Republi...	1994.0	male	55-74 years	546.0	2249100.0	yes	no
4...	Republi...	1995.0	male	15-24 years	501.0	4349400.0	yes	no
4...	Republi...	1995.0	male	25-34 years	759.0	4627000.0	yes	no
4...	Republi...	1995.0	male	55-74 years	638.0	2212100.0	yes	no
4...	Republi...	1996.0	female	35-54 years	532.0	5968300.0	yes	no
4...	Republi...	1996.0	male	15-24 years	619.0	4291000.0	yes	no
4...	Republi...	1996.0	male	55-74 years	796.0	2313200.0	yes	no
4...	Republi...	1997.0	female	35-54 years	535.0	6163400.0	yes	no
4...	Republi...	1997.0	male	15-24 years	528.0	4231500.0	yes	no
4...	Republi...	1998.0	female	25-34 years	533.0	4381500.0	yes	no

Figure 9.2 . Data Source Using Weka 3.8.6

Figure 9.2 shows an example of raw data from Excel that has been transferred to Weka 3.8.6 software. All completed data will be analyzed automatically along with visual graph generated. The analysis also been generated for selected attribute (Villavicencio et. al., 2021) for any relation selected. It can be shown as Figure 9.3:

Figure 9.3: Statistical Analysis using Weka 3.8.6

Besides that, some tools or software not be able to create a graphical visualization for attractive presentation. The most interesting part, correlated graph with different attributes is generated automatically. It can be shown in Figure 9.4.
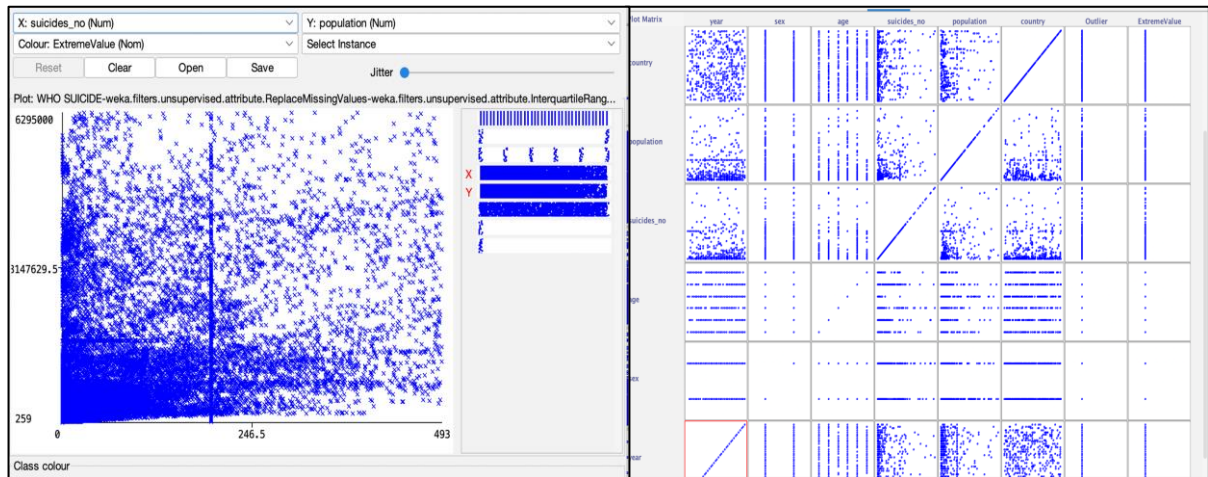
Figure 9.4 : Plotted Graph using Weka 3.8.6

2. *Power BI*

This is a tool that consist of software services, applications, also connectors that can utilize different sources of data. It can solve incoherent big data problem into a specific interactive insight. The raw data may be in Excel, cloud-based and also a hybrid data. As an online generated visual presentation, it can be discovered by other people effectively.
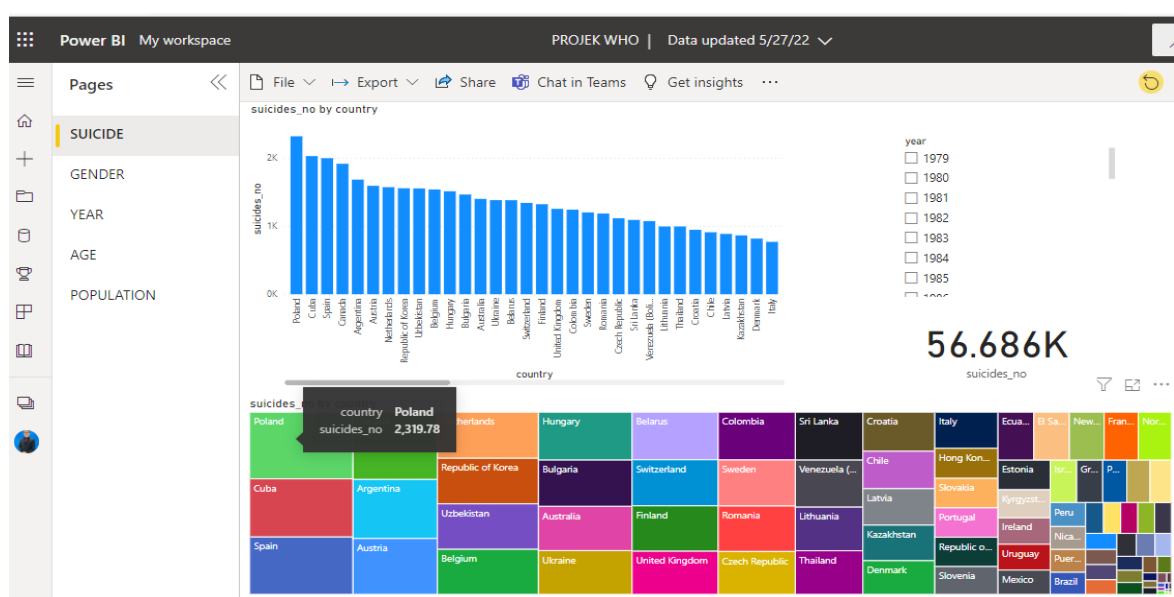
Figure 9.5 Visual Analysis using Power BI

Based on Figure 9.5, the analysis can be shown in colourful visual. In addition, filters also can be done with different settings such as years, ages, population, country, gender, and others. Based on Etaati and Leila 2019, there are many types of visualization as in Figure 9.6 that can be added in Power BI such as map, matrix, funnel, tree map and other attractive visual tools. More visuals can be imported, also from online application for better result to show on the reporting dashboard (Roy and Shirshendu, 2021).
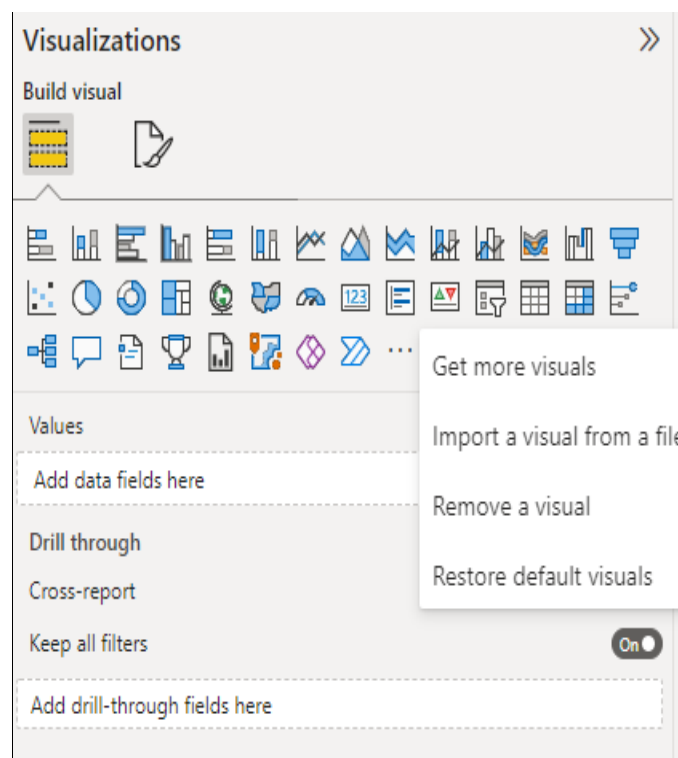
Figure 9.6 Visualizations in Power BI

