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Students' perceptions of information and communication technology (ICT)-based literacy learning needs in higher education

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ABSTRACT
This paper presents a needs analysis with regard to ICT-based literacy development. This needs analysis consists of three aspects: ICT readiness, target needs, and learning needs, which are related to literacy acquisition. This paper discusses how advanced student readiness in using ICT, target needs, and learning needs in higher education is using student teachers as subjects. Data were collected using a survey, which was administered to 140 students at the primary school teacher education programme of two universities of Pekanbaru in Indonesia. During the process of learning activities, students used the Indonesian language as their communicative language. Based on the result of the need analysis of the ICT, students need access to the internet facilitated by the campus. In addition, not only is the lecturer required to provide tasks that encourage the use of ICT as a learning resource frequently but students also need to develop their interests such as participating in training programs. In the target needs, it was found that literacy skill is needed by students as it is an essential competence, but in the learning implementation, they expect to use varied learning, learning media, and appropriate strategies to read comprehensively. In the learning needs, the result indicates that students need to determine the objective of increasing advanced literacy skills, the lecturer as a role model, and the lecturer as a learning resource so that the students can learn based on the instruction and teaching and learning contract.

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Introduction

Literacy learning and technology are interrelated in developing students' literacy acquisition, especially at the higher education levels. Hobbs et al stated that literacy development and technology are needed in education (Hobbs et al., 2022; Guo et al., 2022; Kamble et al., 2022; Afrilyasanti et al., 2023). Literacy is needed by all levels of all ages to deal with the change in the 21st century, which aids students in attaining their basic knowledge. (Safrizal et al., 2022). Literacy and technology often become important public issues to provide information so that it builds critical, logical, innovative,

and creative thinking skills and a globally competitive individual (Negoro et al., 2023; Sigit et al., 2023). Technological intensification and its use demand the need for digital education (Kurniaman et al., 2022). The dependability of technology produces a consideration for providing facilities that encourage students to use technology, interact with each other online, and increase digital literacy skills. (Reddy et al., 2023a). By having literacy skills, students can finish their digital-based tasks (Prabowo et al., 2023). Educational institutions play a role as facilitators in literacy development in order to increase students' advanced literacy skills. The utilization of a technology-facilitated, as such, can be one way to establish innovative learning for students.

According to Cavus et al. (2022), 21st-century education is delivered as technology-based learning, which guides the lectures integrating technology adequately for students. Razak et al. (2022) state that learning in the 21st century needs to encourage advances in ICT in Indonesian society. Kargin et al. (2023) stated that 21st-century learning is applied to society's development over time. It is recognised that society developed from a primitive society to an agrarian society to an industrial society and is now shifting towards an information society (Demirezer, & İlkörücüi, 2023) marked by advances in technology and digitalisation.

Technology influences a change in teaching and literacy learning from direct to online teaching and learning activities in the classroom by providing e-books access as references for learning (Shymansky, 1991). It means that technology changes the system from direct to online teaching and learning. Senge (1990) states that technological integration-related professional development in teaching must be focused on the students' learning increase. Technology literacy, which has been integrated into the university level, requires more than just focus on information and its communication technology. It is equally essential to focus on the available learning strategy about new technologies and make a decision strategy about what and how this technology can increase literacy learning for students (Taffe & Gwinn, 2007). It means that the teaching and learning activity using literacy and ICT is not only focused on its technology integration but is also on how the strategy can be applied and increase literacy learning for higher education students.

In terms of successful literacy development, learning target needs are required by students as a means to make them easily fulfil their needs in learning (Anwas et al., 2022; Nasution et al., 2023). Švajger (2022) noted that the role of the lecturer is to adjust the learning outcome based on the student's literacy acquisition skill in order to create a learning environment that encourages students' progress and success. According to Rigianti (2023), needs analysis in literacy learning for lecturers was to discern students with reference to the use of reading material based on the different literacy learning levels, individual literacy learning preparation, and students' interest while learning in the classroom.

Besides other students' age levels like primary to high school level, literacy learning is essential for students in life by adapting themselves to society, regardless of their role in the academic sphere (Mirizon et al., 2021). Reading literacy for students not only becomes the basis of achievement in each learning subject but also determines their reading literacy skill (Alharbi et al., 2023). Based on Damaianti et al. (2020) statement, literacy is essential in community life as people who can read, write, and count may contribute significantly to society and can learn about the world. Ng & Graham. (2017) and Greenleaf et al. (2010) state that the concept of literacy has been developed based on the basic concept of reading and writing skills to apply every skill and competence in life. Literacy learning for higher education students, as such, is applied to develop their literacy learning.

