



**TECHNIUM**  
**SOCIAL SCIENCES JOURNAL**

**Vol. 37, 2022**

**A new decade  
for social changes**

[www.techniumscience.com](http://www.techniumscience.com)

ISSN 2668-7798



9 772668 779000

## **Do learning ICT usage affect the learning process quality? an empirical study in private university**

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**Abstract.** Information Communication Technology (ICT) brings new opportunities to many aspects of society. Applying ICT in education is a valuable contribution to improving quality, especially improving the quality of the learning process in higher education. This study explains the relationship between research variables by testing the description hypothesis. Variables include Learning process quality, ICT learning usage, Technology Characteristics, Individual Characteristics, and Motivation to use ICT. The Structural Equation Modeling (SEM) was used to analyze the data in this study. The results show a significant positive effect of learning usage ICT variables, Technology Characteristics, and Individual Characteristics on the quality of the learning process, then Individual Characteristics and Motivation use ICT on ICT learning usage. Meanwhile, the Technology Characteristic variable has no significant positive effect on ICT learning usage. The influence of significant positive variables is expected to be able to be utilized and managed properly so that, in the future, a high-quality learning process will be achieved. Campuses can also act as a forum by providing various competency training so that teaching staff becomes more prepared and competent in learning using ICT. Furthermore, the provision of learning using ICT can be better optimized so that the potential characteristics of the technology can be utilized to the fullest.

**Keywords.** Information Comunication Tehnology (ICT), Learning process quality, individual characteristic, technology characteristic, Structural Equation Modelling (SEM)

### **Introduction**

Organizational learning is a variable that is confusing and difficult to understand, and very difficult to measure (Friedman, Lipshitz, & Popper, 2005). Perhaps one reason is that the conceptualizing learning approach in organizations vacillates between behavioral, cognitive, and cultural (Tsang, 1997). For Meyer, organizational learning occurs when an organization makes fundamental changes at the organizational level, such as in its vision, ideology, and structure. Unprecedented environmental changes, organizational reactions are showing resilience or retention tendencies to utilize organizational slack to absorb the effects of such changes and to bounce back from crises versus the capacity to use crises to adapt and integrate new ways of functioning in organizational strategy, structure, ideology (Meyer, 1982). Leveraging current knowledge and exploring new knowledge improves organizations (Karen 2018).

The rapid development of technology has made tremendous changes in our way of life, as well as the demands of society. Recognizing the impact of new technologies in the workplace and daily life, educational institutions are currently trying to reorganize their academic programs and classroom facilities to minimize the teaching and learning technology gap between the present and the future. This restructuring process requires integrating technology into the existing context to provide learners with knowledge of specific subjects, promote meaningful learning, and increase professional productivity (Tomei, 2005, p. 195).

Organizational learning can also be seen as the result of processes ranging from information acquisition, distribution, and interpretation to organizational memory; Through this process, the organization finds useful knowledge that deserves to be stored in the organization's memory. Organizational learning has also been conceptualized as the creation of knowledge by transforming tacit knowledge into explicit knowledge (Nonaka & Takeuchi, 1995).

However, the learning process in higher education is defined as a process of interaction between students and lecturers to share and process information with learning resources in a learning environment (Suharsaputra, 2015). A good learning process will form intellectual abilities, critical thinking, and the emergence of creativity as well as changes in one's behavior or practice or personal based on certain experiences. Teaching quality includes definitions and concepts that vary widely and are constantly changing. There are more and more initiatives (actions, strategies, and policies) aimed at improving the quality of teaching (Henard, 2010).

Information Communication Technology (ICT) brings new opportunities to many aspects of society. Applying ICT in education is a valuable contribution to improving quality, especially improving the quality of the learning process in higher education. Thus, lecturers must master or be able to use ICT tools to enhance the quality of teaching and learning activities.