On presenting any visual progress, we can change the art of Gantt chart to the Progress Record as shown in Figure 9.7. As a manager or leader, any progress that been updated in system can be visualized by all employees or members online. It also presented very neat and clear so that all members will understand better.
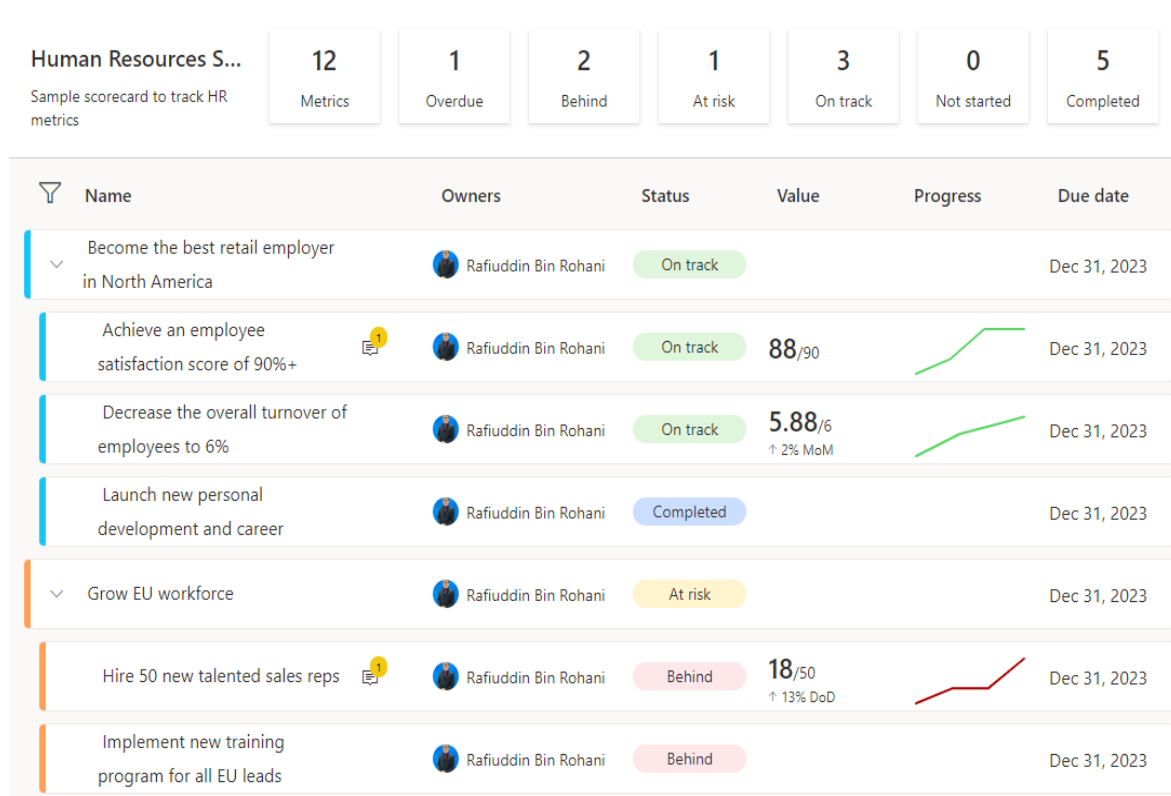
Figure 9.7 : Progress Record using Power BI

3. *PowerPoint*

Microsoft PowerPoint is a presenting tool that was developed by Dennis Austin and Robert Gaskins at the software firm Forethought, Inc. On April 20, 1987, it was initially only available for Macintosh computers. A PowerPoint slideshow (PPT) is a presentation made using Microsoft software that enables users to include audio, visual, and audio/visual components. Most people agree that it's fairly simple to construct a PowerPoint presentation. More than just a presenting tool, PowerPoint.

Presenting statistics in PowerPoint is simple for some people. However, it takes more expertise, time, and effort to present data on PowerPoint in a visual and effective manner. If we know how to use PowerPoint creatively, it can make for an engaging presentation for visual analysis. Column charts, line charts, and pie charts are just a few types of data analysis that may be displayed using PowerPoint.

Another traditional option when using PowerPoint as a visual analysis presentation is column charts, as shown in Figure 9.8. Simple, instantly recognisable, and intelligible column charts are available. Additionally, it is excellent for comparison and provides room for colour

creativity. Although column charts can easily be made creative and entertaining, they do have the flaw of blandness. A design this basic is infinitely flexible.
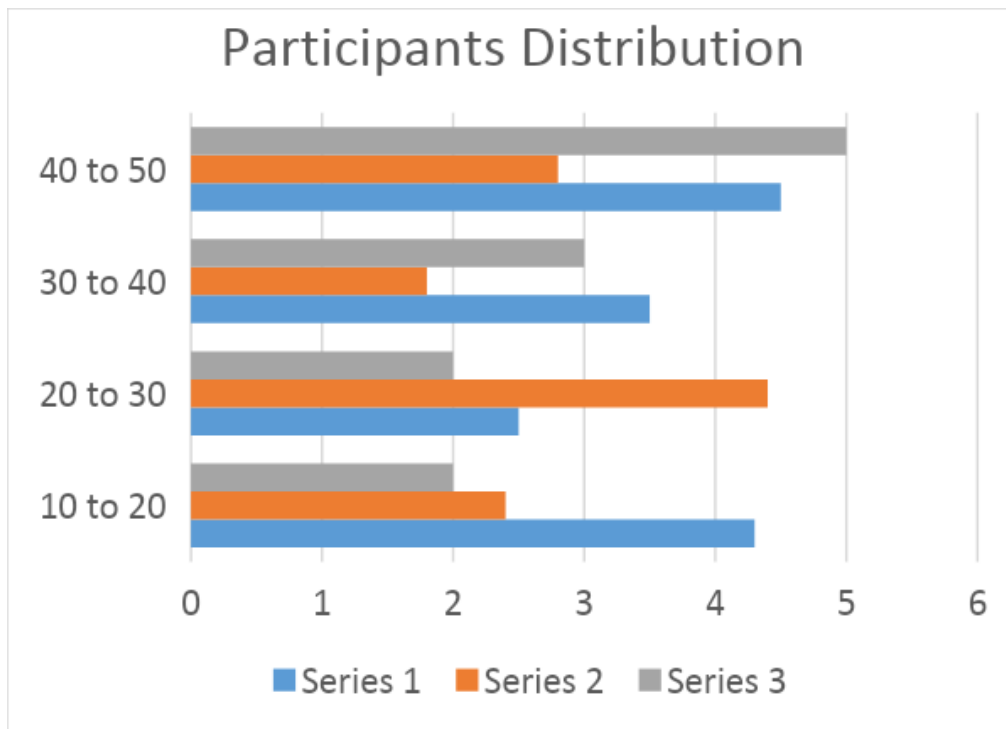
Figure 9.8 Colum Charts using PowerPoint

Among the basic visual analysis is to use Line charts. Figure 9.9 shows a line charts which can be interesting and effective if used in the right place in presenting data. A line chart is something that is simple and consistent because it can be easily compared to other data sets. Line charts will be more effective when using a harmonious colour scheme to enhance the visuals while presenting the data.
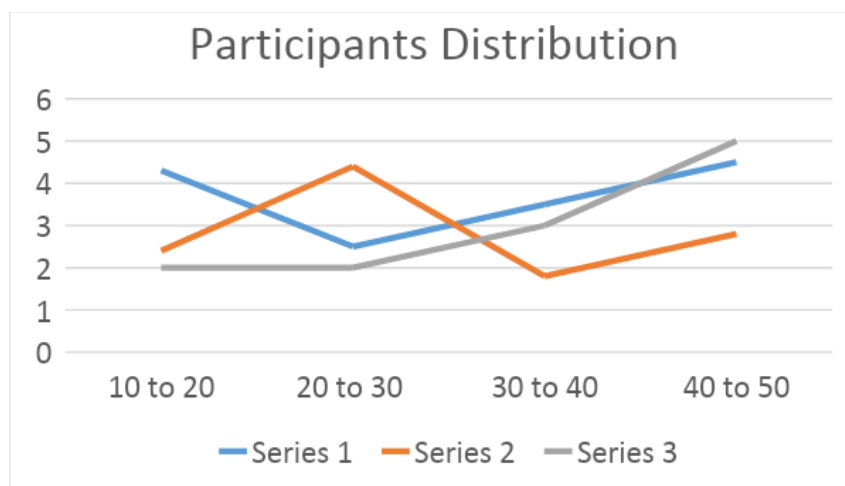
Figure 9.9 Line Charts using PowerPoint