Technology readiness for students, according to Kurniaman et al. (2022), is one of the essential skills to utilise technology in the literacy process, and digital-based learning is a learning resource to enhance critical thinking, creative thinking, and innovative skills. Technological readiness research is growing rapidly conducted by several researchers in order to increase the effectiveness and efficiency of the achievement of learning objectives (Ulfatin et al., 2022). In line with Ulfatin et al. (2022); Hadi et al. (2022) state that the advances in ICT have rapidly increased in today's modern era, especially in multimedia. Multimedia nowadays is commonly used as a learning facility and media because it can increase students' skills. Thus, the researchers conduct the research in this paper in order to find out

how target needs, literacy learning needs, and ICT readiness are applied to students. Three research questions can be described as follows:

RQ1 : How well are students prepared to use ICT?
RQ2 : How significant are the target needs for students in literacy learning?
RQ3 : How significant is literacy learning needed by students?

Literature Review

ICT Readiness of Students

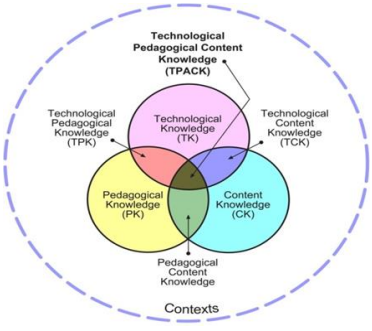
Society 5.0 enables us to use modern science in order to make humans able to live comfortably. Society 5.0 was inaugurated a few years ago for Industry 4.0. The concepts of Industry 4.0 and Society 5.0 overlap considerably, but Society 5.0 focuses more on the human context. As presented by Chernbumroong et al. (2023), learning in the post-Industrial Revolution era is ideally no longer teacher-centred but student-centred nowadays. Industrial Revolution 4.0 is an era where every aspect of technology, including the utilisation of digital media in the teaching and learning process. Thus, digital learning requires readiness in the teaching and learning process to utilise digital technology, such as the use of a Learning Management System (LMS, Pinto, 2020).

ICT readiness for higher education students is determined by Technological Pedagogical Content Knowledge (TPCK) to describe students' understanding of technology. This model is developed by focusing on the component of students' readiness for technological knowledge and is an attempt to increase mastery of ICT. As stated by (Alhabshi & Abdelaziz, 2022) This model's mechanism must be subsequently made based on the student's needs. As regards this model, every learning is different along with the era and is developed sustainably based on the teaching context of how lecturers can integrate their knowledge of thinking, learning, and ICT.

Knowledge regarding the utilization of ICT for students is used as a characteristic of advances in education and self-directed learning that needs a technique to obtain problem-solving in the learning process. It is intended to determine whether the transition can increase the teaching quality without training, education, and preparation for students (Marini et al., 2022). The advanced interconnected framework is called Technological Pedagogical Content Knowledge (TPACK). There are four main concepts of this framework. They are context, content, pedagogical knowledge, and technological knowledge (Mishra & Koehler, 2006) that can be described in Figure 1. TPACK also can be integrated with TPACK in the digital age. It means that it changes the role of technology in the classroom. TPACK needs to adapt as new technologies emerge and how they reflect shifting paradigms in education. Exploring how specific technologies like AI and VR/AR influence the TPACK framework and shift teaching practices.

Figure 1

Technological pedagogical content knowledge (TPACK)



Technological Pedagogical Content Knowledge (TPACK) framework above is a reference for the researchers to learn how higher education students can use ICT in learning in this paper (Mishra & Koehler, 2006). As stated by Armiyati & Fachrurozi (2022), the need for TPACK in higher education provides a different impression in teaching and learning that commonly applied conventional method turning into an essential technology application for learning in terms of increasing students' knowledge. The researchers assess the students' knowledge based on four main concepts of this framework, namely context, content, pedagogical knowledge, and technological knowledge. The development of the instrument, according to Aka (2020), refers to TPACK, which is developed as the theoretical framework and used to find out students' ICT readiness, which can be seen in Figure 2.