The education industry has substantially changed learning and teaching (Lee, 2001). In addition, ICT has brought many benefits to universities, and it is proven that any university that stays away from ICT endangers its survival (Ansah, 2013). Indonesia is included in the group of countries that have a low level of ICT use due to the motivation to use ICT (Dijk, 2012), technology characteristics (Denis, 2001, DeSanctic, 1987),

The motivation for using ICT is an individual's support for taking action and completing it. The high and low of a person's achievement depends on his motivation. The positive attitude of lecturers towards ICT is a must and an added advantage in implementing ICT-related programs (Kandasamy & Shah, 2014). Furthermore, motivation is the main factor influencing the absorption of ICT by lecturers in their teaching (Cox, Preston, & Cox, 1999). In short, the motivation to use ICT by lecturers is considered one example that affects the use of ICT (Vitanova & Pachemska, 2014).

Several studies or studies have consistently shown that various technology characteristics experienced by users can potentially influence different outcomes (Dennis et al., 1987). The user's perception of the technology characteristic comprises the first set of factors influencing the adoption and use of ICT. Social presence, immediacy, and concurrency are technology characteristics that will affect its use through full cognition of performance and effort expectations. These three characteristics are also expected to interact with the task.

When individuals first start using new technology, performance and satisfaction often decline because its use requires new skills and patterns of interaction. But will bring his experience from other related technologies. Over time, the individual's experience with a particular technology will develop and gradually become easier to use, and performance will also improve. And individual characteristics, such as specialized experience, and the ability to

use certain types of technology, can play a role in the selection and use of technology and one's perception of technology Carlson and Zmud (1999); Daft and Lengel (1986).

Shih, Feng, & Tsai (2008), ICT learning (online) can improve the learning quality, while Islam (2013) reports that online learning has a weak influence on the learning quality. Meanwhile, Hartono et al. (2017) stated the limitations of organizational learning and individual performance studies in teaching practice, so examining organizational learning on performance in teaching is recommended. Although efforts have been made to learn the use of ICT, most teachers do not integrate ICT into classroom activities effectively. It should be noted that ICT alone may not significantly contribute to education reform efforts without integrating ICT into Education (Erdogan. 2011).

## Methodology

### *Research Design*

This type of research is "Explanatory Research," or research that explains the relationship between research variables (causality) by testing the hypothesis that the description contains a description. Variables include Learning process quality, ICT learning usage, Technology Characteristics, Individual Characteristics, and Motivation to use ICT. Still, the focus is on the variables' relationship (Sekaran, 1992). Empirical studies in this study include variables of Learning process quality, ICT learning usage, Technology Characteristics, Individual Characteristics, and Motivation use of ICT. The measurements (indicators) of each variable are shown in Table 1.

*Tabel 2. Variable Measurement*

No	Variables	Indicators	Source
1	<b>Learning Process Quality</b> It is a process of interaction between students and lecturers to share and process information with learning resources in a learning environment, which will both form intellectual abilities, critical thinking, and the emergence of creativity and behavior change.	1. Provide training 2. Interaction 3. Think creatively 4. Critical	Shirly (2002)
2	<b>Learning Usage ICT</b> It is an integration of the use of ICT in learning by teachers.	1. Intensity 2. Frequency 3. Duration 4. Choice	Davis, F.D.; Bagozzi, r.P.; and warshaw, P.r.(1989)
3	<b>Tecnology Characteristic</b> It is an institutional competence and technology readiness are more likely to adopt ICT	1. Infrastructure 2. Expert skills 3. Accessibility 4. Technology support	Zhu et al., (2003). Sunday C. Eze (2013)
4	<b>Individual Crhracteristic</b>	1. Experience 2. Ability	Carlson, J.r., and Zmud, r.w. (2019).