Meanwhile the pie charts are a great way to show different percentages of overall data. Readers can immediately identify the largest and smallest values through pie charts. Yet many people use pie charts incorrectly by presenting them excessively. In fact pie charts are ideally used to present a lot of data concisely through first glance, as it is shown in Figure 9.10.
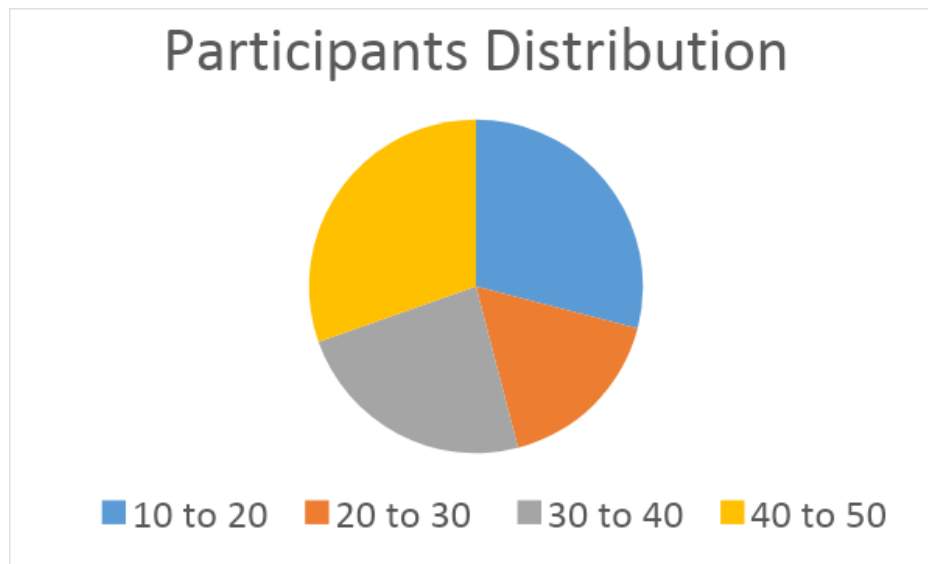
Figure 9.10 Pie Charts using PowerPoint

9.3 Data Presentation

Presenting data is actually an enjoyable procedure that serves as a creative exercise to show off one's abilities to make dry facts interesting. Therefore, try out your own originality and make it stand out in the way that the material is presented.

1. *Microsoft Excel*

We can use charts in Excel as tools to convey data visually. Charts make comparisons and flows more simpler by letting readers understand the significance of numbers. In Excel, charts are used to create graphical representations of any data set. A chart is a visual representation of data, where data is represented by symbols such as bars in a Bar Chart or lines

in a Line Chart. Excel gives us a variety of chart options and we can choose one that suits the type of data available or can use the Chart options recommended by Excel.

Excel worksheets usually contain a lot of data and this data is often difficult to interpret. For example, where are the highest and lowest values? Did the number increase or decrease? The answer to a question like this can become clearer when the data is represented as a chart. As presented in Figure 9.11, Excel has many different types of charts, so we can choose the one that is most effective for representing the data. Here are some types of charts that Excel can generate to present data effectively and interestingly in comparing set of data.
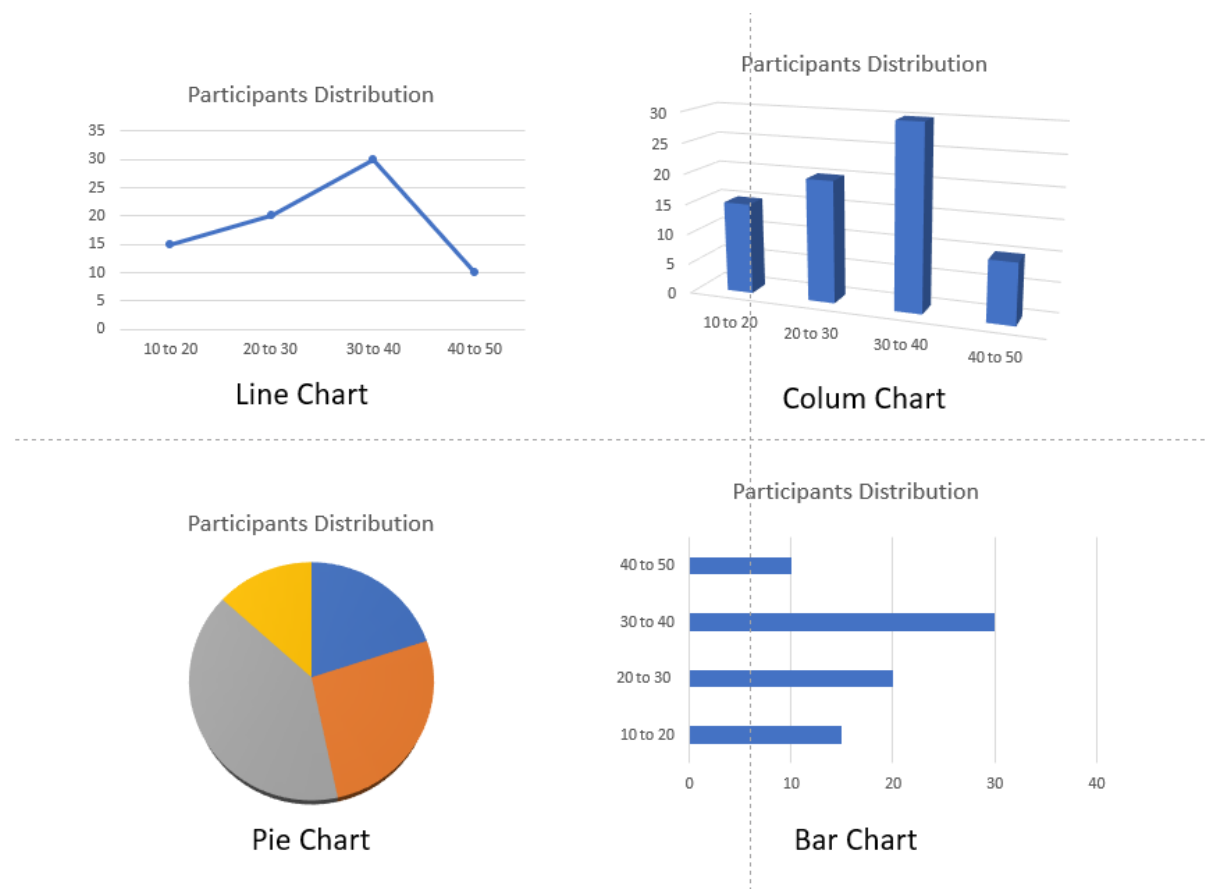
Figure 9.11 Types of data presentation using chart in excel

2.   *Prezi*

Prezi was established in Budapest in 2019 with focus on video and visual communications software and first company funded by TED according to Swartz (2013). The

core platform of the company is a visual storytelling software alternative to traditional slide-based presentation formats. The company coined the term "conversational presenting" to describe the organic flow of information that Prezi enables. This method allows questions and concerns to be addressed as they arise rather than following a scripted path by allowing presenters to adapt the order of their content delivery.

The majority of presentation software employs a slide-based approach, in which you navigate back and forth between individual slides, much like pages in a book. Prezi, on the other hand, employs a canvas-based approach. Instead of slides, Prezi has a single large canvas on which your presentation moves around, zooming in and out to view different frames. As Prezi uses the web browser as a platform, it solves compatibility issues among users while using software like PowerPoint., as shown in Figure 9.12.