Figure 2

Indicator of ICT

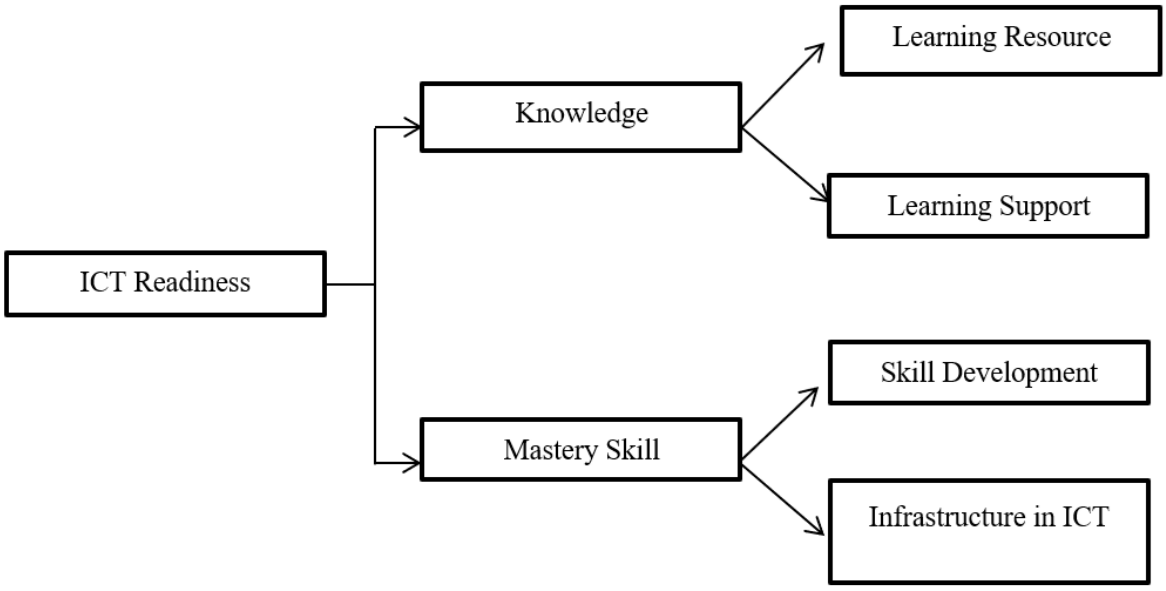


Figure 2 indicates that the indicators of ICT readiness that are distributed to students are based on the theoretical framework above. The indicators consist of knowledge and mastery skills. Knowledge refers to learning resources and learning support. On the other hand, mastery skills refer to skill development and infrastructure in ICT. This means that these indicators are developed to be questionnaires. As stated by Damaianti et al. (2020), carrying out a systematic review of questionnaire development in analysing students' perception of technology in literacy learning is crucial to be considered as a basis in the development and input. Therefore, the ICT readiness is distributed to students in this paper.

Students Need Analysis in Literacy Learning

Students' needs in literacy learning are an attempt to involve the whole stakeholders of higher education, peers, and teachers' roles (Fauzan et al., 2023). Saryono et al. (2017) explained that the development of a literacy culture is implemented alongside character building and ethics in higher education. Hence, a literacy culture will be developed among students as the basis for creating a lifelong learning process. Target needs to help students identify what they require in literacy learning and highlight areas that need attention in higher education. According to Suadi et al. (2022), literacy development for students has a positive impact by building advanced literacy skills through specific programs that encourage and motivate students to read textbooks in their leisure time. This means that literacy encourages students to engage in positive activities like reading. Getting used to reading activities will increase students' advanced literacy skills.

According to Hutchinson & Waters (1987), "target needs" is a general term that encompasses notable differences in implementation based on students' needs in the target situation, including necessities (what students should know), wants (what students want), and lacks (what students do not know yet). In terms of necessities, these are the types of needs determined by the demands of the target situation, meaning what students should know to function effectively in that context. The term "wants" refers to the learners' personal desires in literacy learning, which may not fully align with the objective target needs. However, students may have their own perceptions about their needs in literacy learning, especially regarding areas they find difficult, and they may feel that lecturers do not frequently guide them in literacy. The term "lacks" is intended for matters that are not comprehended by students and refers to the gaps in their knowledge. It means students need to identify what they do not know yet, as well as recognize what they already know, to determine the areas where they lack knowledge. Moreover, the target proficiency should be aligned with the student's current proficiency levels. The gap between the two needs can be called the students' lack.

Literacy Learning Needs

Literacy learning in Indonesia is commonly called a literacy movement implemented from the basic education level to the higher education level (Pratama et al., 2023). In implementing the literacy movement program, we must create and utilize various learning resource facilities as well as provide meaningful learning experiences (Pradana, 2020). To meet expectations and foster cultural behaviour, the Ministry of Education and Culture of the Republic of Indonesia (Kemendikbud) has intensified the literacy movement through the Minister of Education and Culture's Regulation Number 23 of 2015, aiming to cultivate virtuous behaviour in students through language from an early age to the higher education level (Hanin & Islamy, 2020). Thus, it becomes an expectation to increase interest and advanced skills in reading.

