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An Analysis of Distance Learners' Technological Competence on Moodle-Based Learning Experiences

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Abstract: The purposes of this paper were to describe distance learners' Moodle-based learning experiences during the Covid-19 pandemic and analyze distance learners' technological competence through Moodle-based learning experiences. This study uses qualitative method to characterize and analyze the digital competence required to maximize the usage of the Moodle platform as a course media. The questionnaire and Focus Group Discussion (FGD) were used in collecting the data. The total of 509 participants responded to the survey and 17 participants were participated in FGD. The results reveal that the students experience several obstacles in participating in online learning using the Moodle platform. especially for students who live in remote areas, there are many obstacles; starting from the difficulty of getting an internet connection, data limitations due to having to take many courses, and lack of motivation in completing assignments. Furthermore, the findings also show that students have a fairly high level of technological competence. The paper figures out the digital competences owned by the students in facing new tools and exploiting the technological potentials in a flexible ways. This study is crucial due to the important of helping students to understand online learning goals which in turn might increase their primary knowledge, technological usage and behaviors. Furthermore, it is also important for institutions to prepare clear policies to develop their learning systems

Keywords: covid–19 outbreak, moodle-platform, online learning, technological competence

INTRODUCTION

The current Covid-19 pandemic requires all elements of education to be able to improve digital knowledges. These digital knowledges are becoming increasingly important in the 21st century given the very rapid development of science and technology. Being

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digitally competent, students will have extraordinary abilities to think, learn, communicate, and work critically. In addition, educators are now able to create alternative ways of teaching that are more interactive. At the beginning of 2021, many of us anticipated that the COVID-19 pandemic would cease. However, the phenomenon is unmistakably different, Covid-related resistance has been demonstrated in early waves of the pandemic.(Manchia et al., 2022) Even, in the midst of a pandemic, new and more productive alternatives, Omicron, continue to arise, resulting in an increasing in worldwide infection rates and hence greater constraints on social ties.(Solangi et al., 2021). As pandemic cause rapid educational transformation which ultimately demands a greater focus on more efficient learning systems, desire for students to build skills, academic knowledge, and competency in their cognition finally enables students, lecturers, and relevant stakeholders to approach, deconstruct, and solve learning barrier through online learning.

Today's technological improvement particularly online learning has been discussed in many literatures. Previously, educators progressively used broadcasting methods, such as radio in the 1920s and television in the 1950s, for remote education, with the emphasis on allowing students to study from anywhere (as long as they had access to the broadcast), but not on studying at any moment.(Lowenthal et al., 2021) Majority of institutions also have begun to incorporate online education into their overall educational strategy.(Turk et al., 2021) Since number of universities offering online courses and programs has risen tremendously, institution optimized their work to find the best platform for improving education.

Furthermore, Indonesian education equipment provides prompted the development of a range of different curriculum models.(Iqbal & Sohail, 2021) Recent research conducted by learning analytics experts discovered tendencies in learners' use of MOOC discussion forums, focusing attention onto potential barriers to sustained use.(Quintana et al., 2021) One study conducted by Robinson explored that Dougiamas founded Moodle in order to create a free and open-source learning platform based on constructivist educational approaches. Additionally, he explained Moodle is licensed under the GNU, which protects end users' rights to operate, explore, distribute, and modify the system. This Open source concept has developed a huge and active development community around the Moodle project, with ongoing contributions to the primary coding and numerous nations plug-in that enhance the platform's functionalities in a myriad of contexts. (Robinson & Carroll, 2017)

Globalization has triggered a tendency to shift in the world of education from conventional face-to-face education to a more open education. Internet technology has

become a popular medium in developing global education. Internet network is a computer network that is able to connect computers around the world so that all types and forms of information can be communicated between parts of the world globally and instantly. In the world of education, the internet is an ideal medium for distance learning activities. Through the internet, students and lecturers can connect, view class schedules, send lecture assignment files, view grades, consult, and conduct virtual discussions. However, the use of the internet in the field of education must be controlled and controlled so as not to have a detrimental impact on the educational mission itself.

