M-Learning for Technical and Vocational Education Training (TVET)

Siti Azwanee Abdullah, Muhammad Sukri Saud, Yusri Kamin

Abstract: Technical and Vocational Education Training (TVET) plays an important role in shaping human workforce to meet the requirements set by the job market. As to equip the manpower with necessary skills to perform in the job market, the education and training delivery system must be improved. Therefore, TVET institutions take up the challenge by changing the curriculum content and the delivery system to produce students who have both the knowledge and skills. Teaching and learning are not only practiced traditionally where teachers focus on activities in the classroom solely, but it must in accordance with the latest technologies. Therefore, teachers' must be up-to-date with the latest technologies such as the use of mobile devices for the delivery of instruction and they also need to have the necessary knowledge to plan and deliver the content. Specifically, this paper discusses the concepts of mobile learning in technical and vocational contexts, devices used in Mobile Learning, benefits of Mobile Learning, and challenges that exist in the implementation of Mobile Learning. This paper is technically reviewed using document analysis. The documents reviewed are from journal article, conference proceedings, concept paper; accessed via Universiti Teknologi Malaysia Library web portal (www.psz.utm.my). From the review, the researchers provide insights to the need of implementing Mobile Learning in the context of TVET and at the same time improving the quality of education in the vocational context.

Keywords: Mobile Learning (M-Learning), Mobile device, Technical and Vocational Education and Training (TVET)

I. INTRODUCTION

In the era of rapid globalization, there is a growing demand for human resources to possess the content knowledge and necessary skills required by the current job market. In Malaysia, the quality and skills of human resources are crucial to the growth of economy to become a developed nation in 2020 2020 (Rasul, Mohamed Ashari, Azman, & Abdul Rauf, 2015). Hence, TVET education plays an important role in providing trained manpower for economic and industrial growth for both developed and developing countries (Bappa-aliyu, 2012; Bello, Shu'aibu, Saud, & Buntat, 2013).

This has caused the Ministry of Education (MOE) Malaysia to encourage the use of ICT in teaching to support the 21st century learning. In the Seventh shift of the Malaysian Education Blueprint (2013 - 2025), which is "Utilizing ICT to enhance the quality of learning in

Siti Azwanee Abdullah, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Johor Bahru, Johor, Malaysia. waneeabdullah@gmail.com

Muhammad Sukri Saud, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Johor Bahru, Johor, Malaysia.

Yusri Kamin, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Johor Bahru, Johor, Malaysia.

Malaysia", it shows that the use of ICT in teacher teaching is being emphasized (Ministry of Education Malaysia, 2013). Hence, by using mobile technology applications, especially in the field of TVET, it can improve the quality of teaching and learning (Azmi, Mat Noor, & Mohamed, 2017). However, using mobile systems to improve learning techniques is not emphasized much in developing countries such as Malaysia (Abdul Jalil & Tasir, 2014).

Shuib, Azizan and Ganapathy (2018) claim that mobile technologies have a great potential as the future means to increase educational opportunities among communities at all levels in this nation. It is supported by the statistics given by the Malaysia Communication and Multimedia Commission (MCMC), (2017) showing that smartphones are the most popular means for internet accessibility among Malaysians, making the country a mobile-orientated society. In fact, students are more interested in the use of technology in their learning process (Rahmat, Abu Yazid, Raja Daud, Kaulan, & Mohd Hashim, 2016) compared to the traditional approach.

Mobile Learning is a very efficient approach that has a significant impact on educational development in Malaysia (Irwan Mahazir, Norazah, Rosseni, Azwin Arif, & Ridzwan, 2015). However, the use of Mobile Learning in Malaysia including TVET is still as widely as distance learning and e-learning (Aliff & Mohd Isa, 2013). Although a number of studies showed promising results using mobile and flexible technologies to enhance learning and teaching in higher educational institutions, its effectiveness in facilitate the specific needs in TVET remains uncertain (Ricky & Rechell, 2016).

Therefore, the purpose of this article is to bring out clearly, the concept of Mobile Learning in TVET. Specifically, this paper highlights the benefits of Mobile Learning and the challenges that occur when implement Mobile Learning. Based on the analysis document, articles, research findings, and education report etc., researcher bring out clearly the relevance of Mobile Learning to be implemented in teaching technical and vocational courses.

