

The Effect of Individual Learning to Technology Capability

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ABSTRACT

The spread of Covid-19 throughout the world prompted the WHO to establish a pandemic status. This situation encourages the government to make social distancing policies through the work from home (WFH) program. No exception, the Ministry of Education determines the status of WFH from early childhood education to higher education. For higher education, e-learning has become a program in learning, especially in the 4.0 era. However, not all lecturers and students have e-learning capability. The purpose of this study explores individual learning to improve technology capabilities, especially in overcoming the Covid-19 Pandemic. The study was carried out throughout Indonesia by distributing questionnaires via a google form. The distribution is carried out for 6 (six) weeks through various networks. The responses from distributing questionnaires were 420 respondents. Data analysis was performed using regression and factor analysis through SPSS. The factor analysis confirms that individual learning consists of three elements (1) recognizing learning opportunities, (2) applying new knowledge, and (3) self-directedness. The result shows that individual learning has an effect on technology capability, and applying new knowledge has a greater effect to achieve technology capability. This finding supports Cognitive Learning theory, which states that individual learning supports actual behavior change and promotes adaptation to environmental conditions. Individuals may be more motivated through individual learning. Individual learning is a process involving a change in an agent's behavior or knowledge

Keywords: *individual learning, technology capabilities, work from home (WFH)*

A. INTRODUCTION

The World Health Organization (WHO) has categorized the new coronavirus or coronavirus disease 2019 (Covid-19) as a pandemic because it has spread widely throughout the world. The determination of Covid-19 as a global pandemic was carried out after there were more than 22 million cases of coronavirus infection in more than 200 countries, including Indonesia (Worldometers, 2020). Indonesia itself, until August 20, 2020, the number of Covid-19 cases was 147,211, with details of 40,119 people being treated, 100,674 recovered, and 6,418 people died (Worldometers, 2020).

Increasing number of deaths with Covid-19 in 2020 has led the government to issue a social distancing scheme, reducing interaction between people in the community and public spaces. The main objectives are reducing the outbreak's size, delaying the epidemic's peak, and distributing the number of infected people in a more extended period to reduce the health system's burden (Wibawa, 2020). To implement social distancing, the government issued a policy to execute work at home (Work from Home-WFH) (Wibawa, 2020). This policy is no exception as the basis for the Ministry of Education and Culture in issuing the letter no. 3 of 2020 concerning Prevention of COVID-19 in Education Units, with No. 36962/MPK.A/HK/2020 concerning Online Learning and Working from Home in the Context of Preventing the Spread of Corona Virus Disease (COVID-19) (Kemendikbud, 2020). Minister of Education Nadiem Makarim invited teachers and lecturers to also work from home. Nadiem conveyed that teaching activities can be done from home using technology (Wibawa, 2020).

Based on this regulation, there are around 166 local governments and 104 universities both public and private (as of March 19, 2020) that have eliminated activities in the education unit (Harususilo, 2020). The implementation of WFH was carried out through online media such as Microsoft Teams, Edmodo, Zoom, Google Classroom, Skype, and others to support the implementation teaching and learning process. However, the reality is that not all lecturers and students can use online learning media. In a short time, they are required to be able to run online learning programs. It takes a willingness to learn individually from both lecturers and students. In this study, the population is all active students and lecturers from various universities in Indonesia who implement e-learning. The implementation of E-learning is a new learning model, especially in Indonesia that was not previously used.

This situation is in line with Skinner's Learning Theory, where learning is a function of open behavior change. Behavior change results from an individual's response to events

(stimuli) that occur in the environment (Panayides, 2007). This response will shape each individual's learning experience through interactions with organizational members (Panayides, 2007). Each member's learning experience leads to individual abilities, which shows that individual learning is an essential competency for organizational success (Mehrabi et al., 2013). Individual learning includes all behaviors related to acquiring knowledge, attitudes, values, and emotional responses (Mehrabi et al., 2013). Individual learning is a crucial element for improving individual performance because it will increase competence to a higher level to achieve organizational goals (Ahmad & Marinah, 2013). WFH lecturers and students are required to learn through experience in carrying out online learning individually.

