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Validity and Reliability of the Medical Student e-Learning Management System Readiness Scale

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Abstract

The degree to which a person is seen as having the attitudes and traits necessary for success in studies in the future is known as e-learning management system (EMAS) ready. This study evaluated the EMAS preparation measure for medical students. The study's methodology makes use of the Borg and Gall five-step streamlined research design. The EMAS preparedness scale is measured using ten items and five dimensions. 117 students at the Faculty of Medicine, at a public university in Depok, Indonesia, were given the questionnaire. the relationship between the reliability test, Cronbach's Alpha, and the validity test, Pearson's Product Moment. These are the study's findings: All items had values of $\alpha < .05$, testing the instrument's validity on 10 item questions indicates that all question items are declared valid with a value greater than r table 0.1816. While test reliability indicates an alpha value of Cronbach > 0.678, the tested instrument can be declared reliable or consistent. According to the results, ten items possessed high validity and reliability.

Keywords: EMAS Readiness, Validity, Reliability, Questionnaire, Correlation

INTRODUCTION

Currently, the competition in education, especially in universities, is becoming increasingly fierce. To increase the competitive advantage of a university, it is necessary to pay attention to all aspects related to education (Hanna, 2019; Pucciarelli & Kaplan, 2016). The implementation of the teaching and learning process in the institution is one factor that is crucial (Arkorful & Abaidoo, 2015). The influence of technological innovation continues to grow and impacts all industries, including education (Aldowah et al., 2017). In 2015–2020, implementing science, technology, and engineering in education was most widely used as a strategy and learning model (Farwati et al., 2021). Universities are now using information systems to help the teaching and learning process, one of which is by integrating e-learning, thanks to the recent advancements in information technology (Somayeh et al., 2016).

The obstacles to e-learning are complicated, and it is important to understand the needs, available resources, human resource preparation, and students' and teachers' digital proficiency (Hindaryatiningsih, 2023). Implementing e-learning requires the readiness of both infrastructure, organizations, and, Of course, students (Ahmad et al., 2018; Al-araibi et al., 2019; Mosa et al., 2016). This readiness is known as e-Learning Readiness (Rohayani et al., 2015). E-Learning Readiness is measured so that organizations can quantitatively determine their level of readiness, especially for students. The organization can decide what policies or tactics to pursue by knowing the level of readiness. The key to the effectiveness of a successful

e-learning program is the involvement of its students. Students, in this case, are required to be more active because the main process involves students as learners (Mirabolghasemi et al., 2019; Tîrziu & Vrabie, 2015).

In the context of e-learning, students are "forced" to be actively involved in the learning process, and they have greater flexibility in choosing the learning materials they will study and where and how they will study, which will ultimately accelerate student acceleration as the center of their own learning experience (Lee et al., 2016). Therefore, the maturity and readiness of student learning related to learning independence must be a major consideration.

In the context of education in tertiary institutions, learning objectives are more directed at how to develop students' abilities to want continuous learning and also stimulate high-order thinking, which is very necessary for medical students (Hmelo-Silver, 2004; van Woezik et al., 2020). The use of technology gives medical education institutions the chance to promote these two objectives, one of which is the effective blending of face-to-face instruction with e-learning or blended learning (Karamizadeh et al., 2012).

In industrialized nations around the world, e-learning has long been acknowledged as an efficient approach for delivering health and medical education (Shrivastava & Shrivastava, 2020; Trukhacheva et al., 2011). E-learning has evolved from its original definition of remote education, which restricted learning to web-based media, to a much wider range of practices. All instructional environments that are supported by technology are collectively referred to as e-learning. Most organizations that offer e-learning employ a unique piece of software known as the Learning Management System (LMS) (Paulsen, 2003). It has become crucial that medical institutions adopt and expand their e-learning methodologies into their teaching methods. In poor nations' medical education, this problem has been acknowledged.

A public university in Depok, Indonesia, has been using LMS since the end of 2004 to keep abreast of developments in science and technology in the world of education (Santoso et al., 2007; Santoso HB, Handayani PW, Hasibuan ZA, 2008). A public university in Depok, Indonesia, manages distance learning through the EMAS (Direktorat Pengembangan Akademik dan Sumber Daya Pembelajaran, n.d.; Universitas Indonesia, 2022). This EMAS provides a platform for web-based learning. In other words, information and communication technology (ICT) enables teaching and learning both within and outside of the classroom. In all learning modules of the Faculty of Medicine, a public university in Depok, Indonesia, EMAS is used. All course materials, homework, and discussion boards are all processed through EMAS.