	It is the experience of technology, the ability to use certain types of technology, can play a role in the selection and use of technology, and in one's perception of technology.	3. Choice of ICT use
5	<b>Motivation to use ICT</b> It is the teacher's impetus to act and perform tasks and actions with ICT	1. New knowledge needs 2. Desire to learn 3. New challenges

#### *Sample and Data Collection*

The population in this study were private universities in Central Java, totaling 250 active private universities (PDPT, 2020). The respondent is the Head of the PTS study program in Central Java. The sampling method is a purposive sampling technique, meaning that it is based on the characteristics of the population. Its characteristics are PTS have been established for at least five years, PTS are representative of the Central, East, North, and South regions. Then the number of samples (sample size) refers to the opinion of Hair (1992) which says that the recommended minimum sample size in the use of SEM is the number of samples is 100 respondents or using a comparison of 5-10 times the number of observations for each estimated parameter or indicator used, based on the reference The researcher saw that this study used SEM analysis tools, so the number of samples in this study amounted to 8 X 16: 128 Respondents.

#### *Analyzing of Data*

The Structural Equation Modeling (SEM) from the AMOSS Software package was used to analyze the data in this study. This model is a set of statistical techniques that allows for testing a series of relatively complex relationships (Firdinand, 2002). The advantages of SEM in management research are the ability to confirm the dimensions of a concept or factor and measure the existing theoretical relationships.

**Findings / Results and discussion**

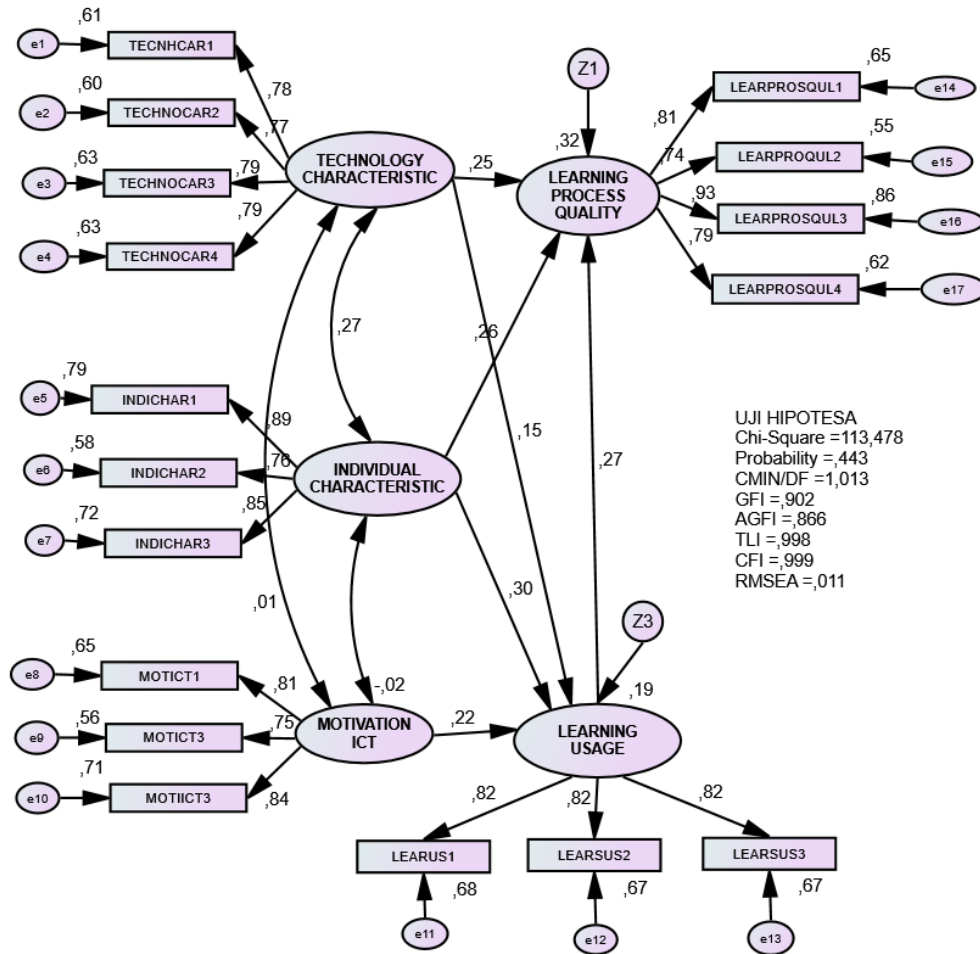


Figure 1. Full model path result

The hypothesis formulated in this study consists of 6 hypotheses. The research hypothesis is a one-sided test because the relationship between the independent and dependent variables is hypothesized to have a positive effect. To find out whether the data support the hypothesis, the Critical Ratio (CR) probability value is compared with = 5%. Suppose the Standardized parameter coefficient is positive and the probability value of the Critical Ratio (CR) is less than = 5%. In that case, it can be concluded that the research hypothesis is supported by the data (significantly proven). The test results of the research model are presented in the following table.