To support the implementation of online, technology's capability is one of the determinants of success. The capability of technology in the form of acceptance in adopting technology is a factor of concern in online learning media (Gan & Vimala Balakrishnan, 2017). Multiple Information System (IS) theory is used to explain technology adoption based on the user's technological competence, namely perceived ease of use (Davis, 1989); expectations from the use of technology, namely perceived usefulness (Davis, 1989), system quality (DeLone & McLean, 1992), and information quality (DeLone & McLean, 1992); cultural values, namely uncertainty avoidance (Hofstede, 1980); and personal motivation, namely enjoyment (Vallerand, 1997), and self-efficacy (Bandura, 1997, 2001; Compeau & Higgins, 1995). However, the real conditions of online learning in higher education are not without challenges and shortcomings. Besides, an inadequate understanding of the technical requirements from the user's point of view can harm the needs of both students and lecturers in the acceptance of technology as a communication medium for academic discussion (Gikas & Grant, 2013; Martin & Ertzberger, 2013). Various studies on e-learning have been carried out, especially in developed countries (Tavangarian et al., 2004; Kamal & Radhakrishnan, 2019; Landenfeld et al., 2018). In Indonesia, the implementation of e-learning is growing with the spread of covid 19. For this reason, this research is needed that examines individual learning capabilities in order to improve technological capabilities. For this reason, the main contribution of this research is to explore individual learning to increase technological capabilities.

B. LITERATURE REVIEW

1. *Individual Learning*

Modern learning theories from the cognitive-constructivist paradigm assume that learning involves an iterative process in structuring, refining, and cognitive restructuring models (Yadin & Or-bach, 2019). These processes are combined with other knowledge, such as common sense, debugging, evaluation, reflection, and many more. All of these processes are necessary for meaningful learning and are used in the context of individual learning (Yadin & Or-bach, 2019). Cognitive learning theory (Duncan & CJ Kelly, 1983) states that individual learning supports actual behavior change and encourages adaptation to environmental conditions. Individuals may be more motivated (Sonntag et al., 2004) through individual learning. Weiss (1990) describes learning as a relatively permanent change in knowledge or skills generated by experience suggests that one must consider the potential change in behavior represented in learning.

Researchers investigating individual learning have noted that such learning involves personal development and changes in behavior, attitudes, or even personality. Individual learning is characterized by the transformation of individuals who see themselves as other people and require sophisticated interpersonal skills (Merriam & Heuer, 1996). These skills are fundamental to help individuals develop and increase efficiency and productivity and meet individual personal and career development needs (Panari et al., 2010).

Learning is a continuous and strategic process. Learning is defined as a process in which individuals acquire new knowledge and insights that result in changes in behavior and actions (Marquardt, 1996). The learning subsystem consists of three complementary dimensions: level of learning (individual, group, and organization), type of learning (adaptive, anticipatory, and action), and skills (thinking systems, mental models, personal mastery, independent learning, and dialogue). Individual learning has utilitarian goals because it is seen as a system-oriented to developing knowledge that helps people survive and adjust to the constant changes affecting their organizations (Marquardt, 1996). Senge (1990) asserts that "organizations only learn through individuals who learn. Individual learning does not guarantee organizational learning, but without it, no organizational learning occurs". Senge (1990) agrees that "learning is not much related to retrieving information; on the contrary, learning is a capacity building process. Learning is about building the ability to act to create what you could not previously create. Cunningham & Iles (2002) identify three sub-dimensions related to individual learning that should help to understand individual learning as a concept better. These sub-dimensions are as follows: 1)

Seeing, Finding, and Realizing Learning Opportunities; 2) Acquiring and Applying New Knowledge; 3) Self-Directedness (self-study).

2. *Technology Capability*

Technological capability is defined as the acceptance and adoption of technology, especially in E-Learning (Gan & Balakrishnan, 2017). Spence & McKenzie (2014) define E-Learning as interactivity in learning to foster an environment that encourages active feedback and discussion between students and lecturers—fostering active interaction in the classroom among students or between students and lecturers. Human behavior is one aspect that determines the successful application of information technology. Problems that arise from human behavior, such as the difficulty of changing behavior, can be a barrier to developing information technology (Suhartini & Handayani, 2009). Multiple Information System (MIS) theory is used to explain technology adoption based on the user's technological competence, namely perceived ease of use (Davis, 1989); expectations from the use of technology, namely perceived usefulness (Davis, 1989), system quality (DeLone & McLean, 1992), and information quality (DeLone & McLean, 1992); cultural values, namely uncertainty avoidance; and personal motivation, namely enjoyment (Vallerand, 1997), and self-efficacy (Bandura, 1977, 2001; Compeau & Higgins, 1995).

