

Factors Influencing Behavioral Intention to Use Online Learning Systems from Student's Perspective: An Extended TAM Model

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I. Introduction

Nowadays, online learning has been recognized as a crucial component in the field of education, especially due to the accelerated adoption caused by the COVID-19 pandemic (Reshi, 2023). As the virus spread across borders, many countries implemented measures to contain virus transmission, including closing campuses to prevent the virus from spreading within educational institutions. Many universities around the world, including South Korea, turned to online learning courses during

the pandemic to ensure the continuity of education (Baber, 2021), as online learning is a highly effective alternative to replace the traditional classroom setting.

Though each university uses different online learning systems, the core functions of these systems typically include features like document sharing, video lectures, discussion boards, exams or quizzes, and communication tools to facilitate student-professor interactions and engagement with course materials. Online learning technology enhances students' learning by providing them with various resources and services through remote collaboration and

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sharing (Jeong and Hong, 2013). In the context of this study, we aim to investigate students' behavioral intentions in utilizing online learning systems, even as courses have primarily transitioned back to offline.

The Technology Acceptance Model (TAM), initially proposed by Davis in 1986, is a widely utilized framework for studying user acceptance of technology. Technology Acceptance refers to the willingness of a user to engage with the technology and its tools (Rafique et al., 2020; Salloum et al., 2019). TAM aims to elucidate users' behavior toward the adoption of technology. Previous researchers used TAM to assess the acceptability of online learning systems in a variety of contexts (Khan et al., 2020; Lazim et al., 2021). Current studies have extended the TAM model, revealing that users' intention to adopt a system is influenced by their perceived ease of use and perceived usefulness (Alia, 2017; Al-Adwan et al., 2023). To investigate the acceptance model in various contexts, a few external factors were tested with perceived usefulness and perceived ease of use (Alsabawy et al., 2016; Hollister et al., 2022).

Before the COVID-19 pandemic, only students from Cyber universities used online learning systems for all their education in South Korea. However, during the pandemic, the necessity of using online learning systems to reduce the spread of infectious diseases became more prominent. Faced with the

sudden shift to fully online learning methods, students initially encountered this change without prior preparation. However, as the COVID-19 pandemic has subsided and the post-COVID-19 era has begun, online learning systems continue to be in use.

Thus, it is necessary to study the factors that influence students' acceptance intentions for using online learning systems. Few studies have investigated students' intentions to use online learning systems in the current context, including in South Korea. This study employs the TAM as a theoretical framework and employs Structural Equation Modeling (SEM) to analyze the relationships between endogenous and exogenous constructs. In addition, this study aims to examine the factors influencing South Korean university students' behavioral intentions to use online learning systems beyond the pandemic, even as their university life almost returned to the state it was in before the COVID-19 epidemic. This study provides valuable insights for higher education institutions to better prepare for online learning for the post-COVID-19 pandemic era.

II. Theoretical Framework

2.1 Online Learning System

Online learning is an educational approach

rooted in formalized instruction and the utilization of electronic resources (Coman et al., 2020). Using online learning systems to study overcomes the limits on education created by geographical and time constraints, importantly provides a greater number of opportunities for more students to access quality education (Moreira et al., 2017). The online learning system is primarily designed to deliver educational content and facilitate various aspects of the education process. Being a complex process, online learning systems serve as a comprehensive system for providing resources, managing courses, conducting assessments, and monitoring student progress (Coman et al., 2020). Online learning systems are tailored to support structured learning experiences with a focus on content delivery and assessment, ultimately fostering a student-centered approach to education (Gallie and Joubert, 2004). Online learning systems differ from online communication systems, such as Zoom and Skype, which are primarily designed for real-time communication and collaboration. The primary function of online communication systems is to enable meetings, discussions, and interactive engagements (Wong et al., 2021). While some online learning systems include basic communication tools like discussion forums or links to video conferencing platforms such as Zoom, their primary focus is on education content and structured learning experiences.

2.2 Online Learning System and Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) has been used in previous studies as a theoretical framework to investigate both students' acceptance of online learning (Khan et al., 2020; Lazim et al., 2021), and the factors influencing the use of online learning systems (Alsabawy et al., 2016; Abdullah and Ward, 2016; Mokhtar et al., 2018). Furthermore, behavioral intention to use is a more progressive dependent variable compared to actual system use (Mailizar et al., 2021). Thus, in this study, we used behavioral intention to use as a dependent variable to explore students' behavioral intentions to use online learning systems.

