Application of TeamViewer software to assist teaching and learning for Computer Aided Design course during Covid-19 pandemic

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ABSTRACT – During Covid-19 pandemic, many universities have been closed to restrain the spreading of viruses. Online teaching and learning (T&L) have been conducted as an alternative to ensure the process of facilitating learning, acquisition of knowledge or skills, could be continued. However, the challenges lie for TVET and engineering courses, which require the use of Computer Aided Design (CAD) software. In this study, the results of online survey data from undergraduate students, who attended the online T&L session are presented, by focusing on the use of an open-source software, TeamViewer as an aiding tool to one of the popular online platforms, e.g., Webex. Results show most of the students (42.3%) agreed that the TeamViewer is helpful during the class session. However, another platform; Whatsapp is their first choice for online discussions and learning processes.

1. INTRODUCTION

Online teaching and learning (T&L) method was quite rare in Malaysia, before the Covid-19 pandemic struck the country in 2019. Since the pandemic, all the institutions, universities and schools started to implement this kind of T&L method and providing online assessment for every semester [1]. Basically, lecturers need to deliver instruction and support student learning from a distance and this new method for a wide range of course subjects should be effective, achieving the course learning objectives at the end of the semester. However, the effectiveness of this method to cover the TVET and engineering courses are still being monitored and discussed, but more disputes rise for courses that required hands-on and skills ability – psychomotor learning [2-4]. In general, those courses required good laboratory facilities and testing equipment. Thus, the students must be physically presented in the university campus to run the equipment and conducting tests. However, there is no exact solution to this issue, especially when the lecturers and students under movement-controlled order due to Covid-19 viruses. Currently, Virtual Reality (VR) technology [5] and virtual private network (VPN) to run university computers from outside has been used to support those engineering courses that required laboratory entrance and software training.

In engineering field, technical drawing is a graphical language used to communicate. It is a graphical representation of a real thing, an idea, or a proposed design for later manufacture or construction. For example, AutoCAD is engineering drawing software used to produce standard technical drawing. The software enables engineers to produce 2D and 3D models using computers. Figure 1 shows the interface of AutoCAD software. The T&L session before pandemic, usually conducted in laboratory, where both the lecturer and students present at the same place. The lecturer's computer was assigned to easily controlled students' computer during the lecture session.

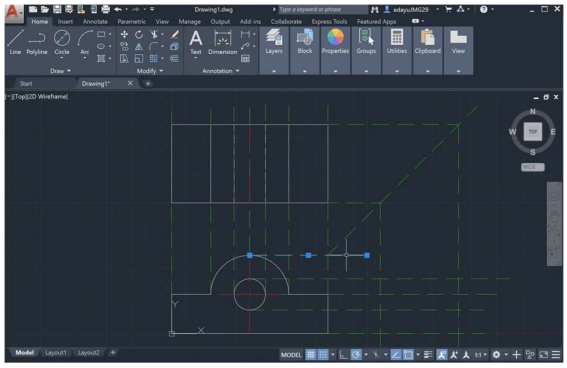

Figure 1 Interface of AutoCAD software.

Currently, the changes in the T&L session due to pandemic, where the lecturer and students at home will result in different learning environments. In this study, the effectiveness of conducting online T&L session with an open-source software like TeamViewer for an engineering course was investigated through online survey. The undergraduate students' opinion on this method was collected and presented for future references in conducting other similar CAD courses.

2. METHODOLOGY

2.1 Online T&L Session

An open-source software called TeamViewer has been used to help the online T&L session at Universiti Teknikal Malaysia Melaka (UTeM), Malaysia on engineering graphic course (BMMA 1303) where the AutoCAD software was used to learn and draw technical drawings. At the end of the course, the students should be able to construct typical mechanical engineering drawings using the software. The students will be exposed to CAD interface, editing commands, coordinate system, template preparation and layer to produce various types of engineering drawing. The online T&L session was running using both Webex and TeamViewer simultaneously, where the former was to deliver the lecture and demonstrations, while the latter was to control and intervene the students' PC from a far

