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Exploring students' literacy of information technology in higher education: Platforms and usage

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Abstract

At present time, information technology (IT) is widely used in society. At any level of school, students use them for a variety of reasons to find, share, and discuss specific topics. By using technology, integrating IT into the basic professional learning curriculum course has not been created into a new format of instructional design. The purpose of this study is to find out how students feel about the platform and how they use technology in a basic professional learning curriculum course. It is a quantitative descriptive research that assesses students' perceptions of information technology in relation to specific topics. According to the findings of the study, the majority of students in the age range of 20–21 years stated that the most appropriate platform to be integrated in the basic professional learning curriculum course and learning efficiency was achieved for the majority of them by the age range of the respondents from 17 to 19 years. IT has infiltrated virtually every facet of society, including education. It is envisaged that the findings of this study would be used as a foundation for the development of IT integration in basic professional learning curriculum courses in order to maximize student learning outcomes.

Keywords: Students' perception, curriculum course, information technology, platform, usage

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1. Introduction

Generally, most education-based universities in Indonesia have always and continue to strive to improve their education system, including curriculum and learning. Various efforts have been made by conducting seminars, workshops and conferences as available in the International Conference on Redesigning Professional Teacher Education which presented experts in the field of teacher education from abroad, such as Hong Kong, Europe, America, China, Japan, Korea and Indonesia. Based on the results of the conference, a new outcome was created by Indonesian stakeholders regarding the basic provisions for curriculum development. The redesigned professional teacher education is in line with the benefits by incorporating the use of technology in the instructional process which has direction to change the nature of socialising, purchasing, communication, entertainment and learning (Abdullah & Ward, 2016). One of the subject groups in the curriculum structure is the basic professional courses. The aim is to improve the proficiency of the profession which includes the basic professional courses. The basic professional learning curriculum course group includes curriculum and learning courses, educational foundation, student development, education management, guidance and counselling. There is a limitation on the scope of subjects in this study, namely the curriculum and learning courses. It is also based on the reason that is course has an essential aspect of instructional process involving pedagogy gained more possibilities to expand with the innovative tools of classroom activities by the assistance of information technology (IT) (Becker & Ravitz, 1999).

The policy of the Indonesian agency for higher education has an impact on all educational students who must take contract in the specified semester. In the basic professional learning curriculum course of curriculum and learning, students learn theories, concepts and models of learning and curriculum development, both theory and practice in class, such as micro-teaching, using certain models. One of the weaknesses of learning in the basic professional learning curriculum course is the lack of students using IT. It leads to students' learning achievements being less than optimal. The phenomena include (a) lack of focus of student attention when attending lectures, (b) low student interest, (c) lack of motivation to learn and (d) assumptions or perceptions as complementary by students. There is also a mismatch or imbalance of the ratio of students and lecturers which results in unfavourable teaching and learning activities. There is an impression from students that in learning, lecturers tend to just carry out their obligations of attendance, lecturing, question and answer activities and ending the course. The phenomenon is the lack of variation in media or learning methods applied by lecturers which has an impact on students' boredom. The application of the learning method is perceived as only to fulfil the teaching to test, and does not pay attention to students' holistic skills. In fact, the standard of the learning process is 'inspiring, interactive, challenging, fun, access to creativity, initiative, and independence in line with students' talents, psychology and interests, as well as physical development in motivating students to actively participate' (National Education Standards, 2005, pp. 19).

The phenomena mentioned above show the importance of in-depth tracing and analysis of the use of IT in basic professional learning curriculum course – curriculum and learning – namely:

1. Critical thinking and problem-solving skills of lateral, systemic and critical thinking in the perspective of solving problems;
2. Communication and collaboration skills of working together and communicating effectively with all parties;
3. Creativity and innovation skills developed that lead to innovative outputs;

4. Information and communications technology (ICT) literacy used to encourage maximum activity and performance;
5. Contextual learning skills of learning has the ultimate goal of independent personal development;
6. Information and media literacy skills of using of communication media for various activities.