II. M-LEARNING CONCEPT

The advancement of technology provides significant impact to education (Aliff & Mohd Isa, 2013). The teaching and learning process is no longer concentrated in the classroom, but it can happen anywhere and anytime (Khyar, 2017).

Due to the advances in mobile technology, students may access or

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read materials on e-learning websites using mobile devices. This type of learning is known as Mobile Learning. Mobile Learning (M-learning) is an e-learning follow-up, which is partly derived from distance learning (Y. S. Wang, Wu, & Wang, 2009). There is a difference between e-learning and M-learning. The concept of e-learning is limited to teaching and learning that take place in the classrooms or physical infrastructure facilities while M-Learning allows teaching and learning to occur anytime and anywhere be it synchronous or asynchronous (Abd Rahman & Mohd Hashim, 2011).

M-Learning is considered to be different kind of learning in which it has the ability to hold student's attention in learning and this indirectly calls them to be a ubiquitous learner (Azmi et al., 2017). The use of mobile technologies makes it easier for learners to study whenever they want (Ferreira, Klein, Freitas, & Schlemmer, 2013). The main feature of M-Learning is that the element of mobility is incorporated into e-learning, allowing learners to learn at anytime and anywhere (Chen, Chiu, & Huang, 2011). According to Udanor and Nwodoh (2014), there are six features of Mobile Learning system which are:

- it enables access to course resources anywhere and anytime
- it enables access to the system for authenticated users
- it enables users to access resources in various formats (voice, text, image and video)
- it enables the material reuse
- it enables users to perform the tasks identified as a component of education.
- it enables flexible environment for adding additional services and components.

As stated by Cheon, Lee, Crooks and Song (2012), there are four types of approaches that can be supported by mobile technologies which are individualized learning, situated learning, collaborative learning, and informal learning. M-Learning supports individualized learning by allowing students to learn based on their own pace while the situated learning enables students to learn by using mobile devices within a real context. M-Learning on the other hand, enables collaborative learning when students use mobile devices to easily interact and communicate with other students and lastly, informal learning happens when students learn outside of the classroom at their own convenience.

III. DEVICES USE IN M-LEARNING

The rapid growth of ICT has affected the teachers' approach in the teaching and learning process. At the moment, the mobile devices such as smartphones, iPads, tablet PCs and flexible technology (Wi-Fi, online and web-based networking) allow learners to learn anytime and anywhere (Shuib et al., 2018; Y. S. Wang et al., 2009). Due to the mobility and portability of the devices used and their ability to fit easily in a pocket or purse, Mobile Learning allows teaching and learning to occur at the users' convenience (Shuib et al., 2018). Students can access the academic resources, communicate to others, and develop content in and out of classrooms (Hashim, Tan, & Rashid, 2015; Ng, Lam, Ng, & Lai, 2016; United Nation Educational, 2013).

Göksu and Atici (2013) stated that learning using portable devices through the use of wireless internet and mobile devices. Mobile devices including mobile phones, laptop, personal digital assistants (PDAs), smart phones and digital audio, tablets and mobile multimedia players enable users to access information and communicate with others without depending on time and place. Meanwhile, mobile technologies include GPRS, Wireless (Wi-Fi), Bluetooth, Infrared, Augmented Reality (AR) and Mobile Cloud Computing Technology.