Table 2. Regression result

	Estimate	S.E.	C.R.	P	Label
LEARNING_USAGE <--- MOTIVATION_ICT	,259	,117	2,219	,026	par_8
LEARNING_USAGE INDIVIDUAL_CHARACTERISTIC	<--- ,268	,093	2,884	,004	par_15
LEARNING_USAGE TECHNOLOGY_CHARACTERISTIC	<--- ,154	,109	1,420	,156	par_19

	Estimate	S.E.	C.R.	P	Label
LEARNING_PROCESS_QUALITY TECHNOLOGY_CHARACTERISTIC	<--- ,294	,112	2,622	,009	par_6
LEARNING_PROCESS_QUALITY INDIVIDUAL_CHARACTERISTIC	<--- ,254	,098	2,593	,010	par_7
LEARNING_PROCESS_QUALITY LEARNING_USAGE	<--- ,300	,112	2,670	,008	par_9

Based on the results of the table above, the following equation can be written:

- Learning Process Quality = 0.294Technology Characteristic + 0.254Individual Characteristic + 0.300Learning Usage ICT + Z1
- Learning Usage ICT = 0.154Technology Characteristic + 0.268Individual Characteristic + 0.259Motivation to use ICT + Z2

In the previous section, the first alternative hypothesis has been put forward, namely "H1: There is an effect of ICT learning usage on learning process quality". The test results with Path analysis (SEM) can be seen that Standardized Regression Weights Learning ICT usage on learning Process Quality is 0.300 with a p-value ( $0.008 < 0.05$ ). This means that the ICT learning usage has a positive and significant effect on learning process quality. So that it can be interpreted that the better ICT learning usage will improve learning process quality. Thus the first hypothesis in this study is proven.

The second alternative hypothesis in this study is "H2: There is an influence of technology characteristics on learning process quality". The test results with Path analysis (SEM) can be seen that the Standardized Regression Weights Learning ICT usage on learning Process Quality is 0.294 with a p-value ( $0.009 < 0.05$ ). This means that the characteristics of technology have a positive and significant effect on the quality of the learning process quality. Thus the second hypothesis in this study is proven.

The third hypothesis is "H3: There is an influence of individual characteristics on learning process quality". The test results with Path analysis (SEM) can be seen that the Standardized Regression Weights Learning ICT usage on learning Process Quality is 0.254 with a p-value ( $0.01 < 0.05$ ). This means that individual characteristics positively and significantly affect learning process quality. Thus the second hypothesis in this study is proven.

In the previous chapter, a fifth alternative hypothesis was proposed: "H4: There is an influence of technology characteristics on Learning Usage ICT". The test results with Path analysis (SEM) can be seen that the Standardized Regression Weights of technology characteristics on ICT learning usage is 0.154 with a p-value ( $0.156 < 0.05$ ). This means that the technology characteristics do not significantly positively affect the ICT learning usage. Thus the fifth hypothesis in this study is not proven.

In the previous chapter, a sixth alternative hypothesis was proposed "H5: There is an influence of individual characteristics on ICT learning usage". The test results with Path analysis (SEM) can be seen that the Standardized Regression Weights of individual characteristics on learning usage ICT is 0.268 with a p-value ( $0.004 < 0.05$ ). This means that individual characteristics have a positive and significant effect on the ICT learning usage.