From the reasons above, students must understand and make the best use of IT in learning in order to improve performance in daily learning activities. The use of IT is not only to meet the demands of the basic professional learning curriculum course – Curriculum and learning competencies – but also to make it easier for students to carry out learning activities where in turn students can master the lecture material better. The educational teaching tools are used to create interaction and become resources of supplemented technology apart from the traditional ones (Sumak & Sorgo, 2016). Further explained by Findik-Coskuncay et al. (2018), it can be a learning management system (LMS) to significantly improve education quality, supported by tools or technology devices such as tablets and/or computers.

1.1 Conceptual or theoretical framework

The instructional system where students are able to acquire knowledge or skills can be obtained through technology (Wang & Hannafin, 2005). From the higher education perspective, this is referred to in terms of e-learning, mobile learning and learning management system. They become the key points of students' perceptions in achieving meaningful and effective instructional processes (Ngai et al., 2007; Badan Standar Nasional Pendidikan, 2010). Universitas Pendidikan Indonesia (UPI) has developed various programmes stipulated in the strategic plan, including the development of learning based on information and communication technology, whose infrastructure has been built on the UPI campus. It has revolutionised people's actions and daily life by transforming the time, speed, range and space (Carbrero & Liorente, 2015). The support and courage have been created for decades to apply IT in the instructional process (Lin et al., 2013; Hepp, 2015).

The development of IT in Indonesia has indeed begun since the 1980s to be the chip or the 'brain' of a personal computer. It refers to the processing of knowledge and implementing the method to transfer and make the progress of information (Karami, 2003). The development of hardware technology is currently very fast, as well as software technology (software). Even now there is a technology that combines personal computers with physical networks via wide area network, local area network, intranet and Internet. Technology is generally seen as the medium to enhance learning goals where the effects of its resources become meaningful in evaluating courses (Cook & Ellaway, 2015; Goodchild, 2018; Pickering & Joynes, 2016).

In learning, many students use the Internet as a medium, as well as a learning resource, because it can connect computers to the rest of the world. They looks for various information and data for learning purposes, in both independent study and structured learning, such as writing papers, articles, theses and others, especially in today's condition where the COVID-19 pandemic has not yet ended, requiring them to study at home. Many research results show that students prefer online learning because of the open and dynamic atmosphere, knowing no boundaries that require meeting face to face with lecturers. Internet technology can be a very powerful and efficient solution to close the relationship between students and lecturers in the context of learning. Actually, in IT, students can use not only the internet in MKDP (Basic Course of Educational Study) curriculum and instruction but also the intranet. They can learn lecture material more deeply and completely. It also provides the

possibility to incorporate the pedagogy areas of IT integration in the infrastructure of instructional processes (Silva et al., 2006; Sunkel, 2006) and chances for developing professional teachers through supports and workshops (Contreras-Sanzana & Villalobos-Claveria, 2010; Sunkel, 2006).

1.2 Related research

The rapid development of IT and its infrastructure globally has changed the mindset and framework of activities in various aspects of human life. It appears in both material and non-material features and is available in hardware and software (Al Soub & Amarin, 2021; Pelgrum, 2001). To have and master innovative abilities and be active in various forms of IT, students inevitably have to master the what, why and how of IT itself, so that, in turn, students can also be actively involved in building the nation's future. The National Education Standardisation Agency (2010) emphasised that 'the skill that will stand out in the 21st century is the ability of connectivity, where science is increasingly narrowed, specific, and integrated and even produces hybrids'. Cepi Riyana in Arifin (2019) argues that physicists are starting to find out about general theories that are able to explain four forces, namely 'gravity, electromagnet, strong and weak force into strong theory that can explain all problems (theory of everything)'. Therefore, teachers are necessarily concerned more with the potential roles of the use IT being incorporated during the instructional process (Blackwell et al., 2013; Vinals & Cuenca, 2016). Some of the several forms of IT that students can use are, namely (a) computers to find and process information, which is known as computer-based training or computer-assisted instructional. The use of IT in the classroom can gain successful learning performance (Prensky, 2011; Villegas et al., 2017; Shen et al., 2018). This means that learning materials are arranged in software used with hardware. (b) The dissemination of learning materials or topics can use the Internet with a webpage format. The material is stored on a server connected to the Internet, so that students can retrieve it via a web browser. (c) The use communication tools by experts who ask for explanations related to material that has not been mastered to get feedback from sources or fellow students. In the educational context, IT has turned out to be the vital variable to facilitate classroom performances by any possible resource and infrastructure (Ibieta et al., 2017; Pyno et al., 2011).