The concept of Digital Competence (DigComp) developed by the European Digital Competence Framework for citizens appeared to assess the potential of digital technologies (Rodrigues et al, 2021). Digital competence is regarded as a combination of knowledge, skills, and attitudes related to the use of technology in performing tasks, solving problems, communicating, managing information, collaborating, as well as sharing content effectively (Skov, 2016). There are competence areas to achieve objectives related to work, employability, learning, leisure, and participation. Calvani et al (2008) state the areas of competence are as follows: (1) information and data literacy competence; (2) communication and collaboration competence; (3) digital content creation competence; (4) safety competence, and (5) problem-solving (Rodrigues et al, 2021). Correspondingly, there are several dimensions in the digital competence. The item of each dimension can be categorized as (1) technological competence, (2) cognitive competence, and (3) ethical competence.

Regarding to the technological competence, it can be defined as the advanced ability to master the technology tools that enrich the professional and pedagogical skills (Ganievich and Toshpulatov, 2021). There are many aspects to the technological experience that needs to be analyzed. As for learning systems, the digitalization of learning systems is progressing. It includes the speed, dissemination and exchange of knowledge and emphasizes the importance of digital archiving and digital representation.

In addition, technology competence integrates multiple aspects to investigate and address issues and new technical contexts in a flexible way. Afterwards, the technical aspects include recognizing technical problems, identifying interfaces, selecting optimal technical solutions, processing logical operations, planning processes, setting real boundaries from the virtual world, and so on. Technological competencies play an important role in preparing specialists for future professionals because they have deep roots in pedagogical theory and practice, these competencies are indispensable in the delivery of teaching in higher education (Kosimov et al, 2021). Furthermore, the aspect of technological dimension can be classified

into several key points, for example recognizing the technological troubles, identifying interfaces, selecting the most suitable technological solution, dealing with logical operation, charting out processing, and distinguishing reality from the virtual world (Rahmiaty et al, 2020).

The acceptance of the five levels of digital technology in the technology literacy classification analyzes and discloses the extent to which students and teachers have actually achieved it, providing information on where the five levels are located or the highest percentages is needed. Moreover, there are five levels in the taxonomy of technological competence, namely: (1) technological awareness is limited to knowing technology only;(2) the conditions that have a deeper understanding of the uses and benefits of technology; (3) competence in using technology appropriately; (4) the ability to find new technologies to solve problems, and ;(5) able to assess and make appropriate and critical decisions regarding the choice of technology to be used (Pavlova, 2009).

However, it cannot be neglected that many study have demonstrated for and against the notion that online learning. The analysis in the context of the pandemic crisis confirmed that students found the online education is beneficial and they saw online education as particularly helpful during a crisis.(Allo, 2020) It claimed that educators and students with inadequate internet connections may be denied access to online learning.(Adedoyin & Soykan, 2020) However, Rahayu cites from Anderson (2008) also explained the following benefits of online education for learners; such as there are no time zones, areas, or distance barriers in asynchronous online learning; the accessible of online material at any time; in synchronous online learning, students and teachers interact in real time; students can use internet to access current and relevant learning resources and discuss with experts in the field they are studying. (Rahayu & Wirza, 2020) Thus, once the usefulness of online platforms for pandemic precaution is established, the certain online system can be enhanced for the purpose of pursuing education. As incorporating technology into education would be benefit both staff and students by boosting teaching and learning, making life more exciting, and facilitating knowledge development in a more adaptive context.

The use of Moodle platform has been started since 2004 until now, and has been developing from time to time for improvement. Meanwhile, for online tutorial services that are synchronous, UT uses the video meeting platform Microsoft Teams from 2018 to the present. Initially, the use of MS Teams for synchronous online tutorials was limited to UT's students living overseas. During the Covid-19 outbreak, UT has optimized the students'

services for synchronous learning supports. In the previous semesters, students in the remote areas were given face to face tutorials.

In providing asynchronous tuton services, UT uses the Moodle which is modified according to the learning needs and learning activities of students under the management of the Vice-Rector for Academic Affairs. However, in its practices, there are three elements of university are involved in the management, namely the ICT Center, the Center for Students' Learning Supports, and the faculties (Faculty of Economics, Faculty of Science and Technology, Faculty of Law, Social, and Political Sciences, and Faculty of Teacher Training and Education) with 43 study programs on the level of Diplomas, Bachelor's Degrees, Master's Degrees, and Doctoral Degrees. Thus, this paper aims to describe distance learners' Moodle-based learning experiences during the Covid-19 pandemic and analyze distance learners' technological competence through Moodle-based learning experiences

METHOD

Study Design

A qualitative technique was used to perform this research. This approach aims to characterize and analyse the digital competence required to maximize the usage of the Moodle platform as a course media. This study employed questionnaire and a qualitative online focus group discussion for a variety of reasons. To begin, this structure makes it possible to conduct an interactive and in-depth examination of respondents' experiences. Second, the group method can assist participants in clarifying points of view that may not surface during a one-on-one interview. Additionally, it might reveal detailed ideas held by individuals about a subject, as well as perceptual disparities across individuals and groups.(Khalil et al., 2020) As a result, focus group sessions were the best option for efficiently addressing the objectives of our study. Because of the current Covid-19 outbreak and social distancing in Indonesia, the conversations were held online.