Thus, an assessment of medical students' readiness for EMAS is necessary because one of the main components of the EMAS program design is self-directed learning, which implies

the user's readiness to engage in EMAS to ensure improved learning outcomes. Student readiness to study online through EMAS can be measured using the EMAS Readiness Scale (EMASRS). Therefore, this study aims to develop the EMASRS questionnaire in assessing student readiness for EMAS among medical students. The existing online learning readiness scale questionnaire uses the Likert scale and mostly non-medical students (Belawati et al., 2023; Dwiyanti et al., 2020; Hung et al., 2010; Pratiwi, 2021), while this questionnaire uses direct answers by three items that are given a score so that it will become clearer in measuring the readiness of medical students in e-learning.

METHOD

The research and development approach is used in this study since it is consistent with the goals that need to be met. Meanwhile, the research and development model picked was the Borg and Gall educational research and development model. The research process was condensed into five parts, including an exploratory study, product design, expert validation and revision, limited and revised testing, mind field testing, and the final product (Ernawati & Sujatmika, 2021; Suartama et al., 2020). We developed ten measures to assess the student's EMASRS. We stick to five dimensions for the student EMASRS. The first dimension is about motivation to learn. The second component measures self-directed learning (SDL). The third component is about online communication self-efficacy. The fourth component is learner control. The fifth component is measuring computer and internet self-efficacy. Tree items will measure all dimensions. Each dimension's questionnaire items and scores are listed in Table 1.

This study involved 117 students from the Faculty of Medicine, a public university in Depok, Indonesia. The questionnaire survey collected information from the fourth-grade students of the Faculty of Medicine at a public university in Depok, Indonesia, who participated in the Primary Health Care System module. Students will be invited to complete a questionnaire survey in EMAS when participating in student activities for the 2020–2021 academic year. They voluntarily filled out the complete questionnaires.

Table 1. Student EMASRS Questionnaires

No	Dimensions	Question items	Score
1	Motivation for learning	Q1. My need to take this course is:	
		• Low – It's personal interest	1
		• Moderate – I could take it later or substitute it with other modules	2
		• High – I need it immediately for a degree	3
		Q2. Feeling that I am part of a class is:	
		• Not particularly necessary for me	1
		• Somewhat important to me	2
		• Very important to me	3

No	Dimensions	Question items	Score
2	Self-directed learning	Q3. I would classify myself as someone who:	
		• Put things off until the last minute	1
		• Needs reminding to get things done on time	2
		• Often get things done ahead of time	3
		Q4. Classroom discussion is:	
		• Rarely helpful to me	1
		• Sometimes helpful to me	2
		• Almost always helpful to me	3
3	Online communication self-efficacy	Q5. When an instructor hands out directions for an assignment, I prefer:	
		• Having the instructions explained to me	1
		• Try to follow the directions on my own, then ask for help as needed	2
		• Figuring out the instruction myself	3
		Q6. I need faculty comments on my assignments:	
		• Right away, or I get frustrated	1
		• Within a few days, or I forget what I did	2
		• Within a few weeks, so I can review what I did	3
4	Learner control	Q7. If I have to go to campus to take exams or complete work:	
		• I will have difficulty getting on campus, even in the evenings and on weekends	1
		• I may miss some lab assignments or exam deadlines if campus labs are not open on evenings and weekends	2
		• I can go to campus anytime	3
		Q8. As a reader, I would classify myself as:	
		• Slower than average	1
		• Average – I sometimes need help understanding the next	2
		• Good – I usually understand the text without help	3
5	Computer/internet self-efficacy	Q9. When I am asked to use iPods, DVD Players, Computers, or other technologies:	
		• I put it off or try to avoid it	1
		• I feel apprehensive but try anyway	2
		• I look forward to learning new skills	3
		Q10. Considering my professional and personal schedule, the amount of the time I have to work on a distance learning course is:	
		• Less than for a class on campus	1
		• The same as for a class on campus	2

No	Dimensions	Question items	Score
		• More than enough for a campus or a distance learning class	3

IBM SPSS version 25 was used to begin the data analysis. Using Pearson's Product Moment Correlation Analysis, validity is assessed. Cronbach's Alpha is used to assess reliability. If a value's probability is more than or equal to .05. If the alpha value exceeds the r table value, the instrument criteria are deemed credible. (Suryaningsih et al., 2022; Widasmara et al., 2022; Wijaya & Kloping, 2021). The r table value for N = 117 is 0.1816 (Priyatno, 2011; IPB University, n.d.). Also determined are the mean, standard deviation, minimum score, and maximum score.