In order to have conformity between student learning activities with IT-based standards in the standard process, research on IT must be carried out. From the results of the preliminary study on the use of IT in basic professional learning curriculum course, in general, students are very pleased and frequently use it to look for material relevant to lectures, create and complete assignments, search for source books in libraries, answer exam questions and find other learning resources online. Students' lives in various fields, of course, cannot be separated from the influence of science and technology itself. It means that IT must be a basic skill for them to master. Computer and technology-based learning can be carried out by students with no time and space boundaries. Therefore, students as prospective teachers at the University of Education of Indonesia must take advantage of the IT in the basic professional learning curriculum course so that they can get better their learning achievements and develop an interest and motivation to learn, as well as a passion for learning, with a more pleasant learning atmosphere. Based on the description above, this study requires cooperation from various experts, including IT experts and curriculum and learning discipline experts, in order to find ways of IT that are practical and can be used by students in learning. Thus, the results of this study can be useful for students and lecturers in implementing the basic professional learning curriculum course learning at university based on educational majors.

1.3 Purpose of the study

The problems of this research are formulated as follows: (1) What are the students' perceptions on the use of IT in the curriculum and learning subjects at the Indonesian University of Education? (2) What forms of IT are widely used by students in the curriculum and learning subjects at the Indonesian University of Education? and (3) What difficulties do students experience in using IT in the curriculum and learning subjects at the Indonesian University of Education?

2. Method and Materials

2.1. Participants and procedure

The population of this study were all students of the Faculty of Mathematics and Science Education, Universitas Pendidikan Indonesia. The sample involved were students of the Chemistry education study programme who were taking curriculum and learning courses, with a total of 140 students. The method used is descriptive method with survey techniques.

2.2. Data collection tools

This study used a questionnaire instrument in the form of a Likert scale, ranging from strongly agree (SA), agree (A), doubt (D), disagree (DA) to strongly disagree (SD). This instrument was previously carried out by expert judgment before being used in actual research, namely by curriculum and learning experts and IT experts. After experts' judgment, improvements were made according to the input from them.

2.3. Data collection process

The statements in the questionnaire items given to students to find out their perceptions of the use or use of IT in learning are divided into two aspects. The statement points are presented in Table 1.

Table. 1 Information technology statement items

No	Aspects	Questionnaire statement
1	Platform Points 10-13	Web centric course is a form of IT that can be used via the Internet. Lecturers and students are completely separate; however, face to face is required.
		Web Blog, 4Shared and the Internet are very appropriate for lecturers to manage basic professional learning curriculum course learning materials
		To present lecture material to students, lecturers should use power points
2.	Usage Learning source Points 1-4	Every implementation of basic professional learning curriculum course learning must use technology information
		Information technology has high speed of access that can be used as a learning resource
		The use of IT in basic professional learning curriculum course requires tools hardware and software

Effective and efficient learning	The basic professional learning curriculum course Learning utilising IT needs special classrooms The use of IT in basic professional learning curriculum course makes the learning atmosphere more conducive.
Meeting learners' needs	My study is more efficient when utilizing information technology in basic professional-learning curriculum course Information technology is very effective used in basic professional learning curriculum course Information technology applications in basic professional learning curriculum course makes me more productive in studying The use of IT in basic professional learning curriculum course is very flexible, because it can be done anywhere and anytime Utilisation of IT has high security The use of IT can guarantee every student need in developing material basic professional learning curriculum course learning The risk of using IT in basic professional learning curriculum course learning is only on hardware damage I want to continue to take advantage of IT in every subject at future I am very happy to take advantage of IT, because it really supports my needs in basic professional learning curriculum course learning I got great support from friends and family in using IT I got great support from friends and family in using IT Using IT is not has a high financial risk

2.4. Data analysis

Data analysis was carried out from August 2, 2021 to October 20, 2021. After all data were collected, it was analysed using the Chi-squared test.