Figure 9.12 What is Prezi (Source: Mendoza, C and Martin, M, 2017)

Users of Prezi presentations can navigate between themes, focus on specifics, and pull back to display context using a map-like overview function. Popular video chat platforms and communication tools including Zoom, Microsoft Teams, Google Hangouts, Slack, Facebook, GoToWebinar, and Webex are all compatible with Prezi Video. A Prezi dashboard is presented in Figure 9.13.
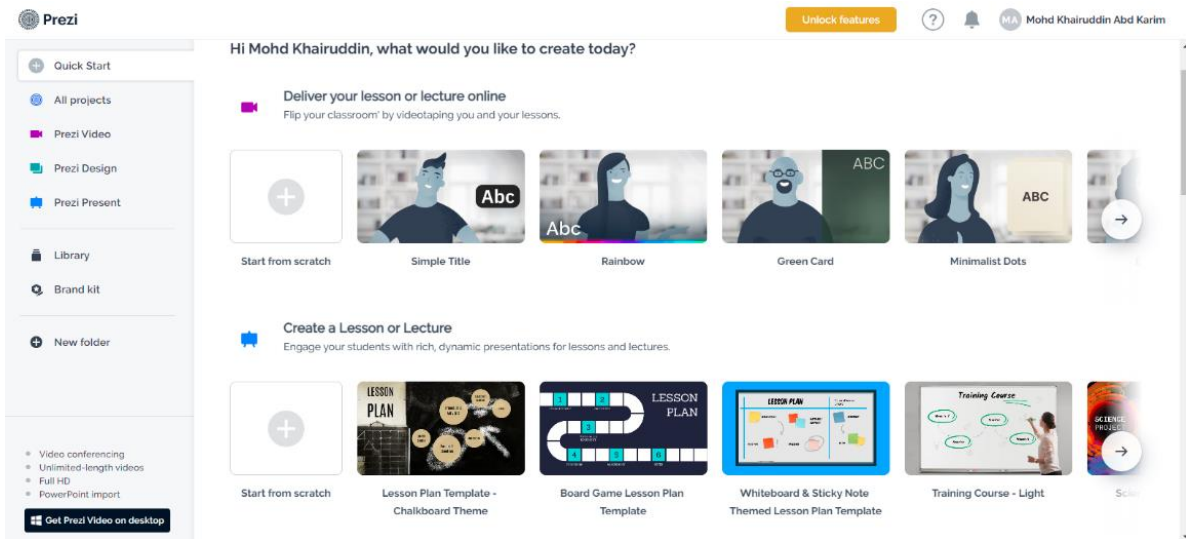
Figure 9.13 Prezi dashboard (Source: Prezi.com, 2022)

Prezi has made many changes in its application by adding video features to the presentation that make it a rival to other software. While Prezi can be accessed online, they provide a desktop version to users for easy editing. Its use that does not depend on the type of device makes Prezi more portable and practical for users to share their presentations., as shown in Figure 9.14.
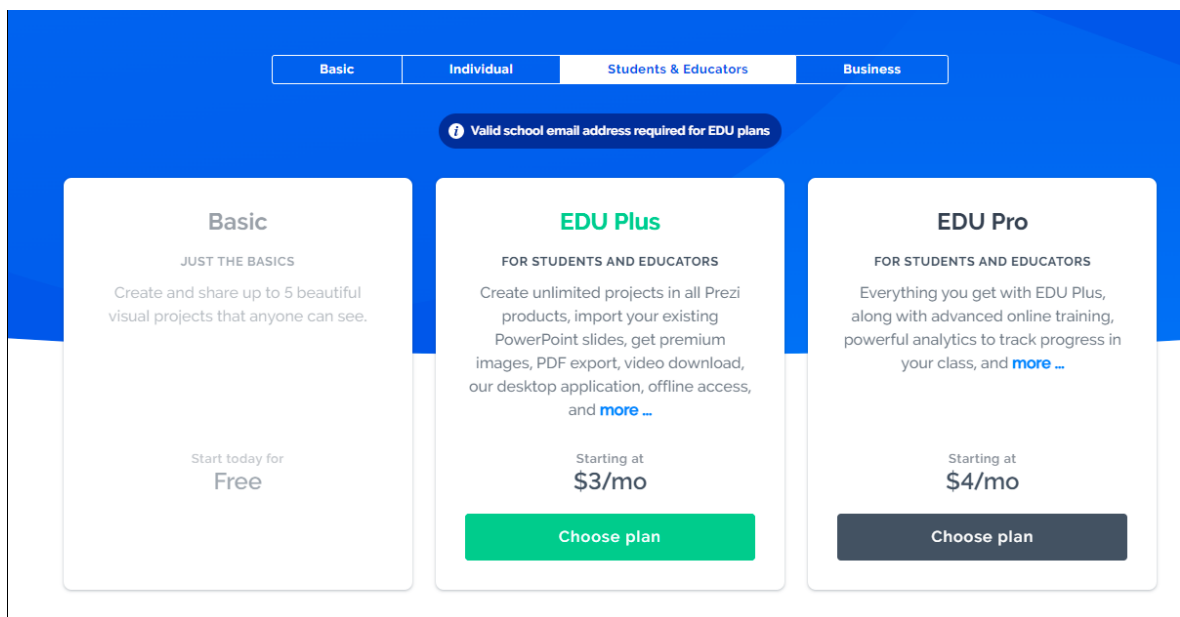

Figure 9. 14 Prezi package (Source: Prezi.com, 2022)

Powtoon is another web-based tool that allows users to create short video presentations and enables anyone to create professional videos and presentations. Users can use royalty-free animation, live-action video, images, designed backgrounds, soundtracks, and moving graphics from royalty-free libraries, or use own visual content and voiceover to produce a video. Macchi (2017) suggested 5 usages of Powtoon as shown in Figure 9.15:

Introductory Video	Course outline Lecturer's backgorund
Preview A Guest Speaker	Introduce speaker Poster / Schedule of Program
Introduce / Conclude Lesson Plan	Highlight major content / lesson Become study aid for student
Create Example of Course Assignment	Demonstrate main component of assessment
Promote New Course / Event	Advertise new course / event in campus

Figure 9. 15 Powtoon usage suggestion. (Source: Macchi, 2017)

Powtoon may attract students to engage to the content as it's look like an animation but some users said sometimes Powtoon are lagged rather than others. This software give a variety of theme-appropriate templates to use as a basis for providing video info. Nonetheless, most of the templates provided are cartoon-based in line with the original Powtoon theme which uses cartoon animations to provide descriptions to the audience, as presented in Figure 9.16.
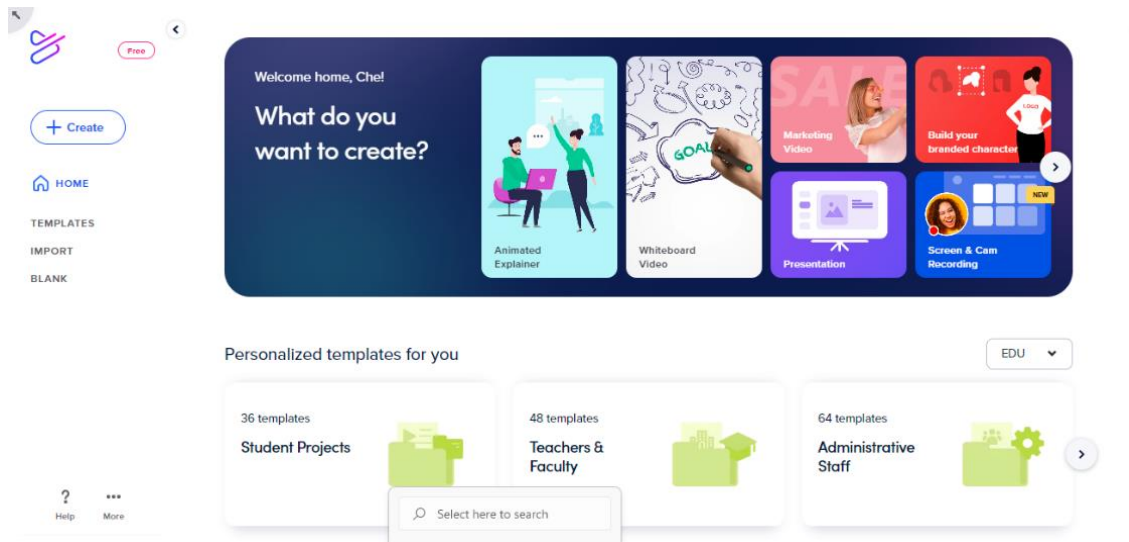
Figure 9.16 The latest interface of Powtoon. (Source: Powtoon.com, 2022)

