

# **Acceptance Analysis of e-learning by University Students in Japanese Higher Educational Institutions using TAM model: A case study in Hokkaido University**

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**Abstract:** This study evaluates faculties at Hokkaido University's intention to utilize e-learning. We have implemented and utilize the theory of the Technology Acceptance Model (TAM) in our research. Faculties' adoption processes are evaluated using a structural equation modeling (SEM) approach and the SmartPLS software. We have figured out faculties' feedback on classes during the covid-19 period. The findings revealed that the content of e-learning and self-efficacy have a favorable effect on and are significantly associated with perceived usefulness and student satisfaction, both of which influence university students' intention to use e-learning. While e-learning has gained acceptance in universities around the world, the purpose of using e-learning remains mainly unexplored in Japan. The created model is used to explain the intention of university students to use e-learning. According to this research faculties at Japanese universities like e-learning, and they want to use it for learning purpose in Higher Educational Institutions.

## **Introduction:**

An e-learning course is a type of online education that relies on technology-based training and instruction. Students can engage in a variety of activities in a virtual world with this method of instruction. Inquiry and audiovisual contact with a wide range of issues are part of these activities. Students and instructors can also communicate via e-learning. Students need to be able to access these virtual courses at educational institutions and universities in order to determine which e-learning techniques need the most improvement. Seminars and classes are not the only ways to study in the traditional sense; e-learning is another. This type of learning promotes pupils to learn on their own rather than in a group or class, therefore individual learning takes precedence over group learning. Thus, students who participate in this type of learning attend classes at home and manage their time in accordance with their own needs and preferences. Consequently, They can even take extra online courses if they find them interesting. Students are attracted to online courses because of the diversity of tasks and assessments that are included in them.

## **Background and Present state of the problem:**

Extending the Technology Acceptability Model (TAM) to analyze e-learning acceptance is a well-studied topic. However, the creation of a comprehensive TAM capable of assessing e-learning adoption in every situation is seen as a critical research path. The most often utilized external factors of TAM-related e-learning acceptability were determined by conducting a literature review of 120 relevant publications over the past twelve years. Computer self-efficacy was shown to be the most prevalent external component in TAM. Other common external elements included subjective/social norms, enjoyment of the computer as a whole and the quality of the system, information, and content. When we begin doing this research, we'll be looking at the students' level of acceptance of e-learning in the context of a thorough Technology Acceptance Model (TAM).

## **Preliminary Literature review:**

A method of teaching and learning that is based on the use of electronic media and gadgets as tools for increasing the availability of training, communication, and interaction and that aids in embracing fresh ways of comprehending and establishing learning is referred to as e-learning. Rissa claims that a wide range of media and technology are used in E-learning. Today, e-learning is described as learning that occurs on a range of computing devices, such as laptops, smartphones, and tablets. It can also refer to learning that occurs in a virtual environment. For e-learning as well as any other educational technology there are numerous benefits and drawbacks. Because of its application in several studies, Davis' Technology Adoption Model (TAM) has earned a great deal of attention in the literature on technology acceptance. As a result of this study, TAM has been found to be more effective than other theoretical models in predicting student adoption of educational technology. Theory suggests that attitudes toward technology adoption are influenced by external and system-specific elements such as "perceived usefulness" and "perceived ease of use," two human views. Predictors of actual system use can be predicted by an individual's attitude toward a certain technology. There have been several earlier studies on technology adoption in order to find out why people accept new technologies. For a wide range of technologies, the TAM model has proven to be an effective forecaster. To date, it has been used and appraised across a wide range of settings and empirical investigations, despite its origins in the United States. To achieve the study's basic purpose, a review of the literature will be conducted utilizing the process after it has been adjusted further. The review will be conducted in order to investigate the sources of e-learning acceptance. Thus, e-learning evaluations for extending TAM to incorporate external factors will be conducted. TAM-

related keywords can be used to search for studies in different databases (i.e., Emerald, IEEE, ProQuest, ScienceDirect, Springer, Wiley, Taylor & Francis, ACM, and Google Scholar). Low-quality research will be eliminated from the synthesis during data analysis. If the studies meet the inclusion criteria, they will be included in the analysis. In previous studies, researchers have utilized these methods to accomplish the same goals.

