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Evaluation of Information System Framework and Suitability of Technology Tasks on the Continuing Intention to Adopt E-Learning Systems

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ABSTRACT

This research aims to propose an information system framework that explores the relationship between perceived suitability and adoption factors in e-learning systems. The evaluation framework is built on previous information system success models and identifies the relationship between people, organisations, and technology task suitability. This research introduces a new framework by combining the dimensions of service quality, satisfaction, user behavior, and system accuracy. A quantitative approach was chosen to produce data objectively, used a questionnaire survey and structural equation modeling to analyse 782 respondents consisting of 643 students and 139 active lecturers at a university in Central Java, Indonesia. The results show that the relationship between humans and technology significantly affects sustainability intentions and perceived impacts. Meanwhile, people and organisations demonstrate attitudes and skills that positively impact system adoption. The findings of the study confirm the validity of the use of the proposed e-learning website application assessment model. Information and service quality variables influence user satisfaction and system use. Organisational elements influence user satisfaction and benefit value with level of significant 0.05 . In addition, a methodology was found that integrates human factors, organisational environment and technology suitability to assess system satisfaction and effectiveness.

Keywords: Framework; Information system; E-learning; Technology; Human factor; Organisations

1. INTRODUCTION

Information systems are the embodiment of a framework that regulates and develops a system. The transformation of higher education demands digital skills and innovation. Changes in student and instructor behavior in accepting information systems area benchmark for successful academic performance[1]. The e learning system has contributed to reforms for education secto rstakeholders to accelerate technology adoption[2]. Previous research prioritizes quality, information, services, supporting facilities, instructors, and benefits for user satisfaction[3]. The availability of a learning management system needs to ensure real-time access[4] especially with the implementation of mobile learning projects. This study applies the Unified Theory of Acceptance and Use Technology (UTAUT, enabling users to easily accept the integrated system[5] by prioritising the value of technological benefits[6] the unified theory of acceptance and use of technology (UTAUT. Resarch[7] indicates that technology acceptance positively affects motivation, facility conditions, performance expectations, and business expectations[8] .

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The research aims to propose an information system framework that explores the relationship between perceived suitability and adoption factors in e-learning systems, as well as evaluating the effectiveness of the system and identifying the relationship between each variable. This research prioritizes the main components supporting information systems: people as assesmen from the user's perspective. Organisations are useful for assessing systems, and technology provides an assessment of the quality of systems, information and services.

2. LITERATURE REVIEW

The literature study covers various theories including the theory of reasoned action, models of technology acceptance, motivation, planned behavior, personal use, diffusion of innovation, and social cognition[9]. This model focuses on the relationship between atti-tudes, intentions, and behavior. Attitudes towards an action are an individual's evaluation of the conse-quences of that action, while subjective norms refer to the social pressure felt by an individual to perform or not perform an action. The gap in the Theory of Rea-soned Action suggests that there is a framework that can include

external factors such as emotions, habits, and motivation, which influence human behavior. So it needs to be combined with the Technology Ac-ceptance Model to provide a more comprehensive pic-ture. Other theories explain system, service, use, in-tention, satisfaction, and benefit value10. Focusing on one aspect of intent and satisfaction, does not account for long-term experiences, social, emotional impact, or ongoing benefits. So there is a need for a more holistic understanding, a combined approach to technology.

A more comprehensive multidimensional e-learning evaluation[11] is based on the intention to use the system continuously, as the level of success varies according to needs[12]. The information system success model categorises evaluation factors, dimensions, and measures[13], as well as suitability in including the concept of compatibility between human, organisational, and technological factors[14]. Information systems in an organisation provide positive impacts, including easier decision-making[15]. The system is considered successful if it meets the criteria for information quality, use, satisfaction ,and organisational environment[16]. The enjoyment system is the level of pleasure or en-joyment felt from technology adoption, which influ-ences performance expectations and business expecta-tions[17]. Satisfaction[18] is a positive feeling that users have when using technology[19]. Service Quality Di-mension is a method used to measure service quality[20-21]. Technology and information systems have become essential in education, with the main functions of collecting, processing, and storing data and dissem-inating information for decision-making, coordination, control, analysis, and visualisation in an organisation[22]. Information system success strategies contribute to understanding digitalisation in e-learning systems[23]. Meanwhile, it is stated that the combination of information and communication technology is very important in an organisation[24]. Theoretical studies in previous research have not provided a solution that can be generalised as a different model for measuring the success of information systems that can be applied universally to all e-learning systems. This gap is the basis for conducting research using an information system evaluation framework approach. Each dimen-sion influences each other according to needs involv-ing the role of human and organisation factors in the suitability of technological tasks[25], as shown in Table 1.

3. METHODOLOGY

This research is quantitative with a descriptive approach, identifying the relationship between human, organisational, and technological factors. Locations and research objects as well as data sampling in six faculties at a university in Central Java, Indonesia.