In the author's view, if an educational institution wants to consider the use of this application, perhaps the administrator of the institution can try the first plan first. The price table of this application plan is shown in the figure 9.17.
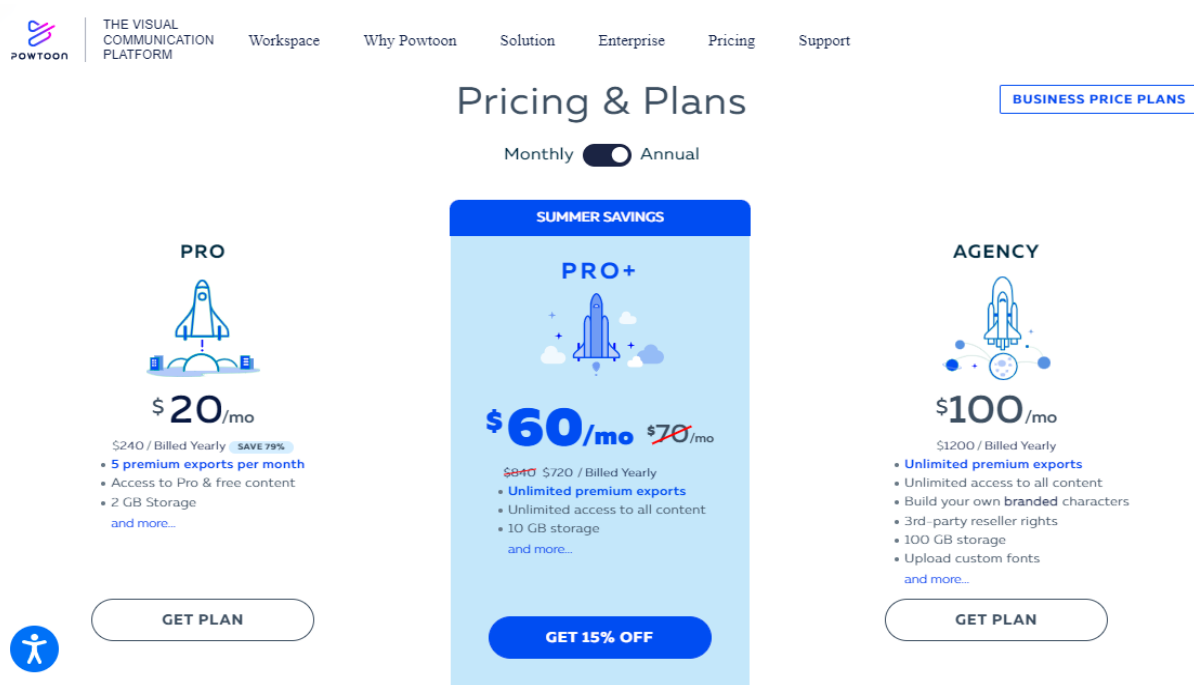

Figure 9.17 Powtoon Pricing and Plans Annually. (Source: Powtoon.com, 2022)

9.4   Conclusion

Since innovation and technology are changing daily, the evolution of interactive presentation with different devices in TVET will not come to an end. The revolution's potential to improve TVET education has both students and educators in awe. The utilisation of current software in TVET instruction is impressive. The evolution of TVET education has made it more captivating and interesting than you could have ever dreamed.

Technology will eventually advance, and education for future generations will continue and follow the greatest teaching practises for the available technology. Challenges will persist, but what matters most is that we try to alter ourselves by educating ourselves to be technologically literate.

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CHAPTER 10 : "I-Foliosys" - The Digitization Of Portfolio Writing With Edi Simulation System

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10.1   Introduction

Portfolio writing is one of the assessments during the implementation of Work Based Learning (WBL) in industry, to develop student's ability in writing, organizing and presenting information in an effective format. In preparing the portfolio for each course, students find it difficult to understand the content of procedures, documents, and write properly while undergoing industrial training.

iFolioSys is a combined simulation system of Electronic Data Interchange (EDI) system in a web-based portfolio writing focusing in the field of Logistics Management and Supply Chain. According to Bhatt (2020), EDI is a process of sending business documents electronically from one computer to another computer from a different company. EDI has been helpful in data accuracy, it helps faster and efficient transaction flow between two parties. Besides no time limitation, EDI contributed to significant reduction of paper documentation and required less time for entering data.

The main objective of the development of iFolioSys is to facilitate students in portfolio writing while undergoing WBL in industry. This online learning platform diversifies the teaching and learning process for lecturers while observing the task completion by students. The complete guideline provides an opportunity for students to describe the theory of knowledge on procedures and functions of documentation, specifically in export activities.

After multiple simulation and pilot tests, iFolioSys helps to increase students' understanding of workflow in export activities according to procedures developed in the system. With the iFolioSys, students are able to enter information related to the documentation of export activities as well as describe the function of the document by typing in the portfolio system. The system helps students to understand the process by producing samples of documents involved in export activities such as invoice, packing list, B/L draft, K2 custom

forms and more to the list. The good understanding of the process then will help the students to elaborate their practical and theoretical knowledge into portfolio writing simultaneously.

At the beginning of the development, i-FolioSys was aimed to improve the process of teaching and learning for courses DPL4W35 Logistic and Supply Chain Information and DPL5W14 Export, Import Documentation and Procedures. These two courses are currently offered for Diploma in Logistic and Supply Chain Management (DLS) programme and are being held at Politeknik METrO Johor Bahru. The use of iFolioSys has been extended to the Logistic Services Certificate (SPL) in Kolej Komuniti Cawangan Rantau Panjang for SLK3043 Import and Export Management course for third semester students. Despite that iFolioSys is used for portfolio writing, the usability then can be offered to other students or industry workers specifically involved in handling import and export documentation.

10.2   Implementation of "iFolioSys"

"iFolioSys" is built based on web applications. The scope of users consists of two parties, such as students and lecturers. According to Livingstone (2011) and Blake (2013), the use of technology among potential lecturers enhances student learning. Therefore, a teaching and learning session that is applied online can bridge the gap between lecturers and students.

The diagram from a technical point of view for the system is as shown in Figure 10.1 :
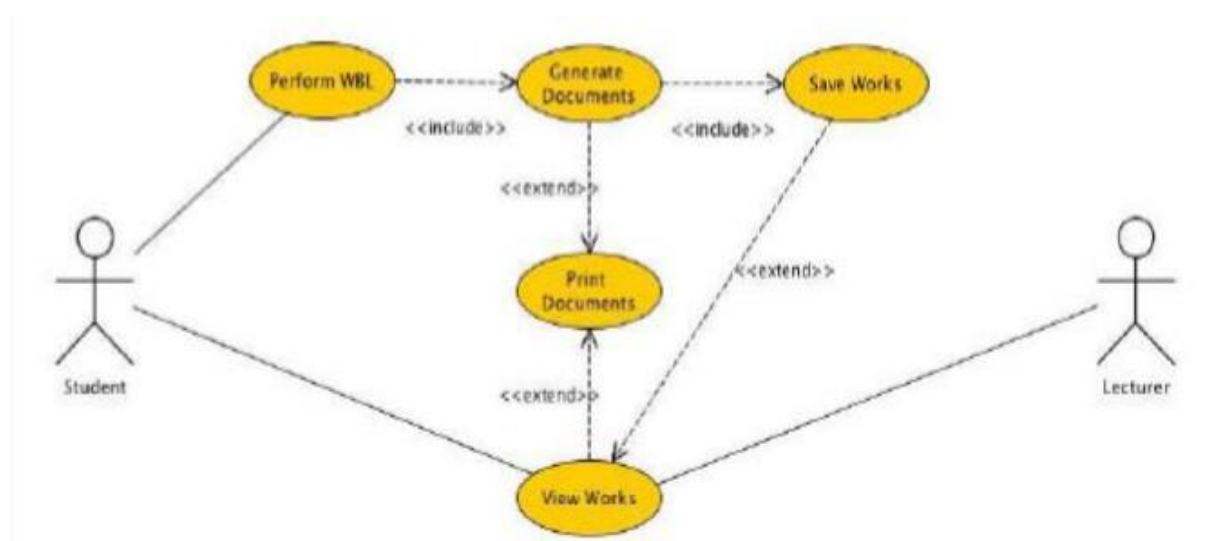
Figure 10. 1: Diagram of the technical aspects of "iFolioSys"

Perform WBL:

Students can perform WBL based on the management of Export documents using the EDI system by simulation. Through the dashboard displayed, students need to fill in the information accurately for each document that has been arranged according to the procedure. The information can be filled in by the student after getting the case study questions given by the lecturer. Students will also need to explain clearly the function of each document Exports involved.