Participants

The study's population included all the students in tuton and tuweb conducted in March-June 2021. All the students using the Moodle system for online learning are the topic of this investigation. A total of 509 participants responded to the survey distributed through surveymonkey.com. Only 358 usable questionnaire sets to be evaluated and 151 surveys were discarded.

Technique of Collecting Data

To accumulate data for research purposes, different methods of data collecting was used, as stated below:

1. **Questionnaire**

The study's questionnaire consisted of closed-ended questions (Khotari, 2002). Surveymonkey.com was used to disseminate this questionnaire. It is stated that the benefit of web technology had proven useful in creating, developing, and receiving user responses in a more efficient manner (Vasantha Raju & Harinarayana, 2016) .The questionnaire was divided into sections. Participants were requested to fill in the form about their gender, age, address, study program, and best suitable Web access devices in the first section. In the second part, participants were asked questions regarding their general usage of computing technology and Internet services, as well as information about their frequency of using the Moodle Platform. Participants, in particular, asked questions on their grasp of the lesson and any information components from the e-learning class. Meanwhile, is being written based on the framework and theories of Guo, Chen, Lei, and Wen (2014). In the final portion of the questionnaire, participants discussed the factors that impact their use of e-learning services during course lectures. All comments were screened using a nominal scale, which is a measurement system in which an answer to a specific question can fall into either group.

2. **Focus Group Discussion (FGD)**

The FGDs incorporates students from UT's English Education Study Program to further examine the survey results. The focus group discussions (FGDs) lasted two to three hours. In total twenty students taken from random selection were involved in FGD, all students agreed that it is not difficult to use the computers, and they claimed that they are commonly used all features in the computer such as office program, database, email access, video editing, digital audio, and web page design, and certainly mingle to several LMS program.

RESULTS AND DISCUSSION

Results

The Description of distance learners' Moodle-based learning experiences during the Covid-19 pandemic.

The new paradigm that has emerged shows that learning no longer refers to face-to-face meetings - although the concept of social interaction in it is maintained. However, it is carried out through the internet. The presence of Internet technology, which makes it easier for people to interact without being bound by space and time, has pushed the education sector into a new era of utilizing e-learning.

Open University (UT) is an institution which implements a distance learning system. Therefore, the development of e-learning is an effort to improve the convenience of the student learning process Through Moodle-based learning; the learning process can take place wherever and whenever desired. Higher education, therefore, must change the picture society

from an institution that is considered exclusive to a populist institution that serves the wider community. At UT itself, the implementation of Moodle-based learning has several objectives, including to increase students' mastery of learning materials, as well as to increase interaction between students and their lecturers (tutors), and between students themselves (El-Bahsh & Daoud, 2016).

In order to figure out the distance learners' moodle-based learning experience during the covid-19 outbreak, The Focus Group Discussion (FGD) was conducted in two sessions. Focus Group Discussion (FGD) was conducted to find a deeper and detailed meaning about the digital technology capabilities of students studying at UT remotely using the Moodle platform. This technique is used to reveal the meaning of a group based on the results of discussions centered on a particular problem so as to avoid the wrong meaning of a researcher to the focus of the problem being studied.

Figure 1 Online Focus Group Discussion with the Students.

The results of FGD show that many students are difficult to accept the concept of Moodle-based learning because they are not used to communicating using computers as a medium of communication. The easiest problem to find is the ease of access to a quality internet network. The most perfect portrait is drawn from the report of the Open University (UT), universities that have been in distance education for a long time are also experiencing difficulties. Although various efforts have been made, UT continues to serve students, both through tutorial services and Tuweb because most students live in areas that have not been reached by the Internet or cellular telephone networks. However, the problem is not only from education providers. Students, in this case students also have their own challenges.