C. HYPOTHESIS

According to Laurillard (1995), learning through discovery will be better if interactive media support it. This process is more colorful and, of course, the most expensive learning way and requires the teacher's intimate involvement and a 'teacher-built world.' The presence of the internet has changed the view of "interactive" media, from offline to online concepts (Suhartini & Handayani, 2009); this concept is also said to be web-based learning (WBL) (Chen et al., 2006). Online learning requires individuals to learn independently. Individual learning creates opportunities to gain new knowledge, especially in terms of mastery of technology. The opportunity to always learn and improve the experience will encourage better technological capabilities. For this reason, the hypothesis built is:

H1: Recognizing learning opportunities will improve technological capabilities

H2: Apply New Knowledge will increase technology capabilities

H3: Self-Directedness will increase technology capabilities

H4: Individual Learning will increase technology capabilities

D. RESEARCH METHODS

The type of research is a quantitative survey and was conducted cross-sectional for three months. The study was carried out in all universities in Indonesia, which at the time of the research were doing WFH. Distribution of questionnaires via Google Forms, which is distributed through the author's network of friends. At the beginning of May, there were 120 responses. After two weeks, the response reached 100 responses. In the first week of June, the questionnaire link was distributed again through various colleagues and associates.

The second link distribution results in a reasonably good response, as 102 responses from various regions in Indonesia and even abroad. At the end of July, the total number of responses received was 456, but those filled in correctly were 420 responses. Therefore, the number of samples in this study was 420 people. Data were analyzed using the Statistical Package for Social Sciences (SPSS) for statistical analysis. Pearson correlation is used to measure the relationship between variables. Factor analysis was carried out on four sub-dimensions of individual learning with 17 items using principal components analysis and Varimax-Rotation. Regression analysis is used to analyze the effect of individual learning on technological capabilities

E. MEASURES

1. Individual Learning

The measurement of individual learning adopts the concept of Cunningham & Iles (2002), consisting of 1) Seeing, Finding, and Realizing Learning Opportunities; 2) Acquiring and Applying New Knowledge; 3) Self-Directedness. A five-point scale was used to rate individual learning from "strongly agree" to "strongly disagree" (Gan & Vimala Balakrishnan, 2017).

2. Technological capabilities

Measurement of technological capability using Multiple Information System (IS) theory is used to explain technology adoption based on the user's technological competence namely perceived ease of use (Davis, 1989); expectations from the use of technology, namely perceived usefulness (Davis, 1989), system quality (DeLone & McLean, 1992), and information quality (DeLone & McLean, 1992). The measurement scale uses a 5 point Likert scale from very supportive to very unsupportive statements.

3. Control Variable

Previous the literature highlighted that personal characteristic such as age and gender (1 female, 0 male) might influence individual learning modes (Colquitt et al., 2000; Proserpio & Gioia, 2007).

F. RESULT

This study involved the participation of lecturers (30.7%) and students (69.3%). Most of the respondents were male (78.3%), and the rest (21.7%) were female. The majority (81%) fell in the 17–26 age category. The online learning media used are as shown in the figure. 1

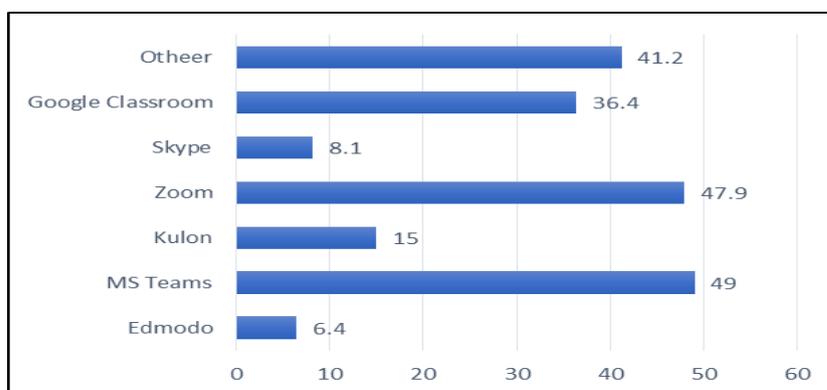


Figure 1 Online Media Learning

The validity and reliability test both individual learning and technological capabilities show that all items are valid ($> .098$) and reliable ($> .60$), at the level of significance at 0.01.