This study received research ethical approval from the Ethics Committee of the Faculty of Medicine, University of Indonesia (No. KET-1184/UN2.F1/ETIK/PPM.00.02/2022, on November 7, 2022).

RESULTS AND DISCUSSION

In the exploratory study, questionnaires for EMASRS were collected and modified from several references (Hung et al., 2010; Minnesota State, 2019; Penn State University, 2019), then developed and designed the EMASRS questionnaires into ten questionnaires and five dimensions. , furthermore, conducting an expert test for several counseling and revision sessions with six teaching staff members who are managers of the Primary Health Care System module and who collectively hold two doctorates and four master's degrees, then conducting a test with students. After that, it continued with the EMASRS Questionnaire validation.

All items had values of $\alpha < .05$, according to the validity test results using Pearson's Product Moment Correlation (Table 2). This shows that the student EMAS readiness scale's components are all highly valid and helpful for gauging student e-learning preparedness.

Table 2. Validity of the EMASRS Questionnaires

No Question	Question items	Pearson Correlation	Sig.	Note
Q1	My need to take this course is	.401**	.000	Valid
Q2	Feeling that I am part of a class is	.549**	.000	Valid
Q3	I would classify myself as someone who	.517**	.000	Valid
Q4	Classroom discussion is	.375**	.000	Valid
Q5	When an instructor hands out directions for an assignment, I prefer	.460**	.000	Valid
Q6	I need faculty comments on my assignments	.373**	.000	Valid
Q7	If I have to go to campus to take exams or complete work	.413**	.000	Valid
Q8	As a reader, I would classify myself as	.567**	.000	Valid

No Question	Question items	Pearson Correlation	Sig.	Note
Q9	When I am asked to use iPods, DVD Player, Computers, or other technologies	.716**	.000	Valid
Q10	Considering my professional and personal schedule, the amount of time I have to work on a distance learning course is	.663**	.000	Valid

Note: N = 117; **p < 0.01

The reliability test results showed that Cronbach's Alpha coefficient was.678 (Table 3), which denotes that r-alpha =.678 > r-table =.1816. All items had a value of >.1816 according to Cronbach's Alpha for the Item deletion coefficient (Table 4). As a result, the reliability and consistency of all the measures created to assess students' preparation for e-learning are quite high.

Table 3. Reliability of the EMASRS

Cronbach's Alpha	N of Items
.678	10

Table 4. Item-Total Statistics of the EMASRS Questionnaires

No Question	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected ItemTotal Correlation	Cronbach's Alpha if Item Deleted	Note
Q1	21.79	7.078	.311	.665	Reliable
Q2	22.09	6.345	.401	.644	Reliable
Q3	22.53	6.441	.365	.650	Reliable
Q4	22.27	6.787	.188	.682	Reliable
Q5	22.29	6.398	.247	.676	Reliable
Q6	22.42	6.849	.206	.677	Reliable
Q7	22.50	6.804	.266	.667	Reliable
Q8	21.99	6.371	.433	.640	Reliable
Q9	22.33	5.431	.563	.602	Reliable
Q10	22.15	5.442	.464	.627	Reliable

The correlation analysis examines each dimension's minimum score, maximum score, mean, and standard deviation. Table 5 displays the outcomes. According to the results of the data description, the dimension of motivation for learning got the highest score (M = 2.75; SD =.32), followed by the dimensions of learner control (M = 2.46; SD =.31), computer/internet self-efficacy (M = 2.46; SD =.57), and online communication self-efficacy (M = 2.35; SD =.41). A lower score was given to the self-directed learning dimension (M = 2.30; SD =.40). According to the findings of the correlation study of the five dimensions, motivation of learning had a positive relationship with the self-directed learning (β = .349; p = .01), online

communication self-efficacy (β = .313; p = .01), learner control (β = .188; p = .05), computer/internet self-efficacy (β = .344; p = .01); the self-directed learning has a positive relationship with the online communication self-efficacy (β = .363; p = .01), learner control (β = .279; p = .01), computer/internet self-efficacy (β = .333; p = .01); online communication self-efficacy have a positive relationship with learner control (β = .306; p = .01), computer/internet self-efficacy (β = .353; p = .01); and learner control has a positive relationship with computer/internet self-efficacy (β = .645; p = .01). This indicates that there is a good association between the five measures of student EMAS readiness that were created and that they are theoretically acceptable.