In addition, Hashemi, Azizinezhad, Najafi and Nesari, (2011) had listed out the mobile devices used in learning which are mobile phones, smartphones, PDAs, MP3/ MP4 players, handheld gaming devices, Ultramobile PCs (UMPCs), mini notebooks or netbooks, handheld GPS or voting devices, and specialist portable technologies. The devices that can be used in Mobile Learning are illustrated in Figure 1 below:
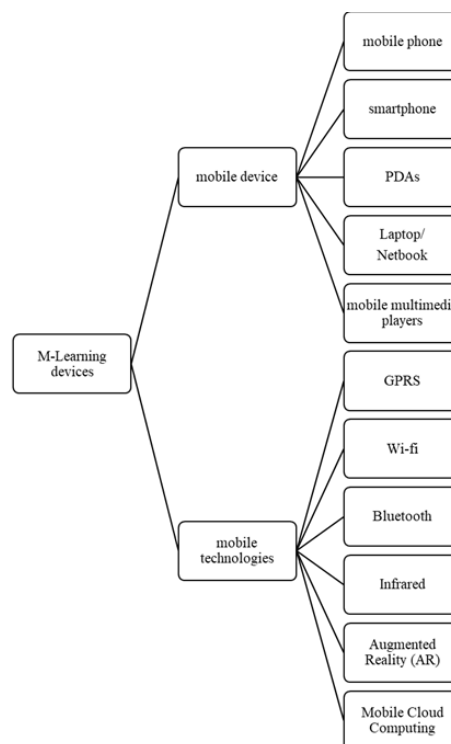

Fig. 1 Devices that can be used in M-Learning

IV. BENEFITS OF IMPLEMENTING M-LEARNING IN THE TVET CONTEXT

M-Learning focuses on the mobility of the learners, interaction with portable technologies, and learning that use mobile devices to support teaching and learning (Mehdipour & Zerehkafi, 2013).

During the teaching and learning session, the use of mobile devices can connect educators with learners and materials on websites around the world (Saleh & Siraj, 2016). M-Learning also can enhance learning achievement and reduce students' cognitive load than those who learn using the traditional approach (Hwang, Wu, Zhuang, & Huang, 2013). In addition, the implementation of M-Learning has greatly benefited everyone in terms of quality content, improved teaching and learning quality, reduced cost and delivery time, and increased knowledge sharing anytime and anywhere (Salim, Mohamad Yatim, & Azis, 2017).

Zarei, Mohd. Yusof, Daud and Awang Hj. Hamid (2017) in their paper entitled, "Mobile Learning for Engineering Education Reform" has categorized the advantages of M-Learning to engineering students into four categories namely accessibility, quality, teaching support and teachers and acceptability. According to them, the main benefits of Mobile Learning to engineering education are it provides more opportunities to achieve professional and personal skills, allows collaborative learning activities and enhances the quality, accessibility and acceptability of learning resources.

V. CHALLENGES INTEGRATE M-LEARNING IN TVET

Even with its vast advantages if implemented in the teaching and learning, there are also challenges surrounding the M-Learning implementation. Among the biggest challenges faced by educators and researchers is the restriction in size of the students' mobile devices (M. Wang, Shen, Novak, & Pan, 2009). Besides that, the lack of infrastructure in education and training institutes has hindered the development of m-learning as a new approach in the education industry (Ahmad & Jabor, 2014).

According to Nobre & Moura (2017), there are obstacle that challenges the use of mobile devices in teaching and learning which is the internet connection that most of the times is slow and unstable. Sampson (2006) also highlights three main limitations of the application of Mobile Learning in Vocational Education and Training, namely device limitations, connectivity and design considerations. The details about these limitations are described in the table below:

Table 1: Limitations of Mobile Learning

No	Limitation	Description
1.	Device limitation	- small size - limited information to display - limited storage
2.	Connectivity limitation	- bandwidth maybe slow when users increase the usage of wireless
3.	Design consideration	- difficult to develop content due to the lack of platform specification

VI. CONCLUSION

The development of ICT has had a great impact on the national education system and it has brought new challenges to the TVET teachers. The teaching methods in the TVET setting should balance both theoretical and practical learning for students' labor market. Moreover, the use of mobile technology in TVET's programme will give positive impacts to the students' learning environment and academic achievement as they can learn at their own time and pace. While there are many benefits, many problems are also found in the implementation of M-Learning in in educational institutions. However, if taken seriously, the problems that arise can be easily solved with the cooperation from all responsible parties This study concludes that M-Learning is a highly effective approach and has a major impact on education development in Malaysia. Further research is suggested to develop a conceptual framework that focuses on the implementation of M-Learning model that can tackle these challenges and make M-Learning to be more usable and effective in TVET institutions.