Table 1 Table of Validity and Reliability

| Variable | Item | N | Validity | Cronbach's Alpha |
|----------------------------|---|-----|----------|------------------|
| Individual learning | Improved learning skills | 420 | .327 | .738 |
| | Gain new knowledge | 420 | .401 | .735 |
| | Better to do individually | 420 | .359 | .736 |
| | Improved my understanding | 420 | .287 | .739 |
| | E-learning more challenging | 420 | .581 | .727 |
| | Continuous learning | 420 | .511 | .729 |
| | Felt more prepared | 420 | .719 | .724 |
| | I'd like to have individual | 420 | .743 | .726 |
| | The grade reflects my knowledge | 420 | .775 | .723 |
| | I think that e-learning contributes to learning | 420 | .597 | .726 |
| | Significant to my learning | 420 | .671 | .727 |
| | Increased my confidence in mastering the learning materials | 420 | .636 | .727 |
| | The instructor comments address my work | 420 | .614 | .730 |
| | Increases the motivation to learn | 420 | .699 | .727 |
| | Changes in behavior | 420 | .623 | .732 |
| | More time to do | 420 | .606 | .731 |
| | I took more seriously | 420 | .686 | .731 |

| | | | | |
|-----------------------------------|---------------------|-----|------|------|
| Technological capabilities | ease of use | 420 | .829 | .748 |
| | usefulness | 420 | .833 | .752 |
| | system quality | 420 | .602 | .803 |
| | information quality | 420 | .786 | .758 |

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Factor analysis was used to test 17 factors constituting individual learning. The commonalities analysis results showed that all values were > .50, meaning that all variables could explain the factor. The three factors' solution was obtained by extracting factors with an eigenvalue of more than 1, which presented 62.415 percent variants (statistic Kaiser-Meyer-Olkin 0.865; Bartlett test of specificity 4173.048; the significance of 0.000). The loading factor was shown in Table 3. The loading factor in each factor exceeded 0.50.

Table 2 Analysis Factor

| | | Factor 1 | Factor 2 | Factor 3 |
|----|---|-----------------|-----------------|-----------------|
| 1 | Improved learning skills | | .803 | |
| 2 | Gain new knowledge | | .902 | |
| 3 | Better to do it individually | | .857 | |
| 4 | Improved my understanding | | .657 | |
| 5 | E-learning more challenging | | | .719 |
| 6 | Continuous learning | | | .817 |
| 7 | Felt more prepared | .730 | | |
| 8 | I'd like to have individual | .754 | | |
| 9 | The grade reflects my knowledge | .733 | | |
| 10 | I think that e-learning contributes to learning | .584 | | |
| 11 | Significant to my learning | .671 | | |
| 12 | Increased my confidence in mastering the learning materials | .560 | | |
| 13 | The instructor comments address my work | .672 | | |
| 14 | Increases the motivation to learn | .833 | | |
| 15 | Changes in behavior | .547 | | |
| 16 | More time to do | .834 | | |
| 17 | I took it more seriously | .838 | | |

The results of the rotated component matrix analysis showed that three factors formed individual learning. In factor 1, 11 items form with correlation values ranging between .560 until .838. Factor one consist of felt more prepared; I'd like to have individual, the grade reflects my knowledge, I think that e-learning contributes to learning, significant to my learning, increased my confidence in mastering the learning materials, the instructor comments address my work increases the motivation to learn, changes in behavior, more time to do, and I took it more seriously.

Factor 2, which consists of improved learning skills gains new knowledge, is better to do individually, improved my understanding, and e-learning more challenging, which has a correlation value between .657 until .902. As a result of the third-factor analysis, it is found that the factors that form are continuous learning and e-learning more challenging with the correlation value is .817 and .719. The three factors of individual learning are recognize learning opportunities, apply new knowledge, and self-directedness.