## **Research Framework and Hypothesis:**

### **A. SYSTEM CHARACTERISTICS**

1. System Quality (SQ): System quality (SQ) describes how system features such as usability, reliability, availability, and flexibility influence users' attitudes about using an e-learning system. System quality (SQ) refers to how system features such as usability, reliability, availability, and adaptability influence users' attitudes about e-learning.
2. Content Quality (CQ): The content quality (CQ) aspect of e-learning has been defined as the depth and frequency with which the content is updated. CQ is an important characteristic that describes the acceptance or adoption of e-learning. It has been established in earlier study that content quality has a considerable impact on perceived usefulness.
3. Information Quality (IQ): Information quality (IQ) is defined as "using e-learning to search out information that is valuable for learning and is updated to make it easier for the learner to comprehend."

### **B. INDIVIDUAL FACTORS**

1. Computer self-efficacy (CSE): "The individuals' trust in their own capacity to take steps needed to deal with future problems" is what self-efficacy refers to. Self-efficacy is linked to computer systems in this study (i.e., the confidence exhibited by the users in their own ability to use the e-learning system).
2. Subjective Norm (SM): The subjective norm (SN) is a component of the social influence variable that denotes the felt social pressure to engage in or refrain from engaging in an activity.
3. Perceived Enjoyment (PE): PE is described as "the activity of utilizing a given system is regarded to be pleasurable in and of itself, regardless of any performance repercussions that may occur from system use". PE is a crucial factor in the adoption or acceptance of e-learning.
4. Perceived Accessibility (PA): A user's perceived accessibility (PA) refers to "the degree of ease with which they can access and use the system's data". Perceived accessibility affects perceived ease of use and perceived utility of e-learning systems, according to research.
5. Perceived Playfulness (PP): "The degree of cognitive spontaneity in microcomputer interaction" is defined as "perceived playfulness" (PP). Examining, discovering, curiosity, and difficulty are all regarded to be part of the concept of playfulness. The term signifies the intrinsic motivation factor which is related to the use of a new system.

### **C. TECHNOLOGY ACCEPTANCE MODEL (TAM) CONSTRUCTION**

1. Perceived ease of use (PEOU): The degree to which an individual believes that using a given technology is not complicated is referred to as the perceived ease of use (PEOU) of a system. The PEOU has been found in multiple previous research to have a favorable link with behavioral intention to use (BI), both directly and indirectly.
2. Perceived usefulness (PU): The degree to which people believe that using a new technology would improve their job performance is referred to as perceived usefulness (PU). PU is the key factor of using a given technology, according to several empirical investigations.
3. Attitude Towards Use (ATT): "The degree to which a person has a good or negative emotion toward e-learning technologies" is what attitude refers to. Various research has shown that attitude has a direct effect on behavioral intention.
4. Behavioral Intention to Use (BI): In the context of e-learning, behavioral intention (BI) refers to the learners' intention to use e-learning systems in the future. Various research has demonstrated that behavioral intention has a direct and considerable impact on the actual use (AU) of an e-learning system.

## **Research Hypothesis:**

This study examines six hypotheses as illustrated in See Figure 1:

- H1: Relationship between e-learning content and student satisfaction.
- H2: Relationship between student satisfaction and self-efficacy
- H3: Relationship between perceived usefulness and intention to use e-learning.
- H4: Relationship between intention to use e-learning and student satisfaction
- H5: Relationship between perceived usefulness and self-efficacy.
- H6: Relationship between perceived usefulness and e-learning content.