3. Result and Discussion

3.1. Participants age and Education level

From the demographic point of view obtained in the field, data or information were obtained from research respondents who were fourth semester students of the chemistry education study programme, Indonesian University of Education, with an average age of 19.5 (*N* = 30) years, of which 40% were women (*N* = 12) and the remaining 60% were men (*N* = 18). The demographic information used in this study related to the age and education level of the respondents is presented in Table 2;

Table 2. Sample demographic data

Demographics	**Mean and Standard Deviation**	**Percentage**
Age (4th Semester)	19.5 (SD = 1. 8)	
Gender		
Male		12 (40%)
Female		18 (60%)
Education Level		
University		30 (100%)

3.2. Students' perceptions on IT

Most students who have almost no knowledge of computers, telecommunications or software find it difficult to understand some of the IT concepts. Based on the questionnaire distributed to students, there are two aspects used, namely the platform (types of IT media) and usage (its use).

3.3. Platforms and usage

The questionnaire given to students to gather their perceptions on the integration of IT in the basic professional learning curriculum course – curriculum and learning – was divided into two main aspects, namely platform and usage. There are several sub-aspects that have been broken down on the platform used, including web centric course; web blog, including four shared and Internet; PowerPoint; and Google Forms. Students provided their respective perceptions on each of these platforms which could be seen from their gender and age as depicted in Table 3.

Table. 3 Sample data

Gender	No	%	Age	No	%
Male	12	40	17- 19	12	40
Female	18	60	20- 21	10	33.3
			22- 23	8	26.7
Total	30				

Table 3 shows the total number of respondents used as the research sample; the composition is quite dominant in one aspect of the review. There were 12 male students (40%) from the total sample. If it is compared to the number of female students, then there appears to be a quite large difference wherein the total number of female students is 18 (60%). By referring to age, most students were in the age range of 17–19 years old.

Table 4. Information technology platform in terms of gender and age

Age years	Web centric course		Web blog		Power point		Google form	
	F	M	F	M	F	M	F	M
17- 19	23.4	43	40	50.9	60.1	68	67	64
20- 21	40	56.2	35.6	45	58	70	70	72
22- 23	35.7	52	55	50	65	59	69	70
Avg.	29.55	47.5	47.5	50.45	62.55	63.5	68	67

F= female; M = male

Table 4 shows that type of IT most frequently used by students is Google Forms with 68% of female students and 67% of male students, followed by PowerPoint, with 62.55% of female students and 63.5% of male students; web blog, with 47.5% female students and 50.45% male students; and the last web centric course, with 29.55% female students and 47.5% male students. This shows that users, in this case students, tend to choose Goggle Forms as a source or media of IT to be used in facilitating learning activities in basic professional curriculum and learning subjects. The use of technology as learning facilities in term of hardware media to support the running of web-based platform for the instructional process can be seen in Figure 1;