Table 3 Correlation Analysis

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------------------------|-------|------|------|-------|------|-------|------|---|
| Gender | 1.22 | .41 | 1 | | | | | |
| Age | 1.48 | 1.02 | .00 | 1 | | | | |
| Recognize learning opportunities | 4.17 | 2.46 | .01 | .12** | 1 | | | |
| Apply new knowledge | 4.04 | 2.44 | .00 | .04 | .00 | 1 | | |
| Self-directedness | 3.87 | 2.48 | -.03 | .16** | .00 | .00 | 1 | |
| Technological capabilities | 14.55 | 2.88 | -.01 | .02 | -.07 | .57** | -.02 | 1 |

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 3 shows that the mean value is above 3; this indicated that respondents generally agreed on the statement measured by the construct. Standard deviation (Std. Dev.) test shows that the respondents are distributed around the mean value; it can be concluded that the data is normally distributed. The sample used is relatively homogeneous. The correlation analysis recognizes learning opportunities and self-directedness has a strong relationship with age ($r=.12$, $r=.16$, $p=.00$). Meanwhile, technological capabilities have a strong relationship with apply new knowledge ($r=.57$, $p=.00$). Age becomes a determinant factor in the relationship between individual learning and technological capabilities.

Table 4 Regression Analysis

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|----------------------------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | | |
| 1 | Recognize learning opportunities | -.207 | .141 | -.072 | -1.473 | .142 |
| 2 | Apply new knowledge | 1.655 | .115 | .575 | 14.391 | .000 |
| 3 | Self-directedness | -.072 | .115 | -.025 | -.623 | .534 |
| 4 | Recognize learning opportunities | -.212 | .116 | -.074 | -1.824 | .069 |
| | Apply new knowledge | 1.654 | .115 | .574 | 14.322 | .000 |
| | Self-directedness | -.080 | .117 | -.028 | -.682 | .496 |
| | Gender | -.080 | .280 | -.011 | -.285 | .776 |
| | Age | .044 | .116 | .015 | .378 | .705 |
| 5 | Individual Learning | .062 | .020 | .154 | 3.147 | .002 |
| | Gender | -.099 | .338 | -.014 | -.291 | .771 |
| | Age | .007 | .139 | .002 | .051 | .960 |

The regression analysis results show that model 1 and model 3, namely, recognize learning opportunities and self-directedness, do not significantly affect technological capability. For that, H1 and H3 do not support.

While in model 2, apply new knowledge has a significant effect on technological capability. Therefore Hypothesis 2 is proven.

In the fourth model, only the dimension apply new knowledge has a significant impact on technological capability ($r=14.322$, $p=.000$), while age and gender also do not affect technological capability.

The fifth model shows that individual learning has a significant effect on technological ability ($r=3.147$, $p=.002$), but age and gender do not affect technological capability. For that, H4 is acceptable.

G. DISCUSSION

The main contribution of this research is to explore individual learning to increase technological capabilities. The analysis result of factors towards individual learning was in line with the study conducted by Cunningham & Iles (2002), consisting of three elements:

- Factor 1 represented recognizing learning opportunities.
- Factor 2 was Apply New Knowledge
- Factor 3 was Self-Directedness

During the Covid-19 pandemic, both lecturers and students were forced to recognize learning opportunities because they had to learn independently through online learning. The change in learning from offline to online makes them realize their needs in the learning process. Lecturers and students are required to operate technology quickly. For senior lecturers, technological skills become new knowledge that they have to learn individually. The Covid-19 pandemic caused WFH, forcing them to seek new knowledge, especially in learning technology. For students themselves, changes in learning models also force them to get learning from various learning sources. Especially for students who need guidance at the final level, the mentoring process that cannot be done face-to-face also forces them to study independently. The context of continuous learning is an issue that must be done, especially in the face of the uncertain conditions of the Covid-19 pandemic

The results showed that H2 and H4 proved acceptable. Apply new knowledge will improve technology capabilities. During a pandemic like this, the application of new knowledge, especially in technology mastery is significant. All learning using a computer device connected to the internet. Interactive learning, project-based assignments make lecturers, and students always apply the new knowledge that they get. Apply new knowledge will improve the achievement goals in particular functional goals in their learning processes; the progress would be higher, and they would acquire many successes in their learning. The results showed that apply new knowledge significantly improved technology capability and had a significant effect on it. It meant that apply new knowledge of the most important factors affecting the technology capability, according to Amini's findings (2003). These

results suggested that they have used self-regulation strategies in learning to the extent that they improved their skill, especially to operate the computer as a tool for e-learning.

Meanwhile, hypotheses 1 and 3 are not proven to improve technological capabilities significantly. In recognizing learning opportunities and self-directedness, learning opportunities arise if the surrounding community supports them. The need for a mentor to help understanding e-learning plays a significant role in increasing technological capabilities.