Generate Documents:

Export documents involved such as Invoice, Packing List, draft Bill of Lading (B/L), Custom K2 forms and others can be produced as attachment purposes for portfolio report , as shown in Figure 10.2.

Figure 10.2: Sample of Export documents generated through the "iFolioSys" system

Print Documents:

This section is optional. Students and lecturers can print the documents involved once the Export management process can be completed according to the procedure through the display dashboard. The sample of the portfolio is shown in Figure 10.3.
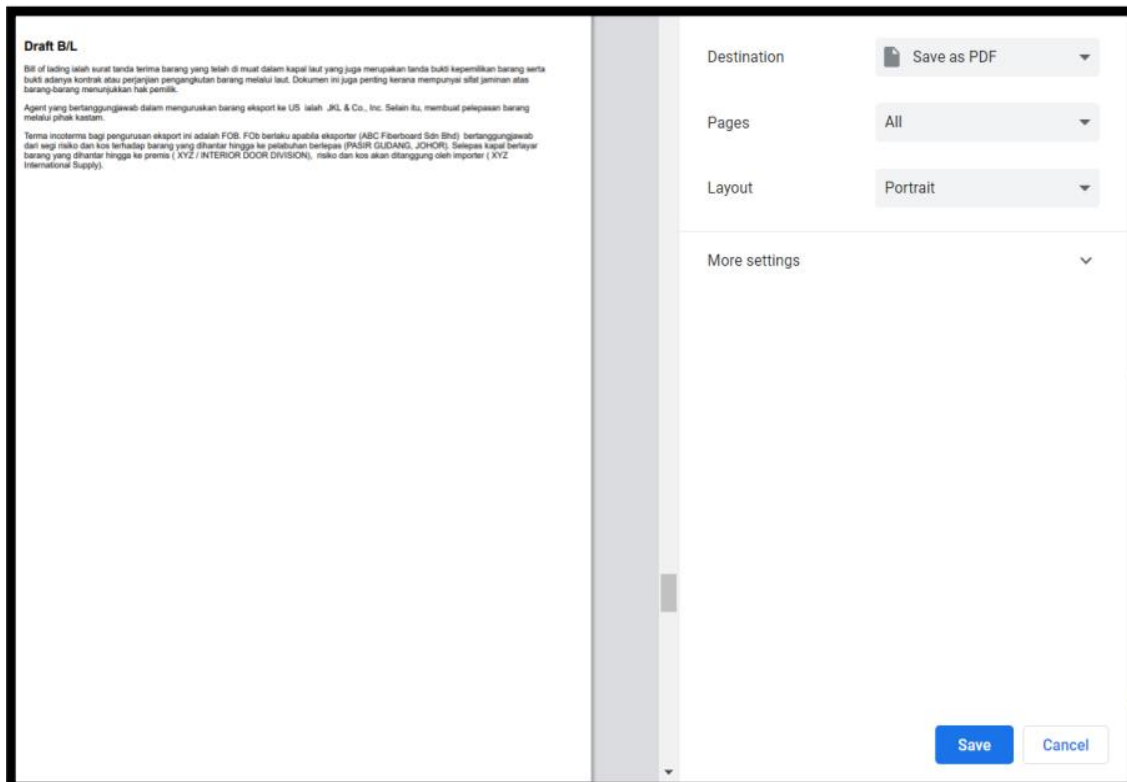

Figure 10.3: Sample of portfolio that can be printed or saved for reference purposes

Save Works:

This process is a space for students to store their work. Students can retrieve their work to continue the Export document management process until it's done.

View Works:

Students can review their work and make corrections if necessary. Lecturers can view student work in the form of a portfolio for the purpose assessment.

10.3 Role of "iFolioSys" dashboard

Figure 10.4 shows the dashboard that displays in "iFolioSys" is the main function that needs to be understood among students of Business Management in Logistics & Supply Chain.
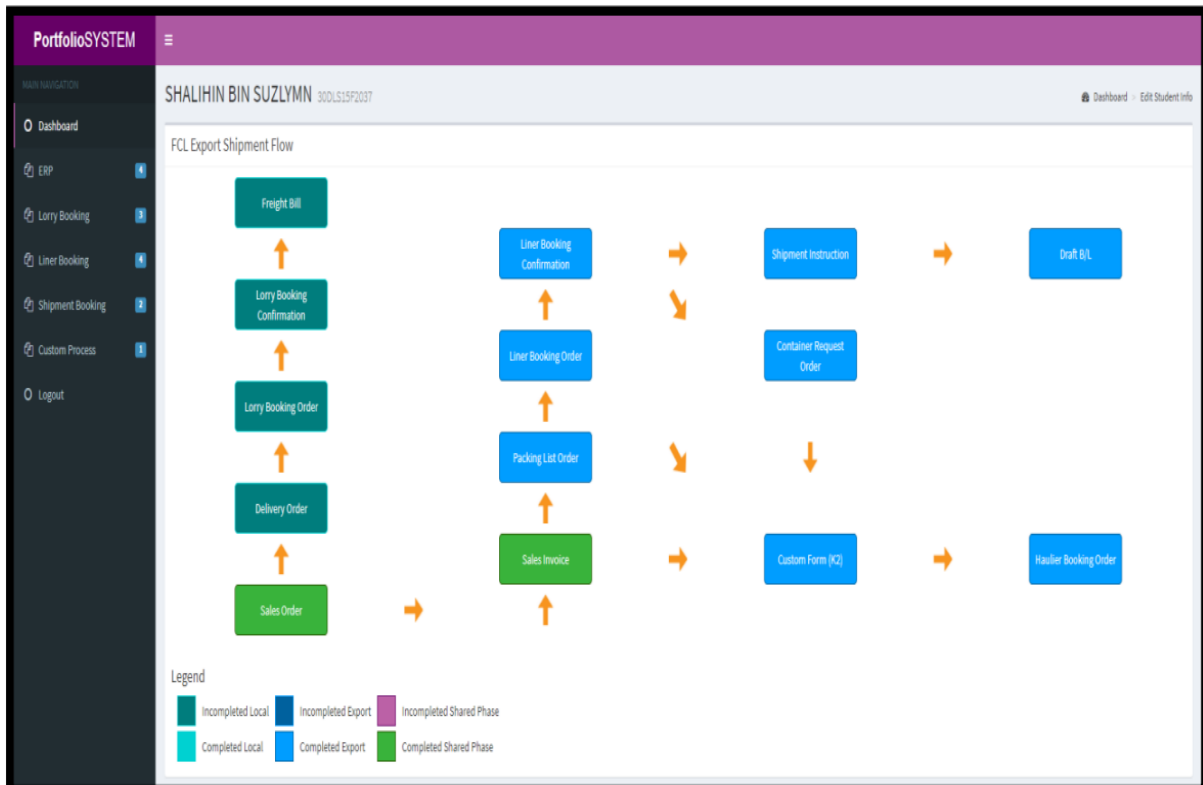