Literacy is the ability to access, comprehend, and use information wisely (Dirjen, 2020). As stated by Kemendikbud, increasing virtuous behaviour in students should indeed be strengthened through the literacy movement. According to Listanto & Firmansyah (2022), the literacy movement must be applied as early as possible to create an intelligent and cultured nation. Because, as stated by Laksono & Retnaningdyah (2018), literacy mastery is essential for the younger generation to comprehend information through reading as an attempt for self-improvement, personal branding, professional development, school, and national development. Similarly, Reder & Davila (2005) state that reading literacy is essential for self-improvement, personal branding, professional development, school, higher education, and national development. Condie & Pomerantz (2020) assert that the awakening of a nation begins with sustainable enlightenment and understanding of literacy-related books. Literacy mastery is essential for the learners to contribute to building the country.

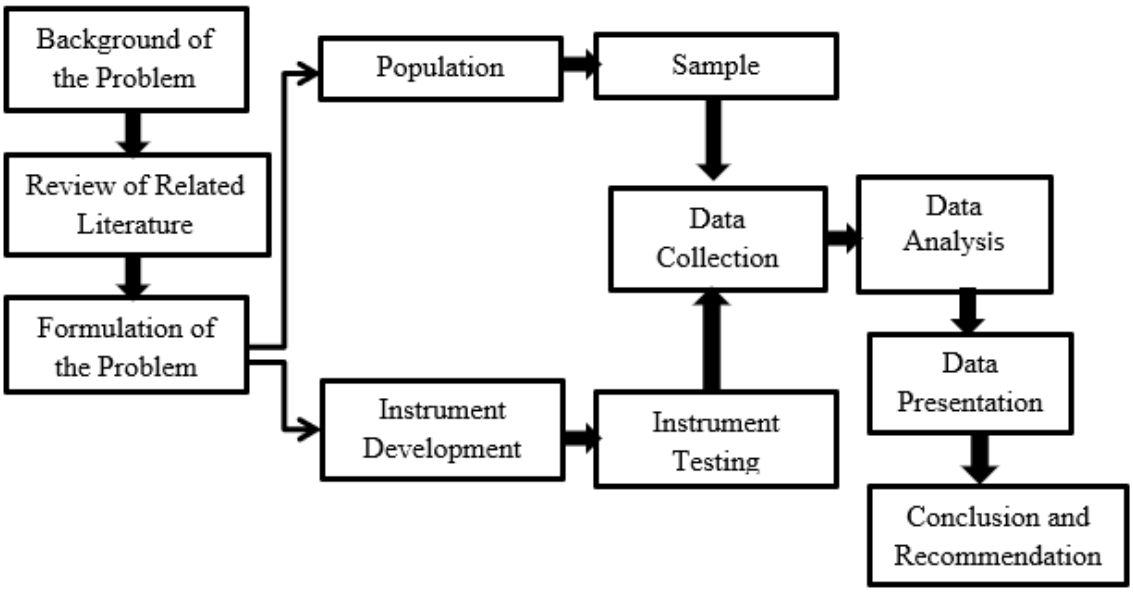
The needs for literacy learning are examined from aspects of learning needs—what students require in reading literacy learning—which includes goals, procedures, teacher's role, learners' role, and setting (Hutchinson & Waters, 1987). Learning needs are considered in relation to the target situation to understand the information required regarding goals, procedures, teachers' roles, learners' roles, and settings. To provide appropriate learning, the researcher needs to use survey methods in order to obtain concrete data.

Methods

The research method used is quantitative survey research. According to Sugiono (2019), a survey is research conducted on large or small populations, but the data are collected from samples based on the population to find out relative events, distribution, and the relationship between sociological and psychological variables. The process of survey research in this paper can be seen in Figure 3.

Figure 3

Stages of survey quantitative research



The survey research in this paper, according to Figure 3, begins with determining the background of the problem. The researcher reviews relevant literature based on the topics in this paper. After formulating the problem, the researcher determines the population and samples and develops instruments. The instrument is subsequently tested before data collection and analysis. Data are collected through a survey using Google Forms that are distributed to five universities in Indonesia contributing to the research of this paper. Data collection is done through a standardized questionnaire allowing for objective comparisons between the universities. The data are subsequently analyzed by calculating the percentage selected from the sample to find out how they assess the needs for ICT readiness, target needs, and learning needs. The researcher also includes the results to present the data and make a conclusion and recommendation at the end of the research.