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REFERENCES

1. Abd Rahman, R., & Mohd Hashim, M. H. (2011). M-Pembelajaran dalam Pendidikan Teknik dan Vokasional (PTV) Di Malaysia. Persidangan Kebangsaan Penyelidikan Dan Inovasi Dalam Pendidikan dan Latihan Teknik Vokasional, 1–11.
2. Abdul Jalil, R., & Tasir, Z. (2014). Mobile Learning in Malaysia. In International Education Postgraduate Seminar (IEPS2014), (pp. 2–9).
3. Ahmad, M. F., & Jabor, M. K. (2014). Pembelajaran Mudah Alih Dalam Program Automotif di Politeknik Malaysia. Jurnal Persatuan Pendidikan Teknik Dan Vokasional Malaysia, 5.
4. Aliff, N., & Mohd Isa, H. (2013). Tahap Penerimaan Penggunaan Telefon Bimbit Sebagai M-Pembelajaran dalam Pendidikan Islam. Journal of Islamic and Arabic Education, 5(1), 1–10. Retrieved from http://journalarticle.ukm.my/7542/1/50.pdf
5. Azmi, S., Mat Noor, S. F., & Mohamed, H. (2017). A Proposed Model of M-Learning for Technical and Vocational Education Training (TVET) Students. Journal of Theoretical and Applied Information Technology, 95(12), 2803–2813.
6. Bappa-aliyu, M. (2012). Integrating e-Learning in Technical and Vocational Education: A Technical Review. International Journal of Academic Research in Business and Social Sciences, 2(5), 52–58.
7. Bello, H., Shu'aibu, B., Saud, M. S., & Buntat, Y. (2013). ICT Skills for Technical and Vocational Education Graduates' Employability. World Applied Sciences Journal, 23(2), 204–207.
8. Chen, T., Chiu, P. S., & Huang, Y. M. (2011). A Study of Learners' Attitudes Using TAM in A Context-Aware Mobile Learning Environment. International Journal Mobile Learning and Organisation, 5(2), 144–158.
9. Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An Investigation of Mobile Learning Readiness in Higher Education Based on The Theory of Planned Behavior. Computers and Education, 59(3), 1054–1064.
10. Ferreira, J. B., Klein, A. Z., Freitas, A., & Schlemmer, E. (2013). Mobile learning: Definition, Uses and Challenges. Increasing Student Engagement and Retention Using Mobile Applications: Smartphones, Skype and Texting Technologies, 6, 47–82.
11. Göksu, İ., & Atici, B. (2013). Need for Mobile Learning: Technologies and Opportunities. Procedia - Social and Behavioral Sciences, 103, 685–694.