The Analysis of distance learners' technological competence through Moodle-based learning experiences.

Responses of 358 students during the exposure of Moodle in the covid-19 outbreak on technological competence integrate multiple aspects in a flexible way. They were analyzed through descriptive statistics which revealed that the mean scores of some items were high

and none of the items scored lower than 0, 56. The following figure illustrates multiple computer-related activities which are commonly used by the students.

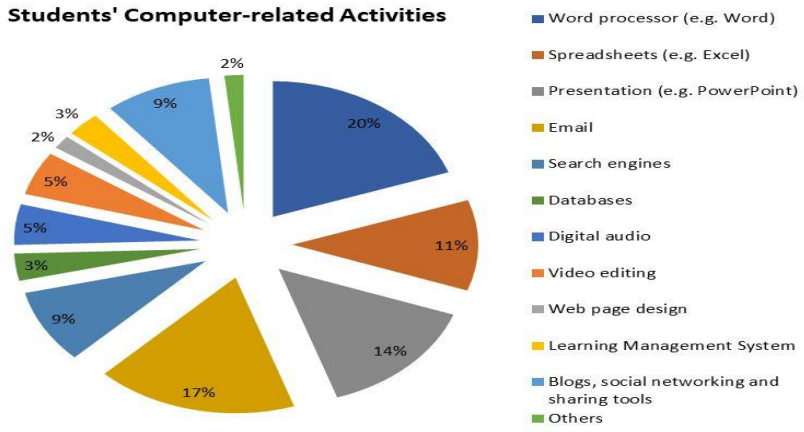

Figure 2 Students' Operating Computer Capability

It was observed that more than 80% students recognize to use word processor. Roughly 45% were able to operate Spreadsheets program like Excel Program and 60% capable of using Presentation. Nevertheless, less number of students cover in using the search engines, only 13% use databases, 20% work on digital audio, 22% use video editing, 7% able to use web page design, 12% common take in the LMS, and 38% often use social networking or sharing tools. But, referring to other point, 7% students mentioned they can manage other complicated tool such as Corel draw, Photoshop, Drawing and Animation Graphic Design and 3D Modelling Software, Script Writer, Design graphics and Translation Program.

To answer the second research questions, the next table provides the information towards the technological competence that the students had during studying at UT before the Covid–19 outbreak happened and while the pandemic spread in Indonesia. Students exhibited a high level of technological competence and more ready to learn independently.

Table 1 Students Technological Competence

item	Statements	Strongly Disagree	Disagree	Agree	Strongly Agree
Q9	I can access the discussion forum easily.	0,56%	2,79%	68,44%	28,21%
Q10	It is easy to participate in an online chat room.	0,84%	8,94%	71,51%	18,72%
Q11	I was active in using instant Messages with my tutor or friends	2,23%	20,11%	68,16%	9,50%

Q12	The layout of Moodle (the tuton platform) is well structured and easy to navigate.	1,68%	9,78%	76,26%	12,29%
Q13	It was helpful to undertake online exercises and quizzes on Moodle.	0,84%	8,94%	75,70%	14,53%
Q14	I used my previous skills in submitting the tasks or assignments.	0,56%	2,51%	78,77%	18,16%
Q15	It was helpful to download or read online written class resources from Moodle.	1,12%	6,42%	73,74%	18,72%
Q16	I could access the materials in the form of audio and video files easily.	1,12%	9,22%	70,11%	19,55%
Q17	I always received alerts about course information (e.g. timetable, the release of a new learning resource, changes in assessment, etc.)	3,91%	20,39%	63,97%	11,73%
Q18	Learning through Moodle as an online platform is fast and reliable.	0,84%	11,73%	72,91%	14,53%
Q19	I used a video conference on the Moodle platform.	5,59%	42,18%	45,81%	6,42%

The conceptual framework for students' technological competences is derived from the findings of this critical literature review. The research studies show that most of the students were familiar with technology in accessing the Moodle platform and using essential features of Moodle platform