distance. Basically, the TeamViewer allows secure remote access to any device from anywhere. It allows users to connect with their own devices or help others remotely. In this proposed method, the lecturer would control the students' devices (computer or laptop) when they were facing difficulties in using the AutoCAD software. The acts of teaching through the student's device can also be seen by the other students in Webex interface. By using this two software simultaneously, the students can privately message the lecturer their TeamViewer ID number in Webex chat box and avoid any privacy breaches. This study conducted an online survey using Google form and disseminated the survey to the students to collect their feedback on the implementation of this open-source software into online T&L session. This preliminary study involves only 50 respondents from age 19 – 21 years old from Year 1 to 4 of study period. The low number of respondents in this survey should be able to describe the positive or negative responses on this method under current strain time. In addition, other online alternatives to support TVET and engineering courses are still under study. Meanwhile, VR technology is expensive with very limited expertise in this country. This study also presents the readiness of students for online T&L session based on their facilities, such as computer and internet coverage at home.

2.2 Respondent and Survey Data

As shown in Table 1, the survey consists of three sections: demographic data, student's feedback on their experience in learning AutoCAD with the help of TeamViewer and student's preference. Table 2 shows an overview of respondent information. The total number of respondents was 50 students, of which were 34 (68%) male and 16 (32%) were female, and 45 used AutoCAD (90%), and 5 (10%) were non-AutoCAD user.

Table 1 List of survey items.

Properties	No of questions
Demographic data	4
Student's experience in learning CAD	15
Student's preference	4
Total	23

Table 2 Respondent information.

Student	AutoCAD user	Non-AutoCAD user	Total
Male	29	5	34
Female	16	0	16
Total	45	5	50

3. RESULT AND DISCUSSION

From Figure 2, it is found that 56% of students faced computer or software problems during online learning. This computer or software problem includes computer was not compatible to install AutoCAD software, or connection loss during the T&L session. Only 26% of students have a smooth process during the online session. Another study [6] also found that the internet connection is a major problem facing by students. However, this problem could not be easily solved as it depends on the government's initiative and planning. However, to help students who were facing difficulties to complete CAD exercises given during class, an open-source software using TeamViewer was proposed in conjunction to the Webex software. In Figure 3, only 28% of students aware of the TeamViewer software existence, meanwhile 62% did not know about this software until its implementation in this course. The implementation and introduction of this software during T&L session also gives the students opportunity to assist their friend for other courses too. This can be seen from Figure 4, where 34% of students have using this software to assist their friend remotely. This peer-to-peer co-operation helps them to understand more and do better in their online learning class. However, this percentage is still low compared to 66% of students who are not using this open-source software to help their friend. This is due to different alternatives used by the students such as (1) Video call through WhatsApp, and (2) YouTube or videos. These results show that students are still not comfortable using TeamViewer as a tool to help their friend remotely. This is understandable as not many students are exposed to TeamViewer and the software feature is only limited to control other's devices. Interestingly, no one (among 50 students) has mentioned ULEARN – an online T&L platform that provided by the university. Most of the students prefer to use WhatsApp as their medium for discussion. The WhatsApp allows more wide and open discussions through video and image sharing, voice note, text messages and fancy emoji. From these results, it is shown that the 'friendly' apps on mobile phone is one of the factors why U-Learn not become student's preferences.

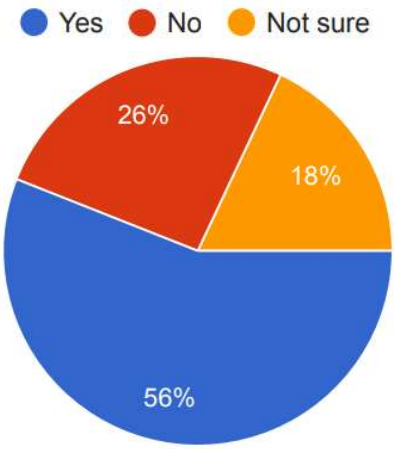

Figure 2 No. of student faced computer or software problem during online T&L

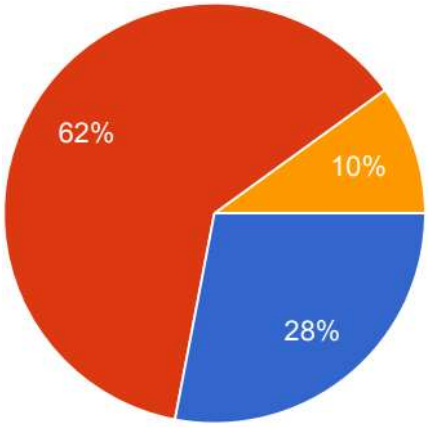

Figure 3 Student awareness about open-source software (TeamViewer)