12. Hashemi, M., Azizinezhad, M., Najafi, V., & Nesari, A. J. (2011). What is Mobile Learning? Challenges and Capabilities. Procedia - Social and Behavioral Sciences, 30, 2477–2481.
13. Hashim, K. F., Tan, F. B., & Rashid, A. (2015). Adult Learners' Intention to Adopt Mobile Learning: A Motivational Perspective. British Journal of Educational Technology, 46(2), 381–390.
14. Hwang, G. J., Wu, P. H., Zhuang, Y. Y., & Huang, Y. M. (2013). Effects of The Inquiry-Based Mobile Learning Model on The Cognitive Load And Learning Achievement of Students. Interactive Learning Environments, 21(4), 338–354.
15. Khyar, S. N. F. (2017). Kerangka bagi Mereka Bentuk Pakej Pembelajaran mobile Untuk Pembelajaran Bahasa Inggeris (Kemahiran Mendengar dan Bertutur). Universiti Tun Hussein Onn.
16. Mahazir, I. I., Norazah, M. N., Rosseni, D., Arif, A. R. A., & Ridzwan, C. R. (2015). Design and Development Performance-based into Mobile Learning for TVET. Procedia - Social and Behavioral Sciences, 174, 1764–1770.
17. Malaysia Communication and Multimedia Commission (MCMC). (2017). Internet Users Survey 2017: Statistical Brief Number Twenty-One. Retrieved on August 24, 2019 from https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/MCMC-Internet-Users-Survey-2017.pdf
18. Mehdipour, Y., & Zerehkafi, H. (2013). Mobile Learning for Education: Benefits and Challenges. International Journal Computational Engineering Research, 3(6), 93–101.
19. Ministry of Education Malaysia. (2013). Malaysia Education Blueprint 2013 - 2025. Ministry of Education Malaysia, Putrajaya.
20. Ricky, Y. K. N., & Rechell, Y. S. L. (2016). Using Mobile and Flexible Technologies to Enable, Engage And Enhance Learning in Vocational Education and Training (VET). In Proceedings of 2015 IEEE International Conference on Teaching, Assessment and Learning for Engineering, TALE 2015 (pp. 96–101). IEEE.
21. Nobre, A., & Moura, A. (2017). Mobile Learning Scenarios in Language Teaching: Perceptions of Vocational and Professional Education Students. In Mobile Learning: Students' Perspectives, Applications and Challenges (pp. 33–60).
22. Rahmat, F. N., Abu Yazid, F., Raja Daud, R. N., Kaulan, K. Z., & Mohd Hashim, M. H. (2016). Multimedia for Teaching and Learning Among Trainers in TVET Institution. International Journal of Vocational Education and Training Research, 2(3), 18–23.
23. Rasul, M. S., Mohamed Ashari, Z. H., Azman, N., & Abdul Rauf, R. A. (2015). Transforming TVET in Malaysia: Harmonizing the Governance Structure in a Multiple Stakeholder Setting. The Online Journal for Technical and Vocational Education and Training in Asia, (4).
24. Saleh, M. P., & Siraj, S. (2016). Analisis Keperluan Pembangunan Model Pengajaran M-Pembelajaran Mata Pelajaran Sejarah Sekolah Menengah. Jurnal Kurikulum & Pengajaran Asia Pasifik, 4(4), 12–24.
25. Salim, N., Mohamad Yatim, N., & Azis, H. (2017). M-Pembelajaran: Kesediaan Pelajar KKBM Terhadap Era Baru Medium Pembelajaran. National Innovation and Invention Competition Through Exhibition (IComp Ex'17).
26. Sampson, D. (2006). Supporting Vocational Education and Training through Mobile Learning Environments. In Proceeding of The Sixth International Conference on Advanced Learning Technologies (ICALT'06) (pp. 1176–1177).
27. Shuib, M., Azizan, S. N., & Ganapathy, M. (2018). Mobile Learning Readiness among English language Learners in a Public University in Malaysia. Pertanika Journal of Social Sciences and Humanities, 26(3), 1491–1504.
28. Udanor, C. N., & Nwodoh, T. A. (2014). A Review of M-Learning Models. Indian Journal of Computer Science and Engineering, 1(4), 426–435.
29. United Nation Educational, S. and C. O. (UNESCO). (2013). Policy Guidelines for Mobile Learning. United Nation Educational, Scientific and Cultural Organization (UNESCO). France. https://doi.org/ISBN 978-92-3-001143-7. France
30. Wang, M., Shen, R., Novak, D., & Pan, X. (2009). The Impact of Mobile Learning on Students' Learning Behaviours and Performance: Report from A Large Blended Classroom. British Journal of Educational Technology, 40(4), 673–695.
31. Wang, Y. S., Wu, M. C., & Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. British Journal of Educational Technology, 40(1), 92–118.
32. Zarei, A., Mohd. Yusof, K., Daud, M. F., & Awang Hj. Hamid, D. H. T. (2017). Mobile Learning for Engineering Education Reform. Sains Humanika, 9(1–2), 1–6. https://doi.org/10.11113/sh.v9n1-2.1091

AUTHORS PROFILE

Siti Azwanee Abdullah is currently pursuing her PhD in Technical and Vocational Education at Universiti Teknologi Malaysia. Her area of interest and research are technical and vocational education and integration of Information and Communication Technology (ICT) and TVET.

Muhammad Sukri Saud is a professor in School of Education, Universiti Teknologi Malaysia. His expertise in curriculum design and development in technical and engineering education.

Yusri Kamin is an Associate Professor in School of Education, Universiti Teknologi Malaysia. His area of interest and research are comparative studies; technical and vocational education and training.