Research Instrument

According to the theories of Hutchinson & Waters (1987) and Macalister & Nation (2010), the instrument needs are based on needs analysis consisting of target needs and learning needs. Target needs are what the students require in the target situation, and learning needs are what the students need during learning. ICT readiness is knowledge about technology and the improvement of mastery of technology. It can be seen more clearly in Tables 1, 2, and 3. The instrument should be suitable for testing in order to obtain the data. Instrument analysis is carried out using SPSS to facilitate data processing.

The questionnaire is distributed to the try-out sample, and the data are subsequently analyzed using SPSS software. Tables 1, 2, and 3 describe statistical data and Cronbach's Alpha coefficient data for the questionnaire.

Table 1

Students' readiness for ICT

Aspects	Indicators	Items	Result			
			r_{count}	r_{table}	Alpha Cronbach	Category
Knowledge of ICT Utilization	ICT Utilization in Learning Resources	1	0.324	0.1396	.73	Valid
		2	0.251			Valid
		3	0.196			Valid
		4	0.188			Valid
		5	0.190			Valid
	ICT Utilization to Support Learning	1	0.186			Valid
		2	0.291			Valid
		3	0.379			Valid
		4	0.346			Valid
		5	0.395			Valid
		6	0.298			Valid
Attempt to Increase Mastery of ICT	Participate in Activities or Carrying Out ICT Seminar or Workshops	1	0.322			Valid
		2	0.355			Valid
		3	0.209			Valid
		4	0.411			Valid
	Completing Various ICT-based Facilities and Media to Support Teaching and Learning Activities	1	0.338			Valid
		2	0.270			Valid
		3	0.212			Valid
		4	0.208			Valid
		5	0.272			Valid

According to Table 1 above, Alpha Cronbach of students' ICT readiness indicate 0.73 from the aspects of knowledge of ICT utilization and attempt to increase mastery in ICT, the result of each indicator is valid. Based on the Alpha Cronbach coefficient data, the value of the test instrument is 0.73, which reveals an acceptable level of reliability because it is higher than 0.6. The instrument in Table 1 about students' ICT for technology based on two aspects are divided into four indicators with 20 question items by using SPSS version 25 indicates that an invalid statement has not been included and used for data collection so that the data that were retrieved from the table 1 are valid with a number of 20 question items. It implies that instrument test items for every variable have a high-reliability level.

Table 2

Students' target needs in literacy learning

No	Indicators	Items	Result			
			r_{count}	r_{table}	Alpha Cronbach	Category
1.	Necessities (What students should know)	1	0.440	0.1396	.574	Valid
		2	0.462			Valid
		3	0.434			Valid
		4	0.349			Valid
2.	Wants (what students want)	1	0.436			Valid
		2	0.552			Valid
		3	0.405			Valid
		4	0.457			Valid
		5	0.408			Valid
		6	0.434			Valid
3.	Lack (what students do not know yet)	1	0.326			Valid
		2	0.304			Valid
		3	0.170			Valid
		4	0.327			Valid
		5	0.303			Valid

Related to Table 2 description above, the analysis instrument of students' target needs in learning literacy above refers to three indicators. It is divided into 15 question items. It is subsequently validated with SPSS version 25. It indicates that the result of $r_{count} > r_{table}$ is valid. It can be seen from the coefficient data of Alpha Cronbach result for the test instrument at 0.574. It implies that the reliability level is acceptable enough because it is lower than 0.6. Hence, instrument test items from all variables indicate quite reliability levels. Nevertheless, this instrument can be used as long as the validity and reliability are categorized as enough.

Table 3

Students' learning needs

No	Indicators	Items	Result			
			r_{count}	r_{table}	Alpha Cronbach	Category
1.	Goal	1	0.351	0.1396	.767	Valid
		2	0.588			Valid
		3	0.429			Valid
2.	Procedures	1	0.454			Valid
		2	0.598			Valid
		3	0.442			Valid
		4	0.627			Valid
		5	0.342			Valid
		6	0.478			Valid
3.	Teachers' role	1	0.508			Valid
		2	0.435			Valid
		3	0.557			Valid
4.	Learners' role	1	0.414			Valid
		2	0.396			Valid
		3	0.298			Valid
		4	0.367			Valid
		5	0.259			Valid
5.	Setting	1	0.390			Valid
		2	0.421			Valid
		3	0.463			Valid
		4	0.259			Valid

The instrument of students' learning needs, which is described in Table 3, describes the feasibility of the instrument in the research of this paper. The calculation of item validation with $r_{count} >$

r_{table} reveals that all items are valid and able to be used for questionnaire distribution. Based on the Alpha Cronbach coefficient data, the value of the test instrument is 0.767. It means acceptable with a high-reliability level because it is higher than 0.6. It implies that instrument test items for all variables indicate a high reliability level.