In addition, to better understand the complexities of technology adoption, TAM has been extended and adapted to incorporate various external factors (Abdullah and Ward, 2016). In a meta-analysis conducted by Abdullah and Ward (2016), they found that perceived enjoyment and self-efficacy are user-centric external factors and were commonly explored in TAM studies related to the adoption of online learning systems. Users need to experience enjoyment from using a technology system to ensure their continued engagement. Additionally, adopting new technology system and the belief in one's

ability to perform well are believed to play crucial roles.

Previous studies have examined the impact of system quality on students' intention to adopt online learning systems (Almaiah et al., 2022; Mailizar et al., 2021; Salloum et al., 2019). However, there has been limited focus on South Korean college students' intention to use online learning systems using the TAM model, particularly when incorporating system quality as an external factor. Given the need for reliable online learning systems, ensuring suitable quality is crucial. Therefore, we included system quality as an essential variable in this study.

Moreover, personal innovativeness has been identified as a significant factor influencing an individual's intention to adopt a technology system (Amoroso and Lim, 2015; Wang and Lin, 2021). However, there is limited research on the role of personal innovativeness in higher education. Before the COVID-19 pandemic, most college students had limited exposure to online learning systems. Given the sudden shift to using the online learning system, personal innovativeness can determine students' level of acceptance and their ability to fully utilize this new technology system. Hence, in this study, we incorporated perceived enjoyment, self-efficacy, system quality, and personal innovativeness as external variables to investigate students' intentions to use online learning systems.

2.3 Self-efficacy (SE) as An External Variable of TAM

Self-efficacy (SE) is a crucial element of an efficient learning environment. It refers to individuals' confidence in their ability to complete academic assignments at a specific level (Shen et al., 2013). Students who have stronger self-efficacy are more likely to demonstrate persistence in their behavior, meaning they do not easily give up and consistently study to achieve their academic goals (Adams et al., 2020). On the other hand, self-efficacy, is the belief that an individual can effectively perform specific tasks required of them in an online learning setting (Bandura, 2012). Due to the COVID-19 epidemic, students had to switch from in-person to online classes to prevent the spread of the virus. This shift might have an impact on students' online learning self-efficacy.

Perceived usefulness (PU), defined in the TAM, is indeed an individual's belief about how utilizing a specific technology or system will improve their performance in their work or studies (Gardner and Amoroso, 2004). Students with high self-efficacy are more likely to believe in their ability to effectively use an online learning system to achieve their goals and improve performance. This positive belief in their capabilities can enhance their perception of the usefulness of the system or technology. In addition, perceived ease of use

(PEU) is indeed defined as the extent to which a person believes that using a certain technology is simple and easy and can be done without difficulty (Altanopoulou and Tselios, 2017). It is a subjective perception of how easy or difficult it is to interact with and navigate a system or technology. Thus, when students have high self-efficacy, they have a greater belief in their own capabilities and skills. This higher level of self-efficacy can lead them to perceive online learning systems as easier to use. They believe they have the necessary competence, knowledge, and confidence to interact with the online learning system effectively, which enhances their perception of ease of use. Therefore, the following hypotheses are formulated:

Hypothesis 1: PU is positively and significantly influenced by SE

Hypothesis 2: PEU is positively and significantly influenced by SE

2.4 Personal Innovativeness (PI) as An External Variable of TAM

Agarwal and Prasad (1998) defined personal innovativeness (PI) as an individual's willingness to experiment with new technology. Within the context of online learning, personal innovativeness is defined as a tendency to take risks. Innovative behaviors such as online learning involve uncertainty

because students have to use a new online learning technology or system (Amoroso and Lim, 2015). When individuals possess a higher level of personal innovativeness, they are more likely to perceive the new technology or system as an opportunity rather than a risk. They tend to approach new technological advancements with curiosity and an eagerness to explore their potential benefits (Al-Adwan et al., 2023). In addition, highly innovative individuals are more likely to actively seek information about new technologies, allowing them to make informed decisions regarding their use in a timely manner. They like to learn and adapt to new technological tools and are willing to invest time and effort in understanding and integrating them into their daily work or study (Mun et al., 2006). This study, personal innovativeness describes the extent to which students have a strong propensity to try out an online learning system in their studying.

Previous studies confirmed the significant effect of personal innovativeness on perceived usefulness (PU) (Amoroso and Lim, 2015; Wang and Lin, 2021). Students with high levels of personal innovativeness, who are more open to and interested in new systems or technologies, are likely to perceive online learning environments as beneficial for their educational needs. By being more receptive to new systems or technologies, students have a better understanding of how to use them

effectively (Mun et al., 2006; Joo et al., 2014). Moreover, personal innovativeness is found to be an enabler of perceived ease of use (PEU). The primary focus of the prior studies employed perceived ease of use to capture students' perceptions of how effortless it is to utilize the online learning system for studying purposes (Alia, 2017; Khan et al., 2020; Mailizar et al., 2021). Because online learning systems provide students with the interactive functions they need to use in learning, they enable students to engage in online learning with ease, despite the absence of traditional classroom settings. Therefore, the following hypotheses are formulated:

Hypothesis 3: PU is positively and significantly influenced by PI

Hypothesis 4: PEU is positively and significantly influenced by PI

2.5 Perceived Enjoyment (PE) as An External Variable of TAM

Perceived enjoyment (PE) is the extent to which using a certain technology is seen to be personally enjoyable in and of itself (Venkatesh, 2000). When individuals perceive a system or technology as enjoyable, they are more likely to engage with it willingly and invest more time and effort in its use. The concept of perceived enjoyment includes feelings of satisfaction, excitement, and

pleasure that individuals experience while using a particular system or technology (Armenteros et al., 2013). Within the context of online learning, perceived enjoyment plays a crucial role in influencing students' motivation and engagement. When students perceive online learning as enjoyable, that means they are more likely to actively participate in the learning process and persist in their studies.

Perceived usefulness (PU) and perceived ease of use (PEU) are crucial factors in the widespread adoption of online learning. Prior studies have demonstrated that perceived enjoyment impacts how users feel about the perceived usefulness and perceived ease of use of online learning (Maheshwari, 2021; Salloum et al., 2019). Students are more inclined to contribute more time and effort to enhancing the usability of an online learning system if they perceive that their engagement with the system is enjoyable (Hollister et al., 2022). When students enjoy using an online learning system, their emotional connection enhances their perceptions of its value and their ability to interact with it effectively. The more enjoyable the experience, the more useful and easier to use the system becomes, leading to increased engagement and continued usage. Thus, we establish the following hypothesis:

Hypothesis 5: PU is positively and significantly influenced by PE

Hypothesis 6: PEU is positively and significantly influenced by PE

2.6 System Quality (SQ) as An External Variable of TAM

System quality (SQ) is an important aspect of information systems, particularly in terms of overall system performance and user satisfaction. System quality is described as the extent to which users receive assistance from an information system (Rafique et al., 2020). System characteristics, like reliability, efficiency, usability, accuracy, adaptability, and availability are affected by system quality and influence the perspectives of the users concerning the use of an online learning system (Alia, 2017). Previous studies have shown that system quality characteristics play an essential role in the use of an online learning system (Alsabawy et al., 2016; Mahmudi, 2017). In the previous study, system quality refers to the characteristic qualities of the online learning system being used, including the speed, function, features, and content-related quality of the used online learning system (Salloum et al., 2019).

Previous studies have demonstrated that system quality substantially impacts an online learning system's perceived usefulness (PU) and perceived ease of use (PEU) (Mailizar et al., 2021; Salloum et al., 2019). With the development of information technology,

students demand high-quality online learning systems that provide convenience, efficiency, flexibility, and interactivity. In essence, a high-quality system can positive student interactions and enable access to content or resources, to enhance their online learning experience and perceptions of usefulness and ease of use (Almaiah et al., 2022; Salloum et al., 2019). In this study, if the online learning system possesses high system quality, characterized by attributes such as quick operation and reliable functionality, students' experience can focus on the learning content instead of being frustrated with the system. This positive perception of system quality contributes to students' belief in the usefulness and ease of use of the system. Therefore, the following hypotheses are constructed:

Hypothesis 7: PU is positively and significantly influenced by SQ

Hypothesis 8: PEU is positively and significantly influenced by SQ

2.7 The Relationship between Behavioral Intention to Use (BIU) and Perceived Usefulness (PU) & Perceived Ease of Use (PEU)

Numerous researchers have studied the relationship between perceived usefulness (PU) and perceived ease of use (PEU) (Davis, 1989; 1993). Perceived usefulness refers to the extent

to which a user believes that using a specific technology or system will be uncomplicated and will help perform tasks more effectively. If users perceive a technology or system as easy to use, they will be more accepting of the technology or system's use. Conversely, if users find the technology or system difficult to use and believe that the effort outweighs the performance benefits, they may be less inclined to use it (Salloum et al., 2019). It's about the user's expectations of how easy or difficult their interaction with the technology or system will be. In this study, when students perceive online learning systems as easy to use, they are more likely to use them as a tool that can help them achieve their academic goals efficiently and effectively. Conversely, if the online learning system is perceived as difficult to use, students might be discouraged by the effort required to interact with the system. As a result, the following hypotheses are formulated:

Hypothesis 9: PU is positively and significantly influenced by PEU

The usability and utility of an online learning system determine its ability to attract students. This aligns with Davis's (1989) definition of perceived usefulness (PU), which refers to the belief that utilizing the system or technology would enhance an individual's performance. Behavioral intention to use