Figure 10.4: "iFolioSys" Dashboard View

It relates to an overview of the export process and the documentation involved via FCL *(Full Container Load)* delivery procedure, i.e. using the "FishyBack" intermodal services *(a combination of land and sea transport)*.
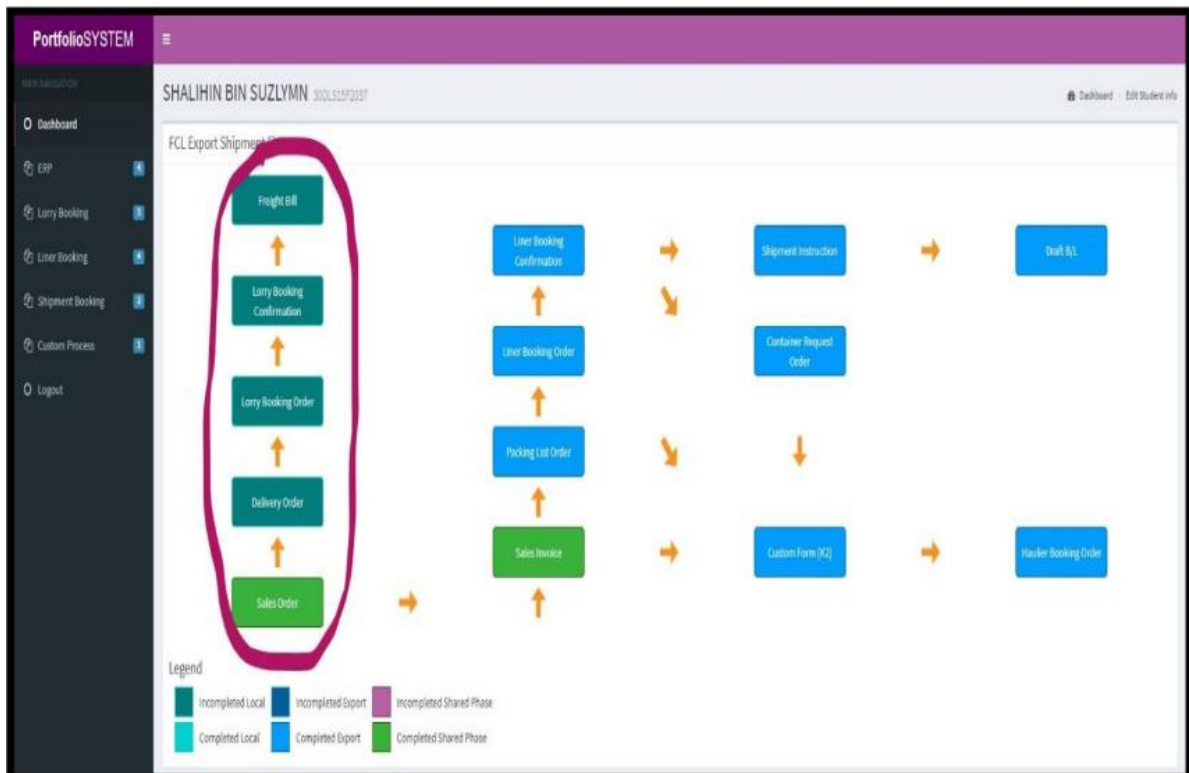
Figure 10.5: The "iFolioSys" dashboard display starts with the "Sales Order" document and goes above vertically.
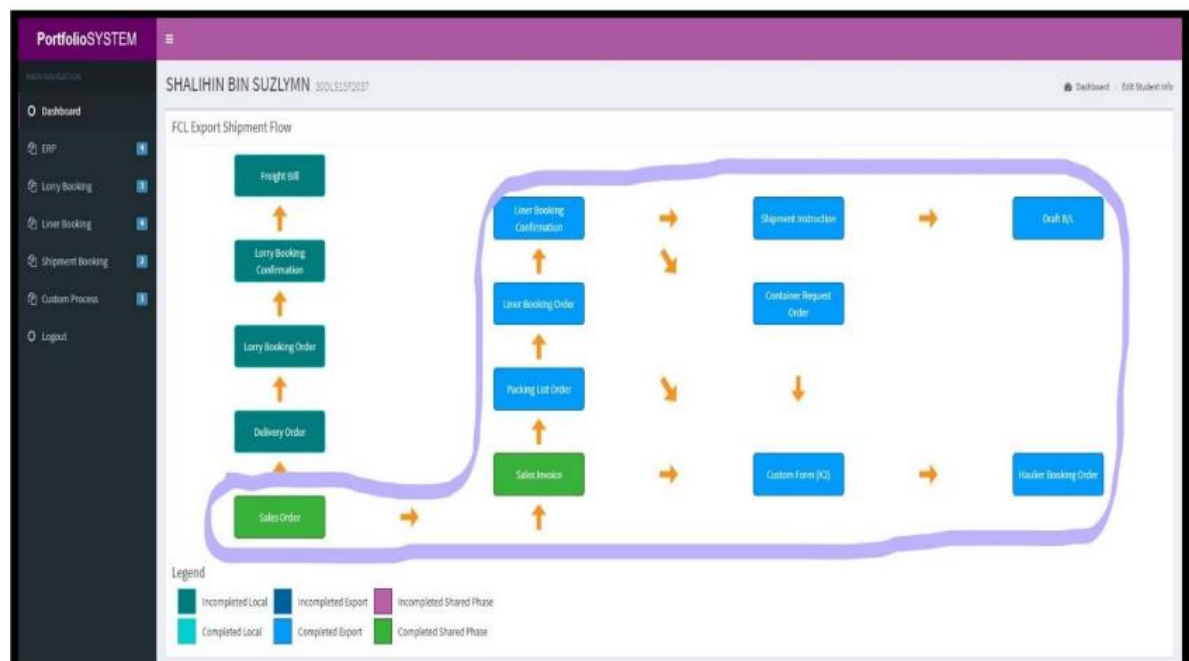

Figure 6: The "iFolioSys" dashboard display starts with the "Sales Order" document and goes to the right.

For channels that start with a document of Sales Order and go up vertically, it is related to the process delivery of goods involving land transportation. Meanwhile, the channel that starts with the Sales Order and goes to the right involves the process delivery of goods using sea transport as well as engaging in export trade. Four components such as Sales Order, Delivery Order, Invoice and Packing List are from a list of documents included in the category of ERP *(Electronic Resource Planning)* systems. It covers details relating to suppliers and customers on behalf of exporters or manufacturers.
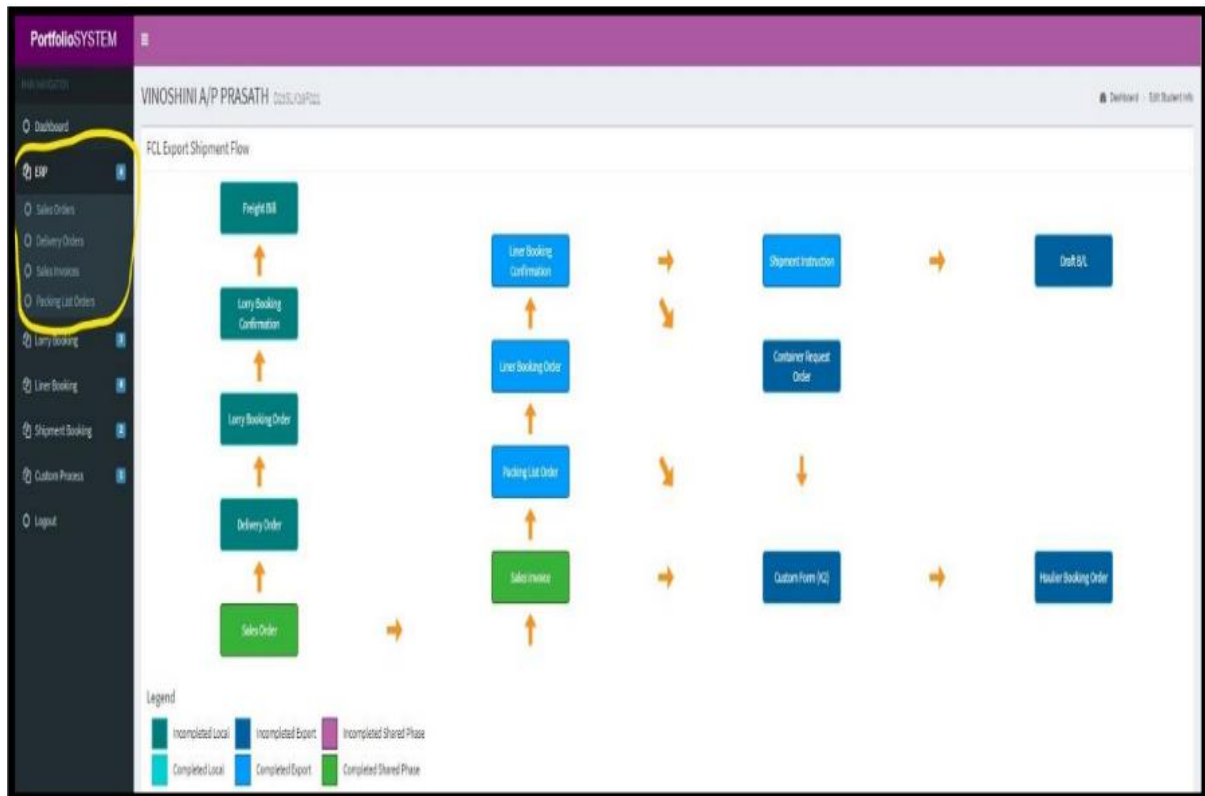