In the previous chapter, a seventh alternative hypothesis was proposed "H6: There is an Influence of Motivation to Use ICT on ICT learning usage". The test results with Path analysis (SEM) can be seen that the Standardized Regression Weight Motivation to Use ICT on

ICT learning usage is 0.259 with a p-value ( $0.026 < 0.05$ ). This means that Motivation to Use ICT has a positive and significant effect on ICT learning usage.

The results of testing the first hypothesis found that ICT learning usage positively and significantly affected learning process quality. This indicates that the better the use of ICT in learning will improve the quality of the learning process. Mastery of technology for educators in the current era of globalization is very important (Rahim, 2011).

As it is known that the development of information and communication technology (ICT) has grown very rapidly and has covered all aspects of human life. The role of ICT is so large that it can change many things in the practice of life, not least in the field of education (Iriantara, 2014). The development of ICT was created to facilitate and provide various benefits for humans in carrying out their work and activities.

In the previous chapter, a sixth alternative hypothesis was proposed "H5: There is an influence of individual characteristics on ICT learning Usage". The test results with Path analysis (SEM) can be seen that the Standardized Regression Weights of individual characteristics on learning usage of ICT is 0.268 with a p-value ( $0.004 < 0.05$ ). This means that individual characteristics positively and significantly affect ICT learning usage.

In the previous chapter, a seventh alternative hypothesis was proposed "H6: There is an Influence of Motivation to Use ICT on ICT learning Usage". The test results with Path analysis (SEM) can be seen that the Standardized Regression Weight Motivation to Use ICT on ICT learning usage is 0.259 with a p-value ( $0.026 < 0.05$ ). This means that Motivation to Use ICT positively and significantly affects ICT learning usage.

Mastery of technology for educators in the current era of globalization is very important (Rahim, 2011). The first hypothesis's results found that ICT learning usage positively and significantly affected learning process quality. This indicates that the better the use of ICT in learning will improve the quality of the learning process.

As it is known that the development of information and communication technology (ICT) has grown very rapidly and has covered all aspects of human life. The development of ICT was created to facilitate and provide various benefits for humans in carrying out their work and activities. The role of ICT is so large that it can change many things. In the world of education, the use of ICT can be applied to all stages of innovative teaching and learning activities, starting from making lesson plans, compiling materials, presenting materials, implementing learning, to evaluation. ICT can develop, enrich, and deepen students' skills, assist work practices, and strengthen teaching (Amin, 2013). Efforts to improve education must continue to be launched in quantity and quality. In realizing this, it is necessary to involve various parties (Mutakin & Sumiati, 2011). As the spearhead of education, Lecturers must always improve their professionalism in operating educational technology media, especially in learning (Syukur, 2014).

The analysis results on the second hypothesis indicate a significant positive effect of technology characteristics on learning process quality. Sunday C. Eze (2013) explained that the indicators of technology characteristics include: electricity supply, Expert skills, Internet connectivity and accessibility, and Obsolete technologies and Technology support. This shows that the completeness of the ICT facilities owned by the campus can significantly improve the quality of the learning process.

In this regard, the results of interviews with most of the respondents stated that on their campus, various ICT facilities could support the learning process, such as the availability of a well-connected network, web applications and campus portals, and servers that are quite good with large bandwidth, hardware devices computer hardware and software. During the pandemic,

there is now a subscription zoom e-learning application available. The completeness of ICT facilities such as the internet or wifi access that can improve the quality of the learning process has also been proven by Sahfitri's research (2019) which found that campus hotspots can provide benefits in helping students in learning activities. In addition to adequate ICT facilities, most respondents also stated that they already have experts and HR with experience in the IT field, competent lecturers, and regular software updates on campus.

The results of testing the third hypothesis found a positive and significant effect of individual characteristics on learning process quality. This means that when there is an increase in individual characteristics, it will improve the quality of the learning process. Individual characteristics that include technological experience and the ability to use certain types of technology can play a role in the selection and use of technology and a person's perception of technology (Carlson & Zmud, 1999).