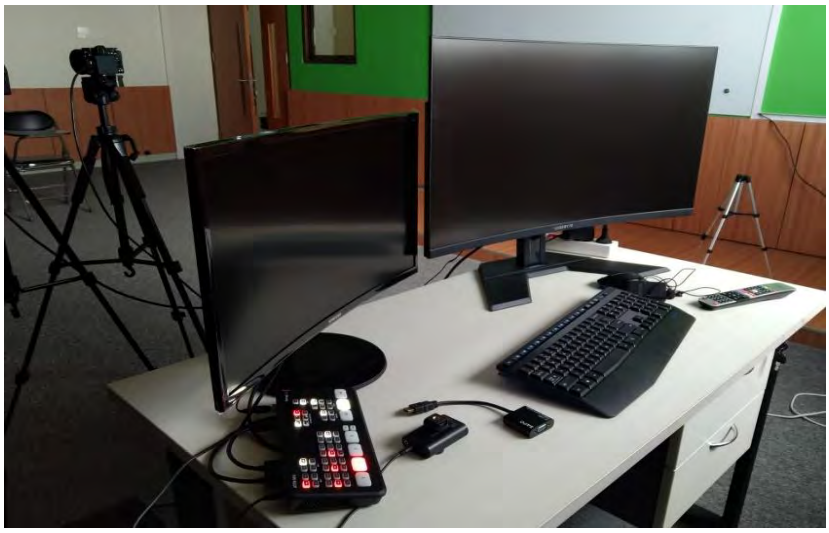
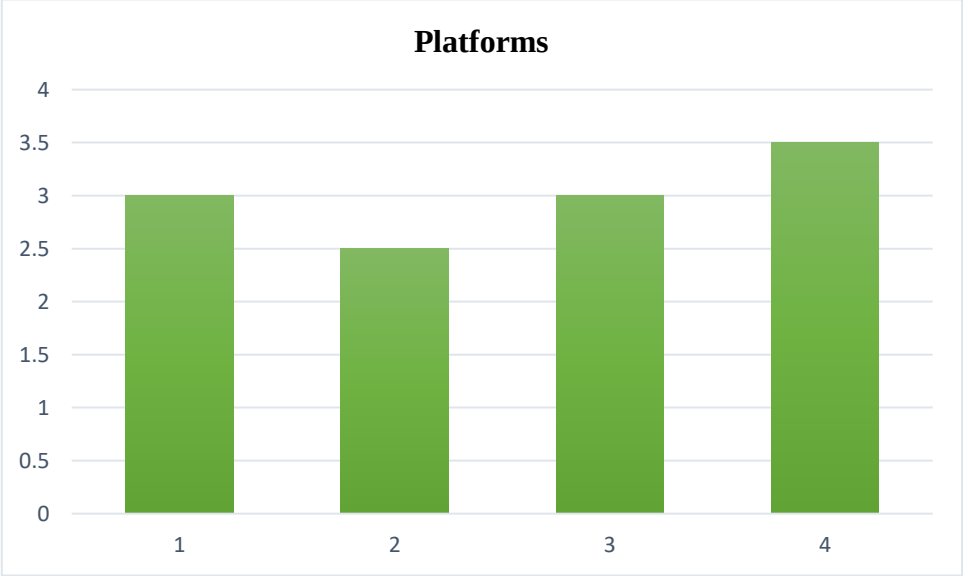


Figure 1. Multimedia based technology for learning

Regarding the terms of age and gender, it could be seen that students in the age range of 20–21 years use IT on cross-platform (56%), 22–23 years at 52.85% and the lowest was 17–19 years old at 43.7%. Meanwhile, if it is seen from a gender perspective, most respondents who were female chose the Google Forms platform as a means or media for learning, which is part of IT.

In the aspect of usage or utilisation of IT in student learning activities, there were several points of concern for the perceptions given by them. Learning sources, learning effectiveness and efficiency, and meeting learning needs were the three sub-aspects successfully explored by the respondents.



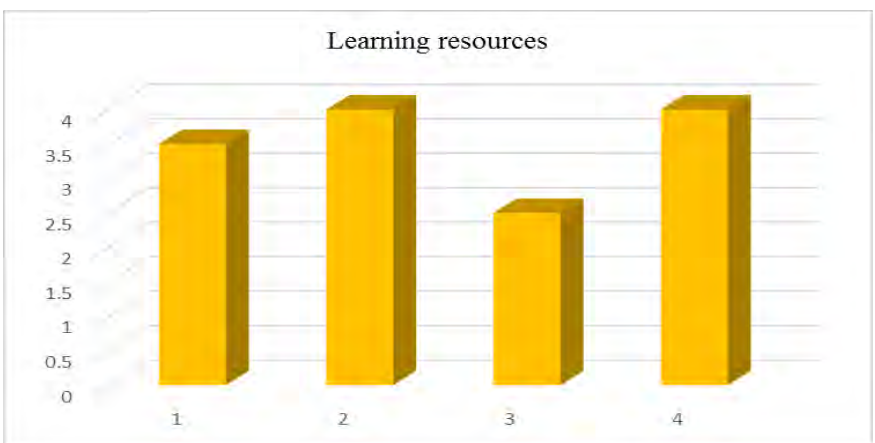
Graph 1. Types of information technology platforms

From Graph 1, it can be seen that there were four types of platforms used by students in the basic professional learning curriculum course. The results showed that most of the respondents stated or

gave the impression that they agreed with the average achievement of 3.5. This means that the IT platform in the form of Google Forms was very helpful for students in achieving IT-based learning goals. The platform as referred by students in Google Forms technically needs a format wherein physical objects in lecturers' teaching–learning process can be visualised in screen feature for online and distant learning. The feature of interaction between students and teachers are conducted through the face-to-face facility, as shown in Figure 2;