3.1 Data Collection

Data was collected through surveys using questionnaires, taking into account the observed condition factors. Before the questionnaire was distributed, a readability test was carried out on 45 respondents to ensure that the respondents did not experience difficulties with the statements given[26]. This pre-survey stage was carried out over a period of one month with the same subjects.

The next process is collecting data from respondents as e-learning users through a questionnaire instrument. The target respondents were instructors and students as users of e-learning systems. Data was collected between June 2023 and January 2024. The data obtained included 782 responses that met the research criteria. Table 2 provides information about respondent characteristics.

Table 1. Evaluation of the information system framework in e-learning systems

Components	Dimensions	Information
Technology	Service Quality	Measurable quality, reliability, responsiveness, assurance, and empathy.
	Independent Learning	Users can learn independently by using information technology, management resources are available, and flexible according to individual needs.
	Ease of Using Technology	The user's level of enjoyment and willingness to acquire skills using a technology. The completeness of the features in the system can pleasure users.
Human	User Satisfaction	Positive feelings that users have about the experience of using technology, functionality, and performance.
	Sustainable Use	User satisfaction is based on perceived benefits and the desire to use the system continuously.
Organisation	User Behavior	It is an attitude towards the behavior and control of system users.
	Academic Achievement	Individual beliefs about academic achievement and abilities, and the influence of culture and society in improving academic achievement.
	System Accuracy	Reliability, availability, and convenience
Benefits/ Results Obtained	Educational Quality Model, System e-learning	Continuous assessment and measurement of user satisfaction in adopting e-learning systems.

3.2 Survey Instrument

The questionnaire was based on a Likert scale[27]the combined importance–performance map analysis (cIPMA[-28]. The research variables used as indicators in the instrument are in the form of statements or questions. For analysis purposes, answers were scored from 1 to 5, defined as follows: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5).

Table 2. Characteristics of respondents

Characteristic	Frequency	Percentage (%)
Gender		
Male	390	49.87%
Female	392	50.13%
Status		
Student	643	82.23%
Lecturer	139	17.77%
Age		
< 25 years	634	81.07%
26-35 years	72	9.21%
36-45 years	45	5.75%
46-55 years	27	3.45%
>56 years	4	0.51%
Level of Education		
Bachelor	643	82.23%
Master	119	15.22%
Doctoral	20	2.56%
Long time using the Internet		
< 1 year	164	20.97%
1-2 year	310	39.64%
>2 year	308	39.39%
Faculty of:		
Economics and Business	127	16.24%
Science and Teaching	143	18.29%
Law	32	4.09%
Engineering	453	57.93%
Agriculture	25	3.20%
Psychology	2	0.26%

3.3 Research Stages

This phase includes planning, model evaluation, data analysis, and interpretation.

Stage 1: Identification, observation, and formative study to find out problems and obtain variables.

Stage 2: Preparation and design of instruments, data collection, and distribution of questionnaires.

Stage 3: Validation of internal consistency, normality, and testing the level of validity through hypothesis testing.

Stage 4: Presentation of results and measurement of achievement models sustainable success.

The data analysis technique uses univariate analysis for summarising measurement results to transform them into useful information. Bivariate analysis is used to test whether there is a significant relationship between one variable and another. Multiple regression technique is employed because this method is robust or invulnerable[29] information quality, and service quality. To answer the second research objective, namely evaluating how effective the system used is and identifying the relationship between variables. The information system framework evaluation model is assessed from three main factors, namely human, organisational and technological. The HOT Fit evaluation model is useful for clarifying understanding of all variables in an information system[30]. This reason is the reference in preparing research model is shown in Fig. 1.

The relationship between variables is explained as follows:

H1: Do humans influence technology.

H2: Does the organisation influence technology.

H3: Do humans have an influence on organisations and their impact on net benefit.

4. RESULTS/OUTCOMES

The results of this research start from the analysis of the goodness of fit index test and hypothesis testing.

Descriptive Analysis of Respondents.

There are three parts that must be answered in the questionnaire:

- The first part includes data on gender, age category, education level, user status, and experience using the e-learning system. Characteristic data can be seen in Table 2.
- The second part contains a statement of experience using technological devices. The survey results can be seen in Table 3. Based on the data in Table 3, it was found that the devices used by respondents were 413 smartphones with a percentage of 53.02 %. This shows that the majority of participants prefer mobile as an effective medium. As for internet access via mobile data which is considered integrated with the device, the frequency of use every day reaches 83.12 %. So it can be concluded that e-learning system users are more dominant.

Based on the summary of the evaluation of the information system framework in Table 1, it was then used in preparing the instrument until the survey distribution was carried out to obtain participant data in Table 2 and Table 3, which overall dimensions showed the required internal consistency and reliability. The discriminant validity test and average variance were obtained, the calculation results are as shown in Table 4.

The multiple linear regression test obtained a relationship between the dependent variable and several independent variables simultaneously with lower limit interval coefficient of 2.50 % and an upper limit of 97.50 % with a certain level of confidence, usually 95 %.