Figure10. 7: The "iFolioSys" dashboard display 4 documents in the category of ERP system

Other items such as Liner Booking Order, Container Booking Order, Haulier Booking Order, Draft Bill of Lading (B/L), Custom Form (K2) and etc., is a document issued through 3PL *(Third Party Logistics)* which is the Shipping Liner, Freight Forwarder, Haulier and authorized agent appointed by customs.
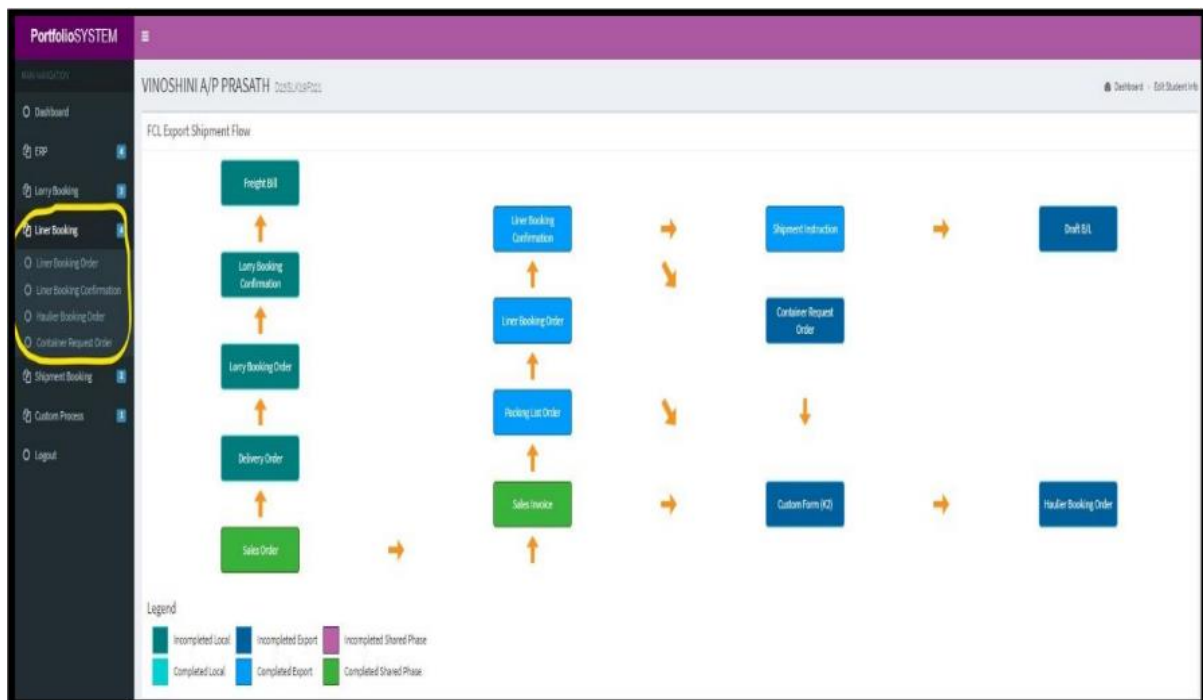
Figure 8: The "iFolioSys" dashboard display documents issued through 3PL

According to Thomas A. Cook, et al; 2012, one of the Freight Forwarder's roles as 3PL *(Third Party Logistics)* in international trade is to provide value added services to the importer or exporter. Among the important services is to do the business transaction using EDI *(Electronic Data Interchange).*

Basically, EDI *(Electronic Data Interchange)* is capable of receiving and transmitting manual data, tracking and producing internal documentation in a format or in an automatic mode. Diversity of data, availability of the equipment and formatting the report is different based on the requirements. However, the capabilities of EDI *(Electronic Data Interchange)* that are provided by Freight Forwarder should have an element of cost reduction and be able to provide delivery data in a timely manner.

10.4 Synopsis of "iFolioSys" dashboard

Through the findings of research studies from Sumah, 2019, by integrating EDI *(Electronic Data Interchange)* and LM *(Logistics Management)* such as transportation management, physical distribution, inventory and warehousing can enhance cooperation between the trading

partners through quality communication services. This study also supports the statement from Bergeron & Raymond, 1997, who confirmed the benefits of EDI *(Electronic Data Interchange)* is to improve communication quality and transaction speed, reduce expenses as well increase business competitiveness. Therefore, the content of an EDI simulation system will be described in detail through the "iFolioSys" dashboard synopsis. Before entering the required information into each of the components available on the dashboard, the course lecturer will provide one case studies related to export trade to be completed by students. Students will feel the experience as an exporter by entering information into Sales Order documents, Invoices and Packing List. Only Invoice and Packing List will be sent to the Freight Forwarder who manages the movement of cargo from the exporter premises or warehouse to the Port of Departure.

At the same time, the student, for example as an exporter or Freight Forwarder will make a reservation of empty space on board via Shipping Liner by filling the Liner Booking Order. Shipping Liner will confirm the reservation of empty space inside the ship through the Liner Booking Confirmation document. Shipment Instruction will be made by the student (exporter or Freight Forwarder) as a notification to Shipping Liner regarding 3PL *(3rd Party Logistics)* that manages the receipt of imported goods at the Port of Destination. Students will experience as a Shipping Liner that issues the draft Bill of Lading on behalf of the exporter or Freight Forwarder. They need to fill in the details of the container for export purposes. In addition, students will also represent the Freight Forwarder by entering information into the Container Request Order that needs to be submitted for the placement of empty containers in Container Yard. Students will also issue a Haulier Booking Order for truck bookings from a carrier who will transport empty containers from the Container Yard to the exporters premises or warehouse and laden containers from the exporters premises or warehouse to the Port of Departure. From another point of view, students will get an experience of being a customs agent that is appointed by the Freight Forwarder by filling in the information into the Custom Form (K2) column. Most of the information entered is from a copy of Invoice, Packing List and draft Bill of Lading which has complete details for the purpose of Customs clearance.

Overall, the export trade flows that have been illustrated through the "iFolioSys" simulations is in line with the findings from the study of Sumah, 2019. It stated that the integration between EDI *(Electronic Data Interchange)* with LM *(Logistics Management)* provides opportunities between trade partners to initiate rapid response in the sharing of vital information about business.

10.5   Conclusion

The "iFolioSys" initiative was developed to provide opportunities and knowledge exposure to students to understand the workflow in export activities according to the procedures they use to describe the EDI (Electronic Data Interchange) system by simulation. Even "iFolioSys" can reduce the use of paper and this has a positive impact on the green environment.

However, "iFolioSys" still has room for improvement in terms of content, namely the work process flow for export by LCL (Less Container Load) which should be included so that students are more exposed with e-commerce business operations. Moreover, improvements in terms of components can be assessed by real time-based lecturers and students can collaborate with lecturers or other students online through the "iFolioSys" platform. It is an opportunity for students to learn from each other in building the skills of working as a group such as leadership skills, teamwork, conflict management and negotiation.

"iFolioSys" has the potential to be developed and implemented on programs and courses offered at Politeknik and Kolej Komuniti. "iFolioSys" is not necessarily only used in the course DPL5W14 (Export, Import Documentation & Procedures) for the Diploma in Logistics and Supply Chain Management program, but can also be applied to the use of courses from other programs that require conducting project writing, research projects, training industry, and Work based-learning. This is because "iFolioSys" is user-friendly and easy to use.

It is hoped that "iFolioSys" can facilitate the delivery, teaching, and disclosure of knowledge between lecturers and students. This is important because the existence of a good educational application system can provide a positive impact in developing the quality of TVET skills among students. With "iFolioSys" is expected to cover and fulfill eight main components, including collaborative learning, technology empowerment, problem-solving skills development, project-based learning, optimizing information and communication technology (ICT) as a source of information, encouraging reflection, developing thinking skills and assessment.

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