Applying ICT in learning requires adjustment and the ability to operate it. However, the lack of knowledge about technology has become a different obstacle in teaching and learning. Results Based on interviews with respondents, it was found that most of the respondents answered that their PTS teachers had experience and ability in using ICT. Shofia and Ahsani (2021) play an important role in mastering IT for teachers in implementing virtual learning. So that the learning process conveyed by educators can be accepted easily by students, it is necessary to adapt to this situation. Implementing this bold learning, of course, requires educators to be able to master the technology so that the learning process can run smoothly.

The results of testing the fourth hypothesis indicate an insignificant positive effect of technology characteristics on ICT learning usage. Dewi's research (2001) suggests that learning facilities have a positive but significant impact on the bold learning system. Andersson and Streith (2005) stated that the perception of the usefulness of computer technology has a significant direct influence on their intention to use it. The positive effect is not significant on the use of ICT in learning, meaning that technology can impact the use of ICT in learning but not large. This is because ICT-based learning in most private universities (PTS) has been scheduled and regulated so that the intensity of the use of ICT in learning follows the rules and schedules applied. Therefore, the existence of adequate ICT facilities will only be able to help learning using ICT but will not have a significant impact.

The analysis results on the fifth hypothesis indicate a significant positive effect of individual characteristics on ICT learning usage. Gani, Siarap, and Mustafa (2006) found that computer knowledge is one of the factors that have been shown to influence the use of computers in the teaching and learning process in the teaching class. Individual and group characteristics may be important for successful collaboration technology because individuals and groups have different needs (Denis, 2008). Based on interviews, most of the teaching staff at PTS have the ability and experience to use ICT. They choose to use ICT in the learning process because of the difficulties and advantages obtained from utilizing technological developments in the learning process.

Vitanova and Pachemska (2014) stated that the motivation for using ICT by lecturers is considered one example that affects the use of ICT and the quality of the learning process. The existence of motivation will increase a person's effort in achieving his goals. It is also related to lecturers' motivation to use ICT. It will increase the use of ICT in the learning process. In this regard, testing the sixth hypothesis in this study also found similar results: a significant positive effect of Motivation to Use ICT on learning Usage ICT. This means that the higher the motivation of lecturers to use ICT, the higher the level of learning to use ICT. This motivational effort is manifested in the form of enthusiasm for participating in ICT training held on campus,

high curiosity, trying to master and understand software applications that are useful for learning, following technological developments, and developing ICT competencies on an ongoing basis.

### **Conclusion**

Based on the analysis and discussion of the antecedents of ICT Learning Usage towards Learning Process Quality PTS in Central Java Province. It can be concluded that there is a positive and significant influence between ICT learning using on the learning process quality of private universities in Central Java. This means that the higher intensity of using ICT, the better quality of the learning process.

Technology characteristics positively and significantly influence the quality of the learning process. This means that the better the technology characteristics, the better the quality of the learning process. Furthermore, there is also a positive and significant influence of individual characteristics on the learning process quality. This means that the higher the experience and ICT capabilities of the lecturers, the higher the quality of the learning process.

Then there is a significant positive effect of technology characteristics on ICT learning usage. This means that the higher the characteristics of the technology owned, it will improve ICT learning usage, but it will not have a big impact. Then, there is a positive and significant influence of individual characteristics on ICT learning usage. This means that the higher the individual characteristics of the lecturer, the higher intensity of learning using ICT. This means that the higher the motivation of lecturers to use ICT, the higher the intensity of ICT learning usage. Motivation to use ICT positively and significantly affects ICT learning usage.

### **Recommendations**

The positive and significant influence of ICT learning usage, technological characteristics, and individual characteristics on the quality learning process is expected to be utilized and managed properly so that, in the future, a high-quality learning process will be achieved.

There is no significant positive effect of technological characteristics on ICT learning usage. It is hoped that in the future, the provisions of learning using ICT can be optimized better so that the potential characteristics of the technology can be utilized to the fullest. With the positive and significant influence of motivation to use ICT on learning using ICT, it is hoped that the campus will become a forum by providing various competency training so that teaching staff becomes more prepared and competent in implementing learning using ICT.

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