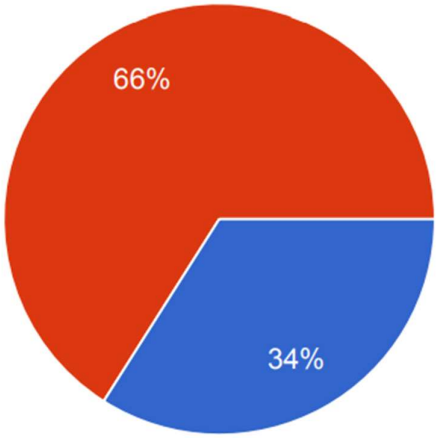

Figure 4 No. of students used TeamViewer for AutoCAD and other subject to help their friends.

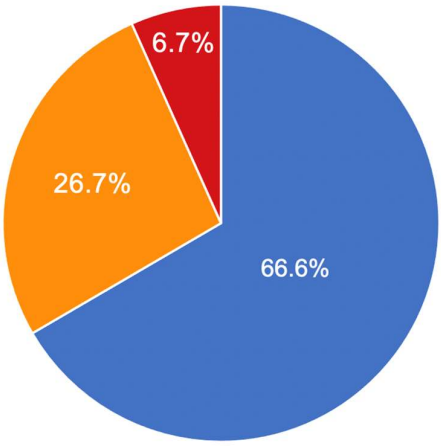

Figure 5 Student agreements on the TeamViewer aided the T&L session on AutoCAD software

Figure 5 shows student agreements on the TeamViewer aided the T&L session on AutoCAD software. About 66.6% of students who used TeamViewer agreed that the TeamViewer is a helpful aiding tool. However, the 26.7% appear for those students who are not sure about the effectiveness of TeamViewer and 6.7% disagree. This is understandable as from the online survey, only 22% of the students have their own computers to be controlled by the lecturer during the T&L session. While the rest of the students did not need help in learning AutoCAD, showing their capabilities to understand the software without a one-to-one coaching approach. The results of TeamViewer effectiveness in CAD course could also be seen in Figure 6, through Likert scale of 1 to 5 involving (1) Strongly disagree to (5) strongly agree. Only two students out of 50 disagree on the effectiveness of this method. Meanwhile, most of the students (54%) agreed that this method is helpful for them to understand the AutoCAD software better.

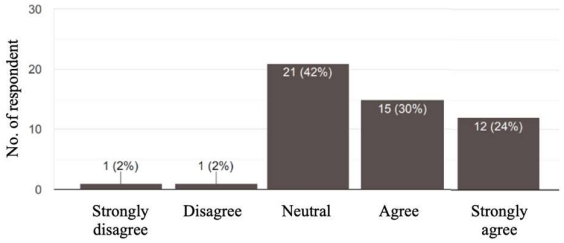

Figure 6 Student agreements/disagreements on the effectiveness of TeamViewer with AutoCAD class.

4. CONCLUSION

During the Covid-19 crisis, online T&L became the lifeline for education, but the opportunities offered by digital technologies provided a convenient solution. Lecturers should welcome this new wave of education because not only will students benefit from it, but lecturers will also be able to be more flexible in planning their lessons creatively. This is in line with the government's hopes of achieving the Industrial Revolution 4.0 (IR4.0). The use of TeamViewer as aiding tool for CAD course seems promising as many students acknowledge its usefulness in online T&L session. However, more wide data should be collected in the future upon the number of online T&L sessions and respondents are increasing with time.

5. ACKNOWLEDGEMENT

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