Research Sample

We distribute the questionnaire to elementary school teacher education students by using a purposive sampling technique. The purposive sampling technique is a sampling technique where samples are selected based on specific criteria relevant to the research topic (Sugiono, 2019). A total of 140 students from two universities in Pekanbaru that have elementary school teacher education programs were selected.

Data Analysis

In data analysis, after the data are collected from the research sample, the data are then analyzed by using percentage calculation to interpret the responses to see how the students assess their ICT readiness, target needs, and learning needs in literacy learning at the higher education level. The result of the data is presented in tables with percentages to describe the research findings. The lecturers' and students' responses regarding their perceptions of needs in literacy learning highlight the importance of conducting research development using validated instruments. After getting the result of the survey data, percentage calculations were carried out to quantify the students' needs. Therefore, response criteria were established based on the questionnaire, as described below:

Table 4

Students respond criteria

Interval	Category
82-100	Strongly Agree
63-81	Agree
44-62	Disagree
25-43	Strongly Disagree

Results

The result of the research indicates students' perceptions of ICT-based literacy learning using the survey method and three research instruments: students' ICT readiness, students' target needs in literacy learning, and students' learning needs. The analysis of perception data implies that there are various needs among students in literacy learning at the higher education level, which have been the focus of this research. Table 5 describes students' ICT readiness from students' self-development to the infrastructure in higher education.

Table 5

ICT readiness for students

Aspects	Indicators	Items	Result	
			Percentage	Category
Knowledge about the ICT Utilization	ICT Utilization in Learning Resources	The Internet is used for searching for learning resources.	63.75	Agree
		Google Classroom as the platform is used for lecture assignments.	63.93	Agree
		I will use the internet if I am constrained in finding out lecture assignments.	60.71	Disagree
		It is difficult for me to find out any sources using the internet.	58.39	Disagree
		I do not prefer to read journal articles online.	59.82	Disagree
	ICT Utilization to Support Learning	The lecturer frequently provides assignments with the source of digital literacy.	59.29	Disagree
		Learning is not interesting when the source comes from the internet.	58.04	Disagree
		The lecturer uses LMS in learning in the classroom.	66.43	Agree
		The use of LMS is easier for learning.	61.43	Disagree
		The use of ICT makes learning difficult.	64.29	Agree
		The use of LMS makes learning difficult.	56.43	Disagree
Attempt to Increasing Mastery of ICT	Participate in Activities or Carrying Out ICT Seminar or Workshops	I participate in ICT workshops to increase self-efficacy.	62.14	Disagree
		I have attended training on the use of LMS organized by Faculty and the University.	60	Disagree
		I have never learnt to develop competence in the use of ICT.	61.61	Disagree
		Participating in the technological workshop and seminar is a time-consuming activity.	59.64	Disagree
	Completing Various ICT-based Facilities and Media to Support Teaching and Learning Activities	The Internet can be accessed easily everywhere.	60.54	Disagree
		The institution provides a facility or place to learn outside classroom with the Internet access.	61.79	Disagree
		The Internet is very fast to access learning resources.	63.21	Agree
		The institution provides LMS for lecture activities.	60.36	Disagree
		Internet access outside the classroom is not essential enough.	61.96	Disagree

ICT readiness for students is an essential issue because of current technological development. Based on Table 5 above, the result of students' responses on ICT readiness reveals five items where students agreed and 15 items where they disagreed. The knowledge aspect of ICT utilization includes the indicator of technology utilization in learning resources, consisting of two statements to which students agreed. The internet is a learning resource in the lecture process utilized by students, so Wi-Fi needs to be facilitated in every place in order to ease their access to the internet. Teaching and learning are conducted by the lecturer and students in the classroom; students agree on utilizing Google Classroom because it makes submitting assignments online easier.

Furthermore, students' responses who disagree with the statement of ICT utilization in learning resources include three items. 60.71% of students still do not use the Internet to complete their assignments. 58.39% of students disagree with the statement that it is difficult to find sources using the internet, implying they find it easy. Related to another item that supports what obstacle the students faced, 59.82% of students disagree with the statement that they do not prefer to read online journal articles. It provides a description of ICT utilization in learning resources that is not still optimally used in literacy learning.