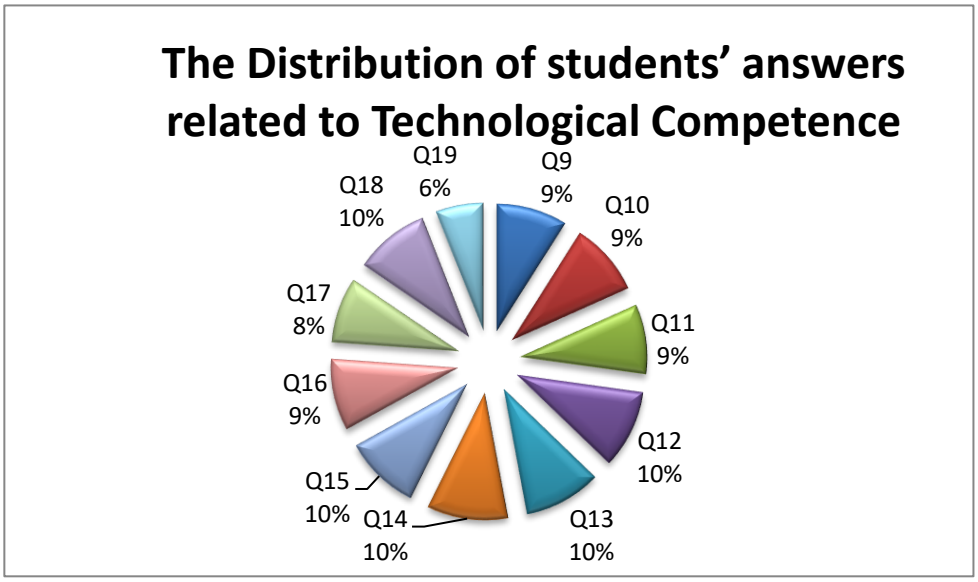

Figure 3 Distribution of students' answers related to Technological Competence

The chart is clearly figured out the experiences of students in using Moodle as a platform provided by UT in facilitating distance learning program. It substantially informs us

a good learning system offered by UT before the pandemic Covid -19 spread widely. That is because it is clearly acknowledged by approximately three out of four percent of students agrees that the learning system is already good. Firstly, 69.93% of students agree that they can access the discussion forum easily, 72.89% prefer to agree by choosing that it is easy to participate in an online chat room. Second, 67.20% said that they are active in using instant messages with their tutor and friends, and 76.99% agree that the layout of Moodle platform is well – structure and easy to navigate. Third, 76.54% the students agree that it was helpful to undertake online exercises and quizzes on Moodle. Fourth, 76.04% of students mentioned that they use previous skills in submitting the tasks or assignment. Next, it was helpful to download or read online written class resource from Moodle, it was confirmed by 74.26% agree with that point. Fifth, 71.07% agree that they could access the material in the form of audio and video files easily. Then, 63.78% said agree that they always received alerts about course information, not only from their tutor but also any news from the department such as schedule, the releases of a new learning resource, changes in assessment and etc. Henceforth, they agree that learning through Moodle as an online platform is fast and reliable which came from 74.03% agree with that point. Subsequently, for the point of video conference on Moodle platform, 43.54% said they disagree and 45.10% agree that video conference has been used to support learning practice.

Discussion

The finding of this study has figured out several facts. From the results of questionnaires and in-depth interviews that were distributed to students through FGDs, many students had to go down to the sub-district city or village by taking steep roads, going to higher places on hillsides, some even had to climb onto the roofs of houses or trees. Just to get a stronger internet signal. Not infrequently, students also have to put up tents on hillsides or under trees, to protect themselves from the sun or rain while participating in Tuweb. However, the challenges faced by students did not dampen their enthusiasm for learning, which was reflected in their facial expressions. They feel proud that in situations like this they can still follow tutorials online and interact with tutors and fellow students.

Furthermore, students often complain that they do not get adequate signal access to attend lectures, especially those who have returned to several remote areas. To overcome this, some lecturers are creative, such as packaging material in a more accessible form or recording the implementation of online lectures, so that students can access it later when they get signal access.

Although the network signal is quite good, it does not mean that learning to use the internet is not a technical problem for students. The limited data quota also sometimes becomes an obstacle for students, considering that they take quite a lot of lectures and for other activities such submitting task in documents or audio files.

Moreover, students also share their experiences concerning communication with their friends and tutors. Most of students agree to avoid sending a rude message to their friends and tutors. Just over a half never felt offended by the tutor's comments on the discussion forum and never misunderstood the tutor's comments sent via chat messages. As regards tutor's messages, more than a third student received several out of topic questions from tutor and the other third did not. Ethics represent way of thinking and motivation behind behaviour. Therefore, it has a crucial influence on student's digital competences. Ethics can be seen from someone's attitude toward digital activities, digital communication, and digital information. Al Khateeb (2017). Students expressed three main indicators that encourage them to own a good self-directed learning, implemented rules of plagiarism, and ethical dilemmas in communication with friends and tutor during and after pandemic.