Table 5. Correlation Coefficients of Student EMASRS Dimensions

Dimensions of Student EMASRS	Min	Max	Mean	SD	1	2	3	4	5
Motivation for learning	1.5	3.0	2.76	.32	-				
Self-directed learning	1.0	3.0	2.30	.40	.349**				
Online communication self-efficacy	1.5	3.0	2.35	.41	.313**	.363**			
Learner control	2.0	3.0	2.46	.31	.188*	.279**	.306**		
Computer/internet self-efficacy	1.0	3.0	2.46	.57	.344**	.333**	.353**	.645**	-

Note: N = 117; **p < 0.01; *p < 0.05

Variables contributing to the understudy online learning readiness scale are maturation, motivation (Rifqiawati et al., 2021), and intelligence (Agustiani et al., 2021). Self-directed learning, motivation for learning, computer/Internet self-efficacy, learner control, and online communication self-efficacy (Hung et al., 2010; Joosten & Cusatis, 2020; Minnesota State, 2019; Penn State University, 2019). We proposed five dimensions of student preparation for EMAS readiness.

The first dimension is the motivation for learning, such as my need to take this course and the feeling that I am part of a class. Medical student motivation is very important because the presence of students in class alone is not a guarantee that they want to learn. The capacity for self-control and appropriate emotional expression that enables a person to adapt to their surroundings is referred to as emotional maturity. Emotional maturity is crucial for distance learning because the students' emotional maturity was excellent, demonstrating that they can adapt to their surroundings. Student learning motivation is crucial to accomplishing the learning objectives (Rifqiawati et al., 2021). Highly motivated medical students are likely to learn easily and make the class a pleasure to teach. In contrast, unmotivated students will likely learn very little, making teaching painful and frustrating (Pelaccia & Viau, 2017). Medical students with

much higher intrinsic motivation have better academic performance (Wu et al., 2020). Therefore, it is very important to know the motivation for participating medical students in a module at EMAS.

I would describe myself as someone who enjoys classroom discussion in the second dimension, SDL. According to Hung et al. (2010), the SDL process involves individuals analysing their learning needs, setting learning goals, identifying human and material resources for learning, choosing, and using effective learning strategies, and evaluating learning outcomes. Because physicians must be self-directed learners to continue lifelong learning in the continuously changing area of medicine and to get the knowledge necessary for career advancement, medical and educational institutions support SDL. Given the significance of SDL in medicine, the existing curriculum should include more learning activities that encourage SDL. It is necessary to consider methods for altering the learning environment supporting SDL (Premkumar et al., 2018). SDL is the main obstacle to the success of an e-learning system (Al-Adwan et al., 2022). It is necessary to know SDL to participate as a medical student in a module at EMAS.

Online communication self-efficacy is the third component; for example, when a professor assigns an assignment, I require faculty feedback on my work. Through self-regulatory systems, self-efficacy beliefs affect pupils' motivation. Medical students applied online communication self-efficacy techniques and had confidence in their capacity to learn well in a problem-based learning (PBL) setting (Babenko & Oswald, 2019; Demirören et al., 2016). Considering online communication self-efficacy concerning medical student preparation is important in an EMAS module.

The fourth dimension, learner control, includes activities such as taking exams or completing work on campus. The idea of learner control includes setting goals for their learning, maintaining focus while learning without being sidetracked by other online activities, and repeating online material based on their learning requirements (Chung et al., 2020). When learning a module, medical students' learner control is crucial to consider concerning self-regulated learning. Academic performance is improved by self-regulated learning, and resource choice helps improve study habits (Ballouk et al., 2022).

The fifth dimension is computer/internet self-efficacy, as when I am asked to use iPods, DVD Players, Computers, or other technologies, considering my professional and personal schedule, and the amount of time I have to work on a distance learning. Since online lectures are given using technologically advanced devices, students need to be prepared and skilled in using computers and the Internet. Computer and the internet when using technologies to

accomplish educational objectives and expectations in higher education, students' self-efficacy idea pertains to their knowledge, abilities, attitudes, and competencies in this area (Chung et al., 2020). A person's level of self-efficacy (SE) is based on a set of personal beliefs that determine how effectively they can carry out a plan of action under fictitious circumstances. In an online learning environment, the usage of technology has a large and positive impact on SE (Heo et al., 2021). During online learning, students with higher internet self-efficacy performed and learnt more effectively than those with weaker internet self-efficacy (Rafique et al., 2021). When using online systems to deliver online learning, it is important to understand how students feel about ICTs (information and communication technologies) and how effectively they can use them for online learning.

CONCLUSION

The study results indicate that the student EMASRS measure is valid and reliable. The five components of student EMAS preparation are also positively correlated. This suggests that evaluating students' readiness for EMAS using the devised scale is possible. More in-depth research on EMAS preparedness is required in the hopes that a better understanding of this concept will help to solve the various challenges that students face as they get ready for study.

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