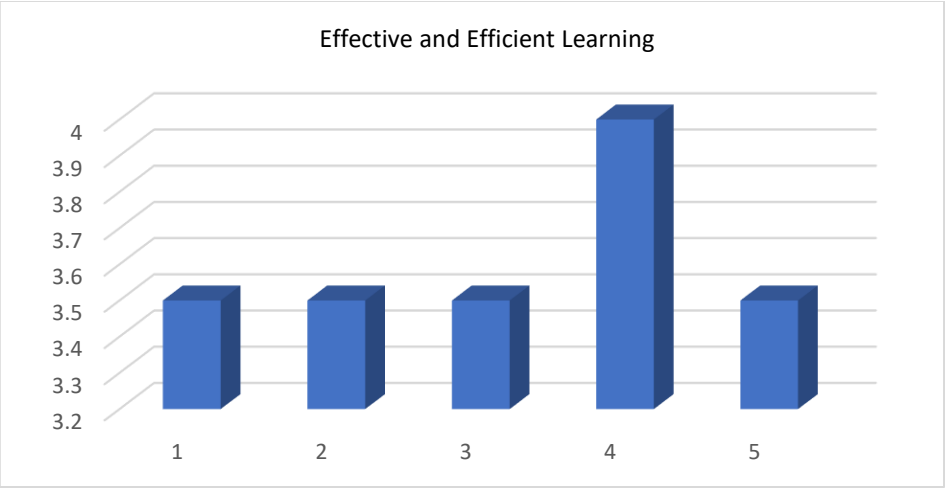
Figure 2. Smartboard for Interactive Learning Process

With regard to the respondents' perceptions on the use or function of IT in the basic professional learning curriculum course, there were three functions that could be extracted from the respondents which included learning resources, effective and efficient learning and meeting learning needs. The description of the results of the students' perceptions regarding the benefits or functions of IT in learning is shown in Graph 2.



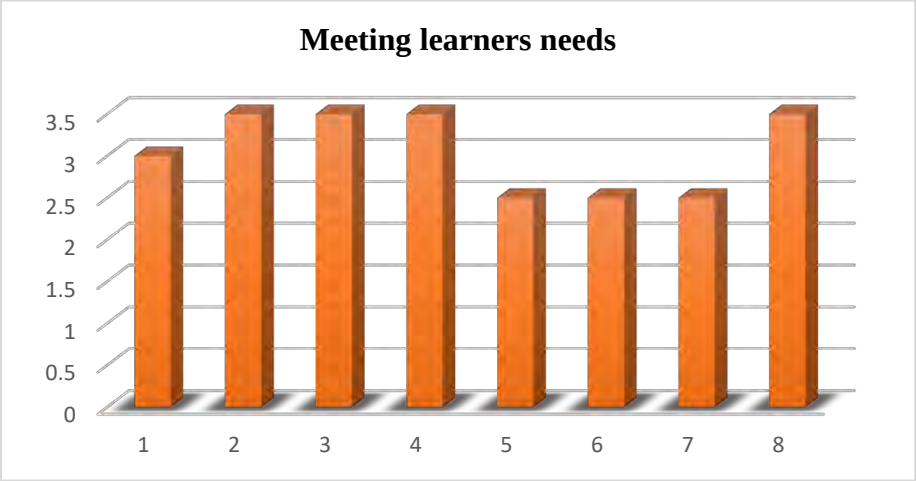
Graph 2. Information technology function as learning resources

With regard to the aspect of the function of IT as learning resources, it was seen that most students thought that these facilities or media were capable of playing a role in carrying out their function as learning resources. On the achievement of the highest average perception result, it gained the average score of 3.7, which was equal to their agreement on aspects related to IT which had very high speed and could be used as a learning resource, and only about 2.5, which expressed doubts that the basic professional learning curriculum course required hardware and software.



Graph 3. Information technology function as effective and efficient learning

In terms of the effectiveness and efficiency of learning, all students gave a response or perception that IT was able to contribute positively to the achievement of these goals. This can be seen from the average achievement of all aspects in the range of 3.5–4, which means strongly agree and agree (Graph 3).