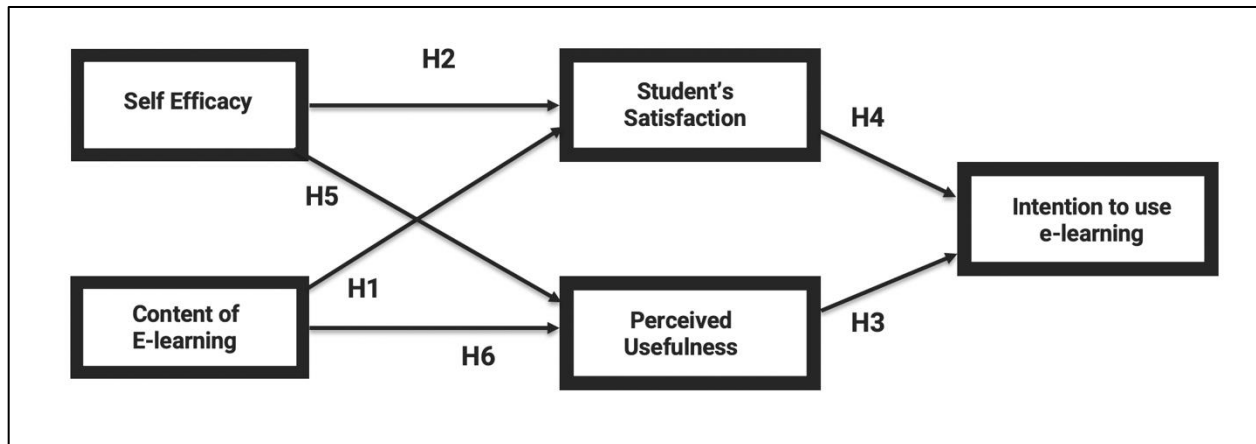


FIGURE 1. The Research Model and Hypotheses

**Research Methodology:**

- A. Target Population: The target population of this study was mainly the faculties in Hokkaido University. 736 Faculty members attended the survey.
- B. Data Collection: Data was collected using Online form.
- D. Study Instrument: A survey instrument is designed to investigate the hypotheses stated in this study. Some items in the survey used to assess the thirteen constructs in the study model.
- E. Survey Structure: Survey questionnaire created and distributed among the faculties. The survey divided into five sections which relate the research hypotheses.
- F. Data Analysis: In this study, the measurement and structural models were evaluated using the Partial Least Squares-Structural Equation Modeling (PLS-SEM). Both the measurement and structural models assume that the relationship between two variables is the same regardless of how they are measured. When measurements and a structural model can be analyzed in real time with PLS-SEM, the results are more precise.
- G. Measuring the Model: Convergent and discriminant validity are two types of validities that must be considered when evaluating a measurement model. So, these two types validities were considered during the research.

**Result and Discussion:**

Table 1. Data from the Survey

Q.No	Question	Option	Number of responses	Percentage (%)
1	Implementation status of the first semester class	Online lessons	673	91.4%
		Face-to-face class	0	0.0 %
		Combined online and face-to-face lessons	47	6.4%
		Moved the opening period to the second semester	16	2.2%
2	What kind of method did you use when conducting online classes?	Simultaneous delivery type (Zoom, Webex, etc.)	233	32.3%
		On-demand type (viewing video)	94	13%
		On-demand type (view PDF and slide materials)	156	21.6%
		Combined use of simultaneous delivery type and on-demand type	201	27.9%
		others	37	5.1%
3	How to grasp the attendance status of the class by managing attendance online and submitting confirmatory assignments.	Use of Elms (use of various functions of moodle, etc.) Answers to assignments (issue assignments to everyone and check the response status, etc.) Simultaneous delivery	114	15.8%
		Confirm attendees on the class screen	341	47.3%
		others	195	27%
		others	71	9.8%
4	Means for reliably communicating information to each student and a system for promptly responding to consultations from students	Simultaneous delivery Communicated on the screen of the lesson	73	10.1%
		Utilize Elms (message function of moodle, etc.)	371	51.5%
		Utilize email	161	22.4%
		Others	115	16%
5	How to evaluate grades when conducting online classes	Online test implementation (simultaneous delivery)	114	15.8%
		Online testing (on-demand)	74	10.3%
		Face-to-face test	73	10.1%
		Submission of assignments, reports, etc.	334	46.4%
		others	125	17.4%

Table 2. Statical overview of survey

Target Audience	743
Answer	736
Did not answer	5
Cancelled	3

**Analysis of structural Model:**

At this stage the study began to test and examine the research hypothesis that we set for our research. It revolved around the relation between the constructs. In order to achieve the objectives, the PLS algorithm was conducted by using the Smart PLS software version 3. Here Figure 2 illustrates the result path coefficients and figure 3 shows the result of hypotheses.