These findings support the learning theory, which states that learning is a continuous and strategic process integrated with work. Marquardt (1996) argued that individual learning has utilitarian goals because it is seen as a system-oriented to develop knowledge that helps people survive and adjust to the constant changes affecting their organization.

Learning has generally been studied in the context of information seeking during socialization (Morrison, 1993). In socialization studies, learning focuses on finding three types of information: technical (about how to do tasks), references (about what other people expect from them), and normative (about expected behavior and attitudes) (Morrison, 1993). Researchers investigating individual learning have noted that such learning involves personal development and changes in behavior, attitudes, or even personality (Morrison, 1993). Individual learning is characterized by the transformation of individuals who see themselves concerning other people and require sophisticated interpersonal skills (Merriam & Heuer, 1996). These skills are essential to help individuals develop and increase efficiency and productivity and meet individual personal and career development needs (Panari et al., 2010).

H. CONCLUSION

This finding supports Cognitive Learning theory (Duncan & CJ Kelly, 1983), which states that individual learning supports actual behavior change and promotes adaptation to environmental conditions. Individuals may be more motivated (Sonntag et al., 2004) through individual learning. Weiss (1990) describes learning as a relatively permanent change in knowledge or skills produced by experience suggests that one must consider the potential change in behavior represented in learning.

Individual learning is a process involving a change in an agent's behavior or knowledge. Agents can learn new information, find a new strategy, or develop a different representation of a situation. It might result from experience, reflection, trial and error, imitation, formal teaching, and conscious or tacit. (Colvin & Mayer, 2011; Novarese, 2012). The change may make the

agent more adapted to its environment or more capable of performing a task, or just even more conscious of some realities. In such cases, learning implies an improvement as it allows better performances and decisions, or understandings. Usually, this expression is used as synonymous with individual improvement.

Behavioral changes result from changes in one's knowledge and intended or unintended changes in one's situation (Boisot et al., 2007). Defining learning processes benefits from the distinction between two competing theories of knowledge: the "bucket" versus the "searchlight" theories of knowledge. This distinction has been introduced by Karl Popper and is analyzed in (Boland & Fowler, 2000). In the "bucket" theory of knowledge, individual learning processes are nothing but an accumulation of data and "raw" experience. Knowledge acquisition is nothing but adding to one's bucket (therefore its name) because the more observations one makes, the more knowledge one has. It is also related to beliefs about inductive logic and proofs.

Limitation and Recommendations

Our research has several strengths; first, this research was carried out during a pandemic, which forced students and lecturers to carry out e-learning. Second, working from home causes them to learn independently in operating computers connected to the internet, so they do individual learning. Third, our samples come from various universities in Indonesia to comprehensively explain the ideas of individual learning. However, this study has limitations. First, our study is the use of a survey method and a cross-sectional design. This design type raises the potential for common method bias as participants can engage in hypothesis guessing and social desirability while completing the questionnaire (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Two, technology capability is measured only from learning media facilities by ignoring the behavior of operating the tool. Meanwhile, the e-learning media used are very diverse, therefore the ability of technology cannot comprehensively explain the behavior related to individual learning because it is only measured by the level of difficulty of a media.

A few suggestions for future studies first should focus on measuring transfer to the workplace and investigating the relationship between self-assessed and externally assessed measures of learning (Kraiger et al., 1993). Two, to consider the directions outlined by Sitzmann et al., (2016) and Armstrong, S. J. & Fukami, (2010) to mitigate the issues concerning the self-assessment of learning. Moreover, future research should build on our results to provide a deeper understanding of the role of group-interaction processes in shaping individual learning during a highly involving training experience. Four should

consider possible effects related to the instructor's role before the simulation. Previous research underscores that instructor behavior may affect an individual sense of absorption in the subsequent activity (Alavi, M., & Leidner, 2001).

Co-Author Contribution

There is no conflict of interest to declare for this publication. Second and Third author wrote the research methodology and did the data entry. Fourth author carried out the statistical analysis and interpretation of the results.

ACKNOWLEDGMENTS

This study is supported by the Diponegoro University Institute for Research and Community Service through a Research Grant for Development and Application. The fiscal Year 2021. Project Grant No. 233-57 / UN7.6.1 / PP / 2020 dated April 20, 2020.

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