To evaluate the experiences of students in using Moodle as a platform to support distance learning program, the open – ended question were also given to reveal the technological competence that students had during their study at UT, both before and during Covid -19. From a bunch of answers, the researchers recapitulated that the most significant responses from the student's perception can be concluded that some students are already satisfied with the system given by UT, indeed while the pandemic Covid – 19 spread in many places in Indonesia or oversea. However, some also mentioned that they still wish a big improvement from the platform, specifically for offline mode of Moodle, the push notifications and reminders that do not work very well, chat room to be more like instant messenger. A complaint also explained when they tried to input their answers in the discussion, the text formatting is bad and would display large-sized or (too) small-sized texts suddenly in the middle of your answers that they had to edit it again.

Then, since the purpose of this research is to explore students' digital competence on the use of Moodle-based at higher education to support their online learning, the result already highlights that three – quarters of students studying at UT are able to mingle with several computer – based activities as explained in figure 4. Moreover, it is also described from figure 4 that three out of four percent of students are able in operating Microsoft office.

Hence, the aspect of technological competence for recognizing technological tools, identifying interfaces as mentioned before is proved to be good due to most students are common with those technological tools. Nevertheless, it is worth discussing these interesting facts revealed by the results of the range of capability of students on the aspect of identifying interfaces. Contrary to other key findings from figure 5 in one open-ended question from the last section of questionnaire, most students gave a various argument towards the use of Moodle.

In short, the point of accessing the forum, few still mentioned that it was difficult to access the assignment, and took a hard time in submitting the task. So, it must have been something related to the system, or matters probably coming from students understanding themselves because not many students complaining similar issues. In addition, some features of Moodle platform seemed to be improved, but, they wish that chat room need to be more comfortable for students to interact with other friend or tutor just like in the instant messengers. Further, some mentioned that they like the system even though they were not really satisfied with mobile Moodle app features. Then, all those responses can be summarized as a proved to develop any features needed on Moodle system. Moreover, positive statements also came up that many students elaborated that learning at UT was a good choice while facing a pandemic situation. It is in line with the previous study explained that system is constructed to simplify the development of basic online materials and make possible creation of virtual content particularly to support the virtual learning process (Coates, James, Baldwin, & management, 2005).

The analysis of the questionnaires given previously, the researchers conducted an FGD section for Students who are pursuing their study in UT. To help determine whether the result of the questionnaire given previously accurate or not, and dig the possibility of another useful information, the researchers gave similar questions to students in form of structured interview combining with the situational questions. These can be concluded that the technological competence In total of fifteen students taken from random selection were involved in FGD, all students agreed that it is not difficult to use the computers, and they claimed that they are commonly used all features in the computer such as office program, database, email access, video editing, digital audio, and web page design, and certainly mingle to several LMS program.

Mostly there were consistence in their answers in forum group discussion and the questionnaire before. Students exposed that they can access the discussion easily, able to use instant message, able to use Moodle as a platform with the well – structure layout, understand

to access the material and upload the task to follow the online class. However, from the discussion on the technological competence of students, the researchers covered the direct grumble of the Moodle system. Some of them mentioned that they did not receive the notification when other students in their online class responded to the discussion. At this point, they could not actively respond to the discussion on time. They wish Moodle have a direct notification just like the social media platform, like What's Up, Facebook Messanger, and others.Afterwards, participants of the FGD entirely speak with one voice that they want to have an interactive class even though they are learning online. As they believed that Moodle is a fast and reliable platform, they hope this LMS can be improved to make them happier in learning no matter the situation of the world.

CONCLUSION

The use of Moodle as a platform at UT to help students has yielded abundant benefits before and during the spread of the Covid-19 pandemic. When a pandemic emerged and began to spread throughout the world, the introduction of online learning systems became an educational option. Previously, UT students chose to study online because access to in-person learning was limited. However, online learning is currently the only option to further your educational progress. Students exposed that they can access the discussion easily, able to use instant message, able to use Moodle as a platform with the well – structure layout, understand to access the material and upload the task to follow the online class. UT students, as well as the institution itself, are ready to face this challenge, continuously improving the quality of students in all aspects of the system.

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