Graph 4. Information technology function as meeting learners needs

The functional aspect of IT was able to meet learners' needs. The results of the responses given by students are quite varied (Graph 4). Of the eight statements given, about 80% of the students agreed, with an average score of 3.5, that IT was able to function in meeting learners' needs, while about 20%,

with an average score of 2.5, expressed doubt. In general, students give a response or perception of agreeing with the presence of IT in the aspects of meeting learners' needs. Considering completing learners' needs, it is considered that the existing hardware or material facilities are able to cope or cover both in direct face-to-face learning and open distant learning as now applied during the pandemic situation. The reflection of the digital instructional process by utilising ICT as the medium to bring online learning in direct face-to-face perspective can be seen in Figure 3.

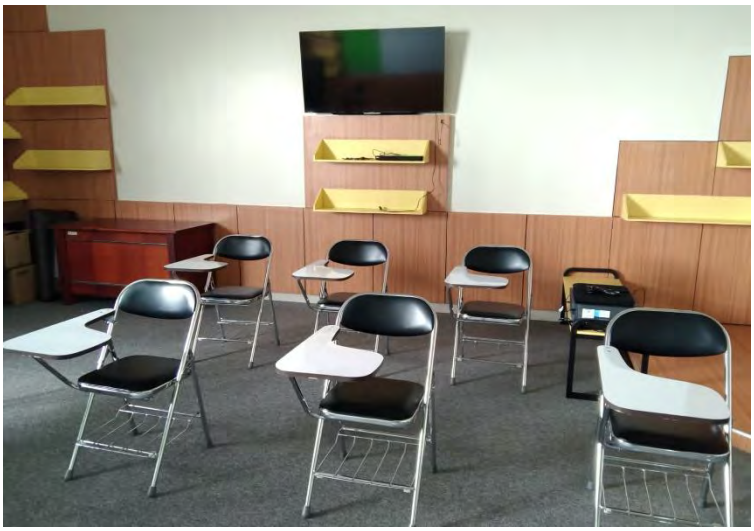


Figure 3. Online Interactive Class Setting

The results of students' perceptions on the use of IT are presented in Table 5.

Table 5. Benefits of IT in terms of gender and age

Age	**Learning source**		**Learning effectiveness and efficiency**		**Meeting learning needs**	
	F	M	F	M	F	M
17- 19	70	69	75	70	61	70
20- 21	72	75	74	80	79	63
22- 23	60	73	82	71	75	60
Avg.	65	71	78.5	70.5	68	65

S= Sample; F= female; M = male

From Table 5, it can be seen that most students felt that IT was very helpful or supportive of them in the effectiveness and efficiency of learning with an average achievement of 78.5% by female students and 70.5% by male students. It showed that students felt assisted in this aspect. When viewed from the perspective of age and gender associated with the use or function of IT, it was found that 71% of male students and 65% of female students were in the aspect of learning resources. Then, in the age range, most students in the age range of 17–19 years (70%) thought that IT played a very important role as a means or media for effective and efficient learning. From the results of the data above, it could be interpreted that the tendency of students' perceptions on the benefits of IT by involving the aspects of age and gender plays a vital role in encouraging and supporting the effectiveness and efficiency of learning.

4. Conclusion

This study is designed to determine students' perceptions on the integration of IT in the platform and its function or utilisation in terms of age and gender. After analysing the questionnaire, the results show that there are two main factors behind students' perceptions on the integration of IT into the learning of the basic courses of the profession learning curriculum, namely platform and usage. With regard to the platform aspect, students tend to give the perception that Google Forms is able to contribute positively to achieving learning targets. Meanwhile, with regard to the usage aspect, students have the perception that the existence of IT in the platform can support effective and efficient learning which, in turn, can lead to the achievement of the final goal of learning.

5. Recommendation

The use of technology in the instructional process is clearly found to be effective in uplifting students' learning outcomes, particularly in the basic courses of curriculum and instruction. It is recommended for the faculty members along with the study programme's quality assurance to consider involving technology integration into other courses or groups such as study programme expertise courses, elective courses and even general courses. It is intended to gain new ways of teaching strategies by utilising technology to reach the intended learning outcomes at its best results.

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