In addition, based on ICT utilization to support students in learning, 59.29% of students' responses disagree with the lecturer frequently providing assignments using digital literacy resources. 58.04% of students' responses disagree with the statement that learning is not interesting when the source comes from the internet, indicating they find it interesting. Nevertheless, there is a response that indicates that the use of LMS makes learning difficult because there are a number of assignment features that must be delivered, and they must learn independently. Students' self-development in ICT readiness on students' response to the participation of ICT training to increase self-efficacy is severely lacking. They assume that the facilities provided by the institution are still lacking because the internet cannot be accessed everywhere. To see target needs for students, it can be described as follows:

Table 6

Target needs for students

Aspects	Indicators	Sub Indicators	Result	
			Percentage	Category
Necessities (What Students Should Know)	Urgency and Role of Literacy Learning	Know the definition of literacy learning	74.28	Agree
		Understand the use of literacy learning	76.25	Agree
		Understand the importance of literacy learning taught to students	81.25	Strongly Agree
		Know literacy learning that can change national exam	68.39	Agree
Wants (What Students Want)	Literacy Learning-Related Students' Wants	Understand the concept of the literacy learning model	75	Agree
		Know literacy learning designed with an appropriate concept	79.46	Agree
		Knowing a reading text that will be discussed should be given in literacy learning	77.32	Agree
		Know the method of practical literacy learning directly	79.46	Agree
		Know the learning material should be contained in Riau Malay Culture	68.03	Agree
		Use learning media	79.82	Agree
Lack (What Students Do Not Know Yet)	Aspects that are not mastered in literacy learning	Know the obstacle in developing an appropriate reading text for students	69.10	Agree
		Do not prefer to read article and book that supports learning	63.39	Agree
		Never prefer to read the book (thrice a week)	62.67	Disagree
		Must re-read to get an understanding of the text	73.21	Agree
		Do not know fast methods to understand a reading text	66.42	Agree

As regards the table above, the response that is obtained between the aspects of necessities, the indicator of urgency and the role of literacy learning and knowing about literacy definition is 74.28% agree. Likewise, the response on understanding the use of literacy learning needed by students indeed agrees with 76.25%. For the importance of literacy learning taught to students, students' responses strongly agree at 81.25% because they recognize its impact on changing national exams at various educational levels in Indonesia. In terms of the aspect of wants on the indicator of students' wants related to literacy learning, the lowest agreed response on the statement item of the material should be focused on Riau Malay culture is 68.03%. They assume that learning material is better varied without being restricted so that the material scope becomes broader in order to develop competency. The highest agreed response on the literacy learning statement item of using learning

media is 79.82%. This is because it eases them to interpret the information provided in the text they read.

Of the aspect of lacks on the indicator of aspects that are not mastered in literacy learning, the students are lacking in developing an appropriate reading text, and their response is 69.10%. This is because students do not prefer to read articles and books that support learning. Students agree response on that statement item is 63.39%. They also lack quick methods for understanding reading texts, with 66.42% agreeing that they do not know fast methods to understand a reading text. To see the students' needs in literacy learning, it can be seen in Table 7 below.

Table 7

Learning needs for students

Aspects	Indicators	Sub Indicator	Result	
			Percentage	Category
Goal	Purpose of Literacy Learning	Improving reading skill	76.25	Agree
		Improving advanced literacy skill	87.32	Strongly Agree
		Being able to understand a reading text or information quickly	83.21	Strongly Agree
Procedures	Activities that are required to increase advanced literacy skill	Use varied learning methods	84.46	Strongly Agree
		Increase discussion	82.5	Strongly Agree
		Enhance assignments and work on the question	66.96	Agree
		Increase literacy practice	80.71	Agree
		Enhance lecture activity	67.14	Agree
		Increase field observation	78.21	Agree
Teachers' role	Teachers' role in literacy learning	Become a facilitator in lecture	79.28	Agree
		Become a role model	78.39	Agree
		Become the source of science	82.85	Strongly Agree
Learners' role	Learners' role in literacy learning	Students learn with guidance	78.75	Agree
		Students participate in lectures actively	81.25	Agree
		Students learn independently by using the internet or book	66.96	Agree
		Students prefer to read journal articles more	66.07	Agree
		Students like more storybooks, novels, short stories, etc.	78.21	Agree
Setting	The place that is liked in literacy learning	Some are placed in the classroom, and some are placed outside the classroom	76.96	Agree
		Outside the classroom	75.89	Agree
		In the classroom	73.39	Agree
		Learning use LMS	75.89	Agree

Related to Table 7 above, need analysis in literacy learning for students in higher education based on the aspect of goal with the indicator of purpose of literacy learning reveals that reading skill is improved because the agreed percentage of students' advanced literacy skill by understanding information in reading quickly is 87.32%. On the other aspects of the procedure with an indicator of the activities that are required to increase advanced literacy skill, the highest sub-indicator is using

varied learning methods with an agree response of 84.46%, while the lowest agree response from students on the sub-indicator of enhanced assignments and work on questions is 66.96%.