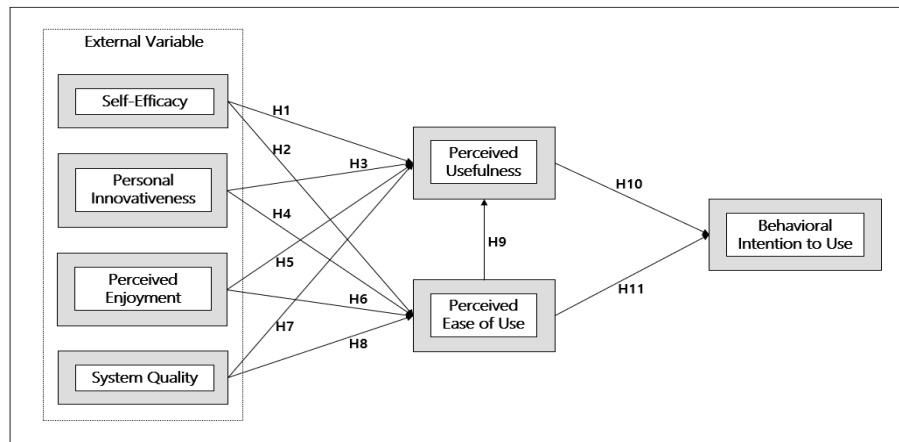
(BIU), which is influenced by cognitive choice, can lead students to respond either unfavorably or favorably towards participating in online learning (Khan et al., 2020; Lazim et al., 2021).

Perceived ease of use (PEU) also plays a significant role in the context of online learning (Khan et al., 2020; Salloum et al., 2019). When engaging in online learning through online systems, students may face certain challenges and concerns. For example, frequent occurrences of systematic errors can create apprehension among students regarding the use of online learning systems. However, despite the challenges, students can learn anytime and anywhere, and they can independently use the learning content in the online learning system for repeated learning.

In conclusion, despite the inconveniences and challenges that may arise during online learning, the advantages of convenience, flexibility, and reviewability outweigh these concerns. When students perceive the system as easy to use, adaptable, and capable of fulfilling their learning needs effortlessly, it enhances their motivation and willingness to utilize the online learning system (Alsabawy et al., 2016; Almaiah et al., 2022). Consequently, we can derive the following hypothesis:

Hypothesis 10: PU has a positive and significant effect on BIU

Hypothesis 11: PEU has a positive and



<Figure 1> Research Model

significant effect on BIU

As mentioned above, this study incorporates self-efficacy, personal innovativeness, perceived enjoyment, and system quality as external variables within the Technology Acceptance Model (TAM) framework. <Figure 1> depicts the modified TAM model to comprehend students' intentions to utilize online learning systems at Korean universities.

graduate students at major universities in Seoul, South Korea, who utilize online learning systems for online classes or as auxiliary systems for studying. The questionnaire's link, hosted on Google Forms, was sent to participants and remained open for three months. Questionnaires were distributed and forwarded through Kakao talk, WeChat, and Blackboard notices for forwarding to the students from January 13 to April 13, 2023. A total of 164 responses were considered valid for further analysis.

III. Research Methodology

3.1 Data Collection

This study used the quantitative descriptive research approach, adopting the positivist research paradigm and utilizing the purposive sampling technique. The targeted sample of the research consists of undergraduate, and

3.2 Data Analysis

In this study, hypothesis testing was conducted by analyzing the data using SEM. To meet the purpose of this research, operational definitions were made on each construct based on prior studies, and then measurement items were constructed based on

prior studies (Aldhahi et al., 2022; Davis, 1989; Lee et al., 2007; Mun and Hwang, 2003; Malaquias and Hwang, 2016; Nordén et al., 2017; Salloum et al., 2019). Respondents filled out the questionnaires and indicated their agreement level with each item on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). In addition to demographic variables, a total of 33 items were established based on TAM constructs (perceived usefulness for 5 items, perceived ease of use for 5 items, and behavioral intention to use for 4 items) with four external variables (self-efficacy for 6 items, personal innovativeness for 5 items, perceived enjoyment for 5 items, and system quality for 3 items).

IV. Findings

4.1 Demographic Characteristics

A total of 164 respondents were male (62), approximately 37.8%, while females (102)

about 62.2%. Additionally, most respondents were students studying in a master’s degree course (73), approximately 44.5%, followed by those in a bachelor’s degree course (71), around 43.3%. And the remaining 12.2% consisted of students studying in a Ph.D. course (20). As indicated in <Table 1>.

4.2 Results of Measurement Model

Exploratory Factor Analysis (EFA) is used to identify the underlying, unobserved variables (latent factors) in a data-driven approach. In this study, we analyzed the EFA using principal components extraction and varimax rotation. In EFA, the factor loadings indicate the strength and direction of the relationship between observed variables and the underlying latent factors (Shrestha, 2021). When a factor loading is greater than 0.6, it indicates that the variable has a significant contribution to the factor and can be considered a substantial indicator of that factor (Shkeer and Awang, 2019).

Thus, we removed items with factor

<Table 1> Demographic Characteristics

Item	Characteristics	Frequency	Percent (%)
Gender	Male	62	37.8%
	Female	102	62.2%
	Total	164	100.0%
Academic Degree Process	Bachelor’s Degree Course	71	43.3%
	Master’s Degree Course	73	44.5%
	Ph. D Course	20	12.2%
	Total	164	100.0%

<Table 2> Rotated Component Matrix with KMO and Bartlett's Test & Cronbach's alpha

Constructs	Indicators	Factor Loading	Cronbach' α	Cronbach' α if Item deleted
Self-Efficacy	SE1	.463(To be removed)	.916	.906
	SE2	.638		.901
	SE3	.814		.901
	SE4	.745		.888
	SE5	.623		.911
	SE6	.694		.901
Personal Innovativeness	PI1	.536(To be removed)	.917	.915
	PI2	.710		.912
	PI3	.820		.883
	PI4	.765		.888
	PI5	.793		.894
Perceived Enjoyment	PE1	.822	.894	.853
	PE2	.811		.864
	PE3	.761		.882
	PE4	.720		.872
	PE5	.645		.882
System Quality	SQ1	.659	.910	.873
	SQ2	.665		.853
	SQ3	.626		.885
Perceived Usefulness	PU1	.681	.942	.929
	PU2	.689		.929
	PU3	.712		.927
	PU4	.689		.924
	PU5	.694		.933
Perceived Ease of Use	PEU1	.676	.947	.937
	PEU2	.740		.930
	PEU3	.692		.938
	PEU4	.660		.934
	PEU5	.620		.937
Behavioral Intention to Use	BIU1	.630	.931	.913
	BIU2	.660		.902
	BIU3	.619		.906
	BIU4	.521(To be removed)		.918
KMO and Bartlett's Test				
Kaiser-Meyer-Olkin Measure of Sampling Adequacy				.959
Bartlett's Test of Sphericity	Approx. Chi-Square			5242.123
	df			528
	Sig.			.000

loadings less than 0.6 to reduce the initial 33-item questionnaire to 30 items with a 7-factor structure by identifying the latent variables. <Table 2> shows the outcomes of the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. Based on these results, it can be concluded that the EFA passes the criteria for adequacy ($1 > KMO > .5$ and Bartlett's Test of Sphericity $< .05$) (Hair et al., 2010). In <Table 2>, the KMO Measure of Sampling Adequacy is .959, and Bartlett's Test of Sphericity is .000. This implies that the selected sample is suitable for further analysis.

Exploratory Factor Analysis (EFA) is used to explore and identify underlying factors, while Confirmatory Factor Analysis (CFA) validates and confirms the relationships between observed variables and latent factors (Thompson, 2004). Since the EFA results have confirmed the suitability of the study's sample, the next step involves moving forward with CFA. The refined 30-item questionnaire will be utilized to assess the fitness of the latent variable structure and to further validate the theoretical constructs. Therefore, this study also utilized AMOS to conduct the CFA, aiming to assess the validity convergence and evaluate the composite reliability of the measurement model. The research needs to calculate the Average Variance Extracted (AVE) to assess validity convergence.

Additionally, for evaluating Composite Reliability (CR), it is necessary to calculate the value of CR.

According to the results presented in <Tables 2 and 3>, all AVE values surpass the threshold of 0.50, indicating satisfactory convergent validity. Additionally, all CR values are greater than 0.70, indicating reliable measurement of the constructs. Furthermore, Cronbach's alpha coefficients for each construct exceed the value of 0.70, indicating good internal consistency reliability (Hair et al., 1998). These findings suggest that all the values reported in this study meet the established criteria and can be considered satisfactory.

Furthermore, the correlations between the constructs used in the study are shown in <Table 3>. The mean of behavioral intention to use (5.291, SD=1.222) is the highest among the constructs, whereas the mean of personal innovativeness is the lowest (4.811, SD=1.274). In terms of the correlations between constructs, perceived usefulness showed the highest correlation with perceived ease of use (.808, $p < 0.01$). On the contrary, personal innovativeness showed the lowest correlation with perceived enjoyment (.469, $p < 0.01$). Furthermore, for each construct, the AVE square root is greater than the correlation value with other constructs, as indicated in the off-diagonal entry.

<Table 3> Correlations Among Constructs & Convergent Validity and Composite Reliability

Constructs	SE	PI	PE	SQ	PU	PEU	BIU	AVE	CR
SE	.814							.663	.908
PI	.685*	.858						.737	.917
PE	.516*	.469*	.797					.635	.896
SQ	.652*	.666*	.609*	.878				.771	.910
PU	.668*	.583*	.665*	.736*	.815			.665	.908
PEU	.707*	.658*	.586*	.759*	.808*	.826		.683	.915
BIU	.685*	.631*	.620*	.748*	.780*	.758*	.848	.719	.885
Mean	5.022	4.811	4.924	5.197	5.178	5.094	5.291		
S.D.	1.195	1.274	1.275	1.362	1.204	1.252	1.222		

* $p < 0.01$.

4.3 Empirical Result

This study examined the suitability of SEM before investigating the causal relationships among the construct variables. Generally, if the $X^2/\text{degree of freedom}$ value is below 3, and if the Incremental Fit Index (IFI), Comparative Fit Index (CFI), and Tucker -Lewis Index (TLI) values exceed 0.90, while the Normed Fit Index (NFI) is above 0.80, it suggests a good fit for the model (Gefen et al., 2000; Hair et al., 1998). Furthermore, in this study, the RMSEA value of 0.081 indicates a reasonable fit for the measurement model (with a threshold of < 0.05 for a good fit, < 0.08 for a reasonable fit, and 0.08 to 0.10 for a mediocre

fit) (Hoe, 2008). According to the results presented in <Table 4>, the model fit for this study is as follows: $X^2 = 810.791$, $df = 394$, $NFI = .838$, $IFI = .910$, $CFI = .909$, $TLI = .900$, $RMSEA = .081$, and $X^2/df = 2.058$, showed that the overall model fit is satisfactory for the objectives of this study.

The results of each path are detailed in <Table 5>. Among the factors influencing perceived usefulness, self-efficacy (.155, $p < 0.01$), perceived enjoyment (.233, $p < 0.01$), and system quality (.204, $p < 0.01$) demonstrated a positive influence on perceived usefulness. On the other hand, self-efficacy (.362, $p < 0.01$), personal innovativeness (.145, $p < 0.01$), perceived enjoyment (.153,

<Table 4> Analysis Table of Model Adaptation Degree

	X^2	df	X^2/df	NFI	IFI	CFI	TLI	RMSEA
Empirical Result	810.791	394	2.058	.838	.910	.909	.900	.081
Suggested Value	-	-	< 3	> 0.8	> 0.9	> 0.9	> 0.9	< 0.1

<Table 5> Path analysis

Hypothesis	Path	Coefficient	p-value	Result
H 1	SE → PU	.155*	.009	Supported
H 2	SE → PEU	.362*	.001	Supported
H 3	PI → PU	-.044	.309	Rejected
H 4	PI → PEU	.145*	.004	Supported
H 5	PE → PU	.233*	.001	Supported
H 6	PE → PEU	.153*	.005	Supported
H 7	SQ → PU	.204*	.001	Supported
H 8	SQ → PEU	.457*	.001	Supported
H 9	PEU → PU	.432*	.001	Supported
H 10	PU → BIU	.527*	.001	Supported
H 11	PEU → BIU	.316*	.001	Supported

* $p < 0.01$.

$p < 0.01$), and system quality (.457, $p < 0.01$) were all found to impact perceived ease of use significantly and positively. Conversely, personal innovativeness (-.044, $p > 0.1$) was found to not have a significant impact on perceived usefulness. Furthermore, perceived ease of use has a significant positive effect on perceived usefulness (.432, $p < 0.01$). Both perceived usefulness (.527, $p < 0.01$) and perceived ease of use (.316, $p < 0.01$) have a significant positive impact on behavioral intention to use. Thus, except for hypothesis 3, all other hypotheses are supported in this study.

V. Discussion and Implications

The aim of this study was to analyze several

South Korean major university students' behavioral intentions to use online learning systems using the Technology Acceptance Model (TAM). According to the above results, the findings of this study align with those of the TAM model as demonstrated in previous studies (Alsabawy et al., 2016; Pituch and Lee, 2006; Salloum et al., 2019), indicate that perceived ease of use has a positive impact on perceived usefulness, and both of perceived usefulness and perceived ease of use significantly influence users' intentions to use online learning systems. This study's findings are discussed further below.

Firstly, in the current research, individuals with a high level of self-efficacy are more likely to dedicate themselves to completing tasks and sustaining those efforts over a longer period compared to those with a low level of self-efficacy (Adams et al., 2020; Bandura, 2012). In this study, students with strong

self-efficacy tend to develop a more profound interest in their online studies and develop a strong sense of commitment to their online learning. Students with high self-efficacy believe in their capability to successfully use the online learning system. In other words, when students possess the confidence to effectively engage with the online learning system and complete their study tasks, they view it as a useful and accessible tool for their online studies. This leads to a positive connection between self-efficacy and both perceived usefulness and perceived ease of use.

In addition, previous studies have shown that perceived enjoyment and system quality both have positive and significant effects on both perceived usefulness and perceived ease of use (Alsabawy et al., 2016; Mahmodi, 2017; Salloum et al., 2019), this research found the same result as the prior studies. The findings showed that when students derive enjoyment from their online learning experience with a system, they are more likely to develop positive perceptions regarding both the usefulness and ease of use of the system. This positive emotional connection to the learning process can influence their perception. In other words, students perceive the online learning system as not only easy to use but also providing positive value for their online studies. The enjoyable experience may lead to a heightened sense of engagement and satisfaction, fostering students' formation of

positive attitudes towards the online learning system.

Furthermore, the results showed that a higher level of system quality in online learning systems is associated with positive perceptions of both usefulness and ease of use among students. This finding shows the quality of the system, including ease of access, seamless interaction with course materials, the capacity to meet students' functional needs with diverse and effective tools, and the presentation of educational materials and resources within the online learning system. When these aspects align with students' educational requirements related to interaction, function, and content for using online learning systems, students are more likely to perceive the online learning system as a valuable and practical tool. These positive qualities of the system impact students' perceptions of both usefulness and ease of use.

What is particularly noteworthy in this study is that the results diverge from the findings of previous studies regarding the impact of personal innovativeness on perceived usefulness and perceived ease of use (Amoroso and Lim, 2015; Mun et al., 2006; Joo et al., 2014; Wang and Lin, 2021). Prior studies had consistently demonstrated a significant effect of personal innovativeness on both perceived usefulness and perceived ease of use. In contrast, the findings of this study reveal that personal innovativeness has a significant

positive impact on perceived ease of use, but not on perceived usefulness.

Students who exhibit a high degree of personal innovativeness are typically eager to explore new technologies. Even if the new technology is a challenge for them, they tend to approach it with enthusiasm. This positive mindset toward innovation may lead them to navigate new learning systems effortlessly. Consequently, students with a high level of personal innovativeness might find it easier to use an online learning system, contributing significantly to the perceived ease of use. However, personal innovativeness might not necessarily correlate directly with how students perceive the usefulness of the online learning system for their educational needs. Personal innovativeness is primarily focused on the willingness to explore new technologies, without necessarily considering the benefits of using online learning systems. In other words, while personal innovativeness might encourage students to try new technologies with enthusiasm, it might not necessarily lead them to perceive the system as useful for their online learning needs.

The contribution of this study is recognized to be twofold. First of all, nowadays, most South Korean universities have largely returned to in-person methods. However, some universities that have experienced the effectiveness of online learning systems are actively integrating them into education. This

trend is expected to continue in the future. While everybody certainly hopes to avoid situations like another COVID-19 outbreak, it is anticipated that South Korean universities will recognize and expand the use of online learning systems as a part of their education methods. Therefore, the impact factors of online learning systems presented in this study provide important insights for future system expansion.

What is more, the implications of this research extend to educational practitioners and developers, aiding in the effective adoption of online learning systems. As South Korean universities expand online learning, these findings hold managerial significance, guiding decisions related to system development, user support, and resource allocation, furthering the adoption of online learning systems in higher education.

VI. Conclusion

The increased use of online learning technologies based on the Internet for education is a global trend that impacts all types of educational institutions. Online learning has long been a part of the educational landscape. However, the outbreak of COVID-19 brought about a transformative shift in South Korea's education system. The mandate for most South Korean universities to

transition to online courses during the COVID-19 pandemic not only prompted the development of online learning systems, but also increased awareness among college students about the advantages of online learning.

This study presents the results of an examination of the utility of the Technology Acceptance Model (TAM) in explaining the factors affecting the acceptance of online learning behavioral intention. These findings align with prior research (Alsabawy et al., 2016; Khan et al., 2020; Lazim et al., 2021; Pituch and Lee, 2006; Salloum et al., 2019), reaffirmed the TAM's applicability in understanding how students accept technology, particularly within the field of online education.

Additionally, the study identified factors such as self-efficacy, perceived enjoyment, and system quality that have a positive impact on both perceived usefulness and perceived ease of use. Notably, personal innovativeness, while not directly influencing perceived ease of use, significantly affects perceived usefulness. These findings have significant implications for the improvement and development of online learning systems, ultimately enhancing the online educational experience for students. While the direct impact of the COVID-19 pandemic may be subsiding, online learning systems are likely to persist and continue to be improved and developed, offering greater

flexibility and accessibility to students.

The research primarily examined South Korean university students' behavioral intentions to use online learning systems in the period when their university life had largely returned to the state it was in before the COVID-19 pandemic. However, this study did not conduct a longitudinal study that spans multiple time points, including the pre-COVID era and the height of the pandemic. It is hoped that future research can include data from different phases of the pandemic could have provided a more comprehensive understanding of how students' intentions to use online learning systems evolved in response to varying circumstances and over time.

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<Appendix> Measurement Items

Construct	Measurement Item	Research
Self-efficacy	I feel confident completing all assignments on time.	Aldhahi et al. (2022) Nordén et al. (2017)
	I feel confident focusing on schoolwork when faced with distractions.	
	I feel confident navigating online course materials efficiently.	
	I feel confident choosing a safe and lasting storage place for digital content.	
	I feel confident browsing, searching, and filtering data, information, and digital content.	
	I feel confident managing and deleting my digital traces.	
Personal Innovativeness	I like to experiment with a new online learning system.	Lee et al. (2007) Malaquias and Hwang (2016).
	I would look for ways to gain experience with a new online learning system if I heard about it.	
	I am usually the first to try out new online learning systems among my peers.	
	I can't wait to try out a new online learning system.	
	In general, I am not hesitant to try out new online learning systems.	
Perceived Enjoyment	I have fun using the online learning system.	Mun and Hwang (2003)
	Using the online learning system is pleasant.	
	I find using the online learning system to be enjoyable.	
	Study is more interesting with the online learning system.	
	I enjoy those aspects of my study that require me to use the online learning system.	
System Quality	I consider the online learning system interaction to be satisfactory.	Salloum et al. (2019)
	I consider the online learning system functions to be satisfactory.	
	I consider the online learning system content to be satisfactory.	
Perceived Usefulness	Using the online learning system gives me greater control over my study.	Davis (1989)
	Using the online learning system saves me time.	
	Using the online learning system enhances my effectiveness in the study.	
	Using the online learning system improves the quality of the study I do.	
	Using the online learning system makes it easier to do my study.	

Perceived Ease of Use	I find it easy to recover from errors encountered while using the online learning system.	Davis (1989)
	I find it easy to get the online learning system to do what I want it to do.	
	My interaction with the online learning system is easy for me to understand.	
	It is easy for me to remember how to perform tasks using the online learning system.	
	The online learning system provides helpful guidance in performing tasks.	
Behavioral Intention to Use	I will make use of the online learning system regularly in the forthcoming time.	Salloum et al. (2019)
	I intend to make use of the content and functions of online learning systems to provide assistance to my academic.	
	I will give out my recommendation to others to use the online learning system.	
	I plan to use the online learning system in all of my courses.	

양이 (Yang, Yi)



경희대학교 경영석사학위를 취득하였다. 현재 경희대학교 경영학과 박사과정으로 재학하고 있으며, 주요 관심분야는 MIS, 빅데이터경영 등이다.

김민용 (Kim, Min-Yong)



서울대학교 경영학사와 KAIST 공학석사와 경영정보학박사학위를 취득하였다. 현재 경희대학교 경영학과 교수로 재직하고 있으며, 주요 관심분야는 MIS, 지식경영연구, 빅데이터응용 등이다.

<Abstract>

Factors Influencing Behavioral Intention to Use Online Learning Systems from Student's Perspective: An Extended TAM Model

Yang, Yi · Kim, Min-Yong

Purpose

This study employed the Technology Acceptance Model (TAM) to understand students' acceptance of online learning systems. Specifically, this study investigated the factors influencing the behavioral intention of South Korean major university students to use online learning systems for educational purposes in the period when their university life had largely returned to the state it was in before the COVID-19 pandemic.

Design/methodology/approach

This study examined the impact of four external factors: self-efficacy, personal innovativeness, perceived enjoyment, and system quality, on two TAM constructs: perceived ease of use and perceived usefulness. Additionally, this study explored how perceived ease of use and perceived usefulness affect the behavioral intention to use online learning systems. We conducted an online-based survey using a structured questionnaire. The data collected from the survey were then subjected to Structural Equation Modeling (SEM) analysis to test the study's hypotheses and examine the relationships among the various constructs.

Findings

The findings reveal that perceived usefulness and ease of use significantly influence students' behavioral intentions to use online learning systems. Furthermore, factors of self-efficacy, perceived enjoyment, and system quality positively affect perceived usefulness and ease of use. Notably, personal innovativeness impacts ease of use but not perceived usefulness.

Keyword: online learning system, TAM, self-efficacy, perceived enjoyment, system quality, personal innovativeness, perceived usefulness, perceived ease of use, behavioral intention to use

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