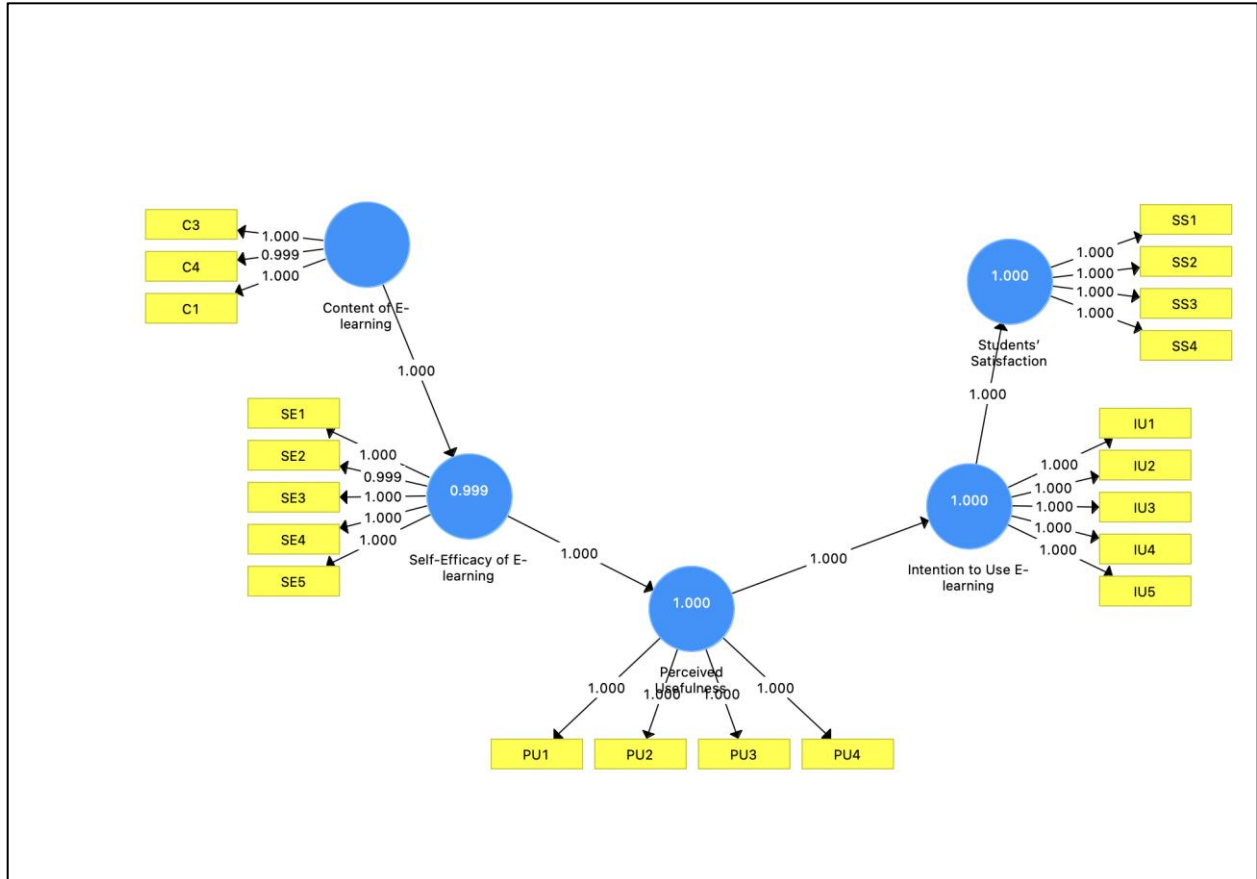


FIGURE 2. Path coefficient result

Table 3. Discriminant validity

Constructs	Meaning
C	Content of e-learning
SE	Self-efficacy of e-learning
PU	Perceived Usefulness
IU	Intention to use E-learning
SS	Student Satisfaction

As we considered the value of coefficient from the percentage of data so we can see that from Figure 2 most of the coefficient value range from .90-1.00 which is standard factor. So, we can conclude that total six hypotheses of this research passed the criteria.