Concerning the aspect of teachers' role on the indicator of teachers' role in literacy learning, the highest response belongs to being the source of knowledge that agrees with 82.85%, and the lowest percentage refers to the lecturer who becomes a role model with an agreement response of 78.39%. The aspect of learners' role with the indicator of learners' role in literacy learning implies that the highest response is 81.25% agree with the statement item of students participating in lectures actively, and the lowest response is 66.07% agree that students prefer to read journal articles. Regarding setting as another aspect of the indicator of the place that is liked in literacy learning, the highest students' response agreed with 76.96% based on the statement item of literacy learning applied in and outside the classroom to provide different teaching and learning situations. Whereas the lowest response refers to the statement item of teaching and learning are carried out in the classroom with an agree response of 73.39%.

Discussion

It is essential to recognize the needs of students in dealing with the use of technology in literacy learning so that lecturers and universities can enhance students' technology readiness (Kurniawan et al., 2021; Çil, 2022). The utilization of ICT as a source of knowledge encourages the need for digital-based learning. As stated by Reddy et al. (2023b), the dependency on digital technology has increased rapidly, and a lot of consideration needs to be given to every individual in order to see how they apply ICT readiness to interact with others online and the skills they possess to complete assignments requiring digital resources. There is no obstacle based on the student's response to the use of the internet in finding resources. The obstacles only come from the lack of intensity in how they use it. It is seen that they prefer to use social media like Facebook, Instagram, and so on more than to read articles that support learning. According to Suyamto et al. (2020), it can influence students' readiness when becoming educators who should be competent. Because, according to Kurniaman et al. (2020), a competency that is related to behaviour and habits is formed on how students build their behaviour and habits as future educators. Hence, educational institutions are facilitators in providing skills for the use of ICT that are appropriate for future educators through innovative learning.

Target needs for students in literacy learning consist of the necessities (what students should know), wants (what students want), and lacks (what students do not know yet). Based on the student's responses, they need literacy learning to increase their critical thinking, creative, and problem-solving skills through the information from reading texts. As stated by Supriadi et al. (2022), the low students' literacy comes from the conventional teaching and learning styles, which lead to low learning systems based on the time, resources, and lecturers that play important roles. According to Ulfatin et al. (2022), the use of learning media is intended to ease students in literacy learning, which encourages the interests that grow within the students themselves. Self-motivation will appear from the curiosity about assignments assigned by the lecturer, and the students will try to read more frequently and find appropriate learning resources for individual learning.

The students' needs in literacy learning are intended for students to be able to find out the importance of understanding information within the text. It is added by Luyten (2022), that students' literacy awareness is the main factor in enhancing their skills and determining the reading strategies applied in learning activities. According to Anuar et al. (2023), when the students read, they will be involved and have a dialogue with the author to question, analyze, interpret, and evaluate the content and reading structure, and relate the reading text to the student's life experience. Thus, discipline in literacy learning will increase various skills that are essential to encourage critical thinking and involve the reader.

Conclusion

The present study examined how much ICT-based literacy learning is needed in terms of ICT readiness, target needs, and literacy learning needs. In general, the highest student needs are in the literacy learning aspect, while the lowest needs are in the aspect of students' ICT readiness. For the aspect of ICT readiness, the key needs for students are the availability of ICT-based learning infrastructure and the ease of using the infrastructure. The main target need is that students need learning media as a tool for interpreting information they read, so they like reading several articles more based on their lecture needs. In contrast to literacy learning needs, the most essential ones are to use varied methods and increase the assignments that are able to encourage students to read. The lecturer should create learning resources so that learning activities can occur both inside and outside the classroom, fostering effective learning. The research implication is that ICT-based literacy learning is needed by prospective elementary school teachers because the current technological development requires them to adapt to a new paradigm in higher education. Literacy learning in higher education should combine the use of ICT as learning resources and learning media that are able to contribute to the improvement of 21st-century skills.

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