H	Independent	Relationship	Dependent	Result
H1	C	—————>	SS	Passed
H2	SS	—————>	SE	Passed
H3	PU	—————>	IU	Passed
H4	IU	—————>	SS	Passed
H5	PU	—————>	SE	Passed
H6	PU	—————>	C	Passed

FIGURE 3. Result of Hypothesis

**Discussion:**

The current study aims to investigate the impact of usefulness and student satisfaction on learners' inclination to use e-learning technologies. The intention to use this technology depends on perceived usefulness and satisfaction of the students. Previous research on these elements' correlations supports these findings. E-learning helps college students perform projects and research. It's also used to evaluate their academic performance. Also, studies on the use of social media, e-learning, and massive open online courses in higher education encourage and advocate the use of these applications in educational contexts. Meier examines the benefits of using the Internet for education. The study is about South African students' experiences exchanging information with their Finnish counterparts. Instructors can use e-learning features in their presentations and classes. This includes curriculum, lecture notes, tutorials, assignments and examinations. Students can access web-based video, audio, presentation materials, and chats through e-learning. Perceived usefulness is one of the primary indications of e-learning intention. The ease of use and usefulness of e-learning has been shown to positively affect users' intention to use it. One of the key benefits of e-learning is that it can be used in several educational settings. According to Krajnc's research, e-learning in the classroom places a lot of responsibility on students and takes up their time. In this study, factors predicted students' intention to adopt e-learning technologies. Using a rigorous approach structural equation model, this study's theoretical framework helps build usefulness and satisfaction dimensions connected to e-learning intention. Aside from its utility, e-content learning's and delivery are equally important. It is vital to examine how this content is presented to students. For students to use this content, it must be current. Many e-learning users remark that they can easily find blended learning courses relevant to their subject of study. As a result, e-success learning's depends on the students' perceptions of the technology's value and usefulness, as well as their level of satisfaction with it. There has been previous research showing that these factors interact with each other. E-learning makes it easier for college students to complete various assignments and conduct research. Aside from that, it's a good way to gauge how well they're doing in school. Another study, for example, on social media, e-learning, and massive open online courses (MOOCs), encourages the use of these applications in educational settings.

**Conclusion:**

Hypotheses in this study were tested and found to be true in all six cases. According to the hypothesis, characteristics like satisfaction and perceived usefulness have a substantial impact on university students' intentions to utilize e-learning. An important aspect of e-learning is the ability for students to share their knowledge with each other and their teachers. Other elements, especially those connected to collaborative learning, should be studied in the future to improve student academic performance in higher education. Studies should also include demographic data and a larger sample size. Students should be included in future study. Interviews should be used to supplement data and findings. Ongoing research should build on the current findings and investigate additional aspects of developing online learning environments. The quality of services and student characteristics may have an impact on the willingness of individuals to participate in e-learning in future studies. Support for e-learning and its connection to self-efficacy are two examples of these factors. In order to increase the likelihood that students will use e-learning in the future, such research should focus on increasing student satisfaction with it. When students oversee how much time they spend on e-learning, it has been shown to have an impact on the academic experience. To help students in higher education achieve better grades, researchers recommend that future studies investigate other factors, particularly those related to collaborative learning. Studies should also focus on demographic factors and increase the sample size. Students, Researcher should be included in future studies instead of just Faculty members. Interviews are an important part of this type of investigation because they provide additional context for the data collected. Finally, it is recommended that educators pay attention to how e-learning impacts students' performance and engagement, with a particular focus on interactivity and collaborative learning on the future context of education system.

**Acknowledgement:** Special thanks to Center for Open Education, Hokkaido University who have conducted the survey in between the faculty members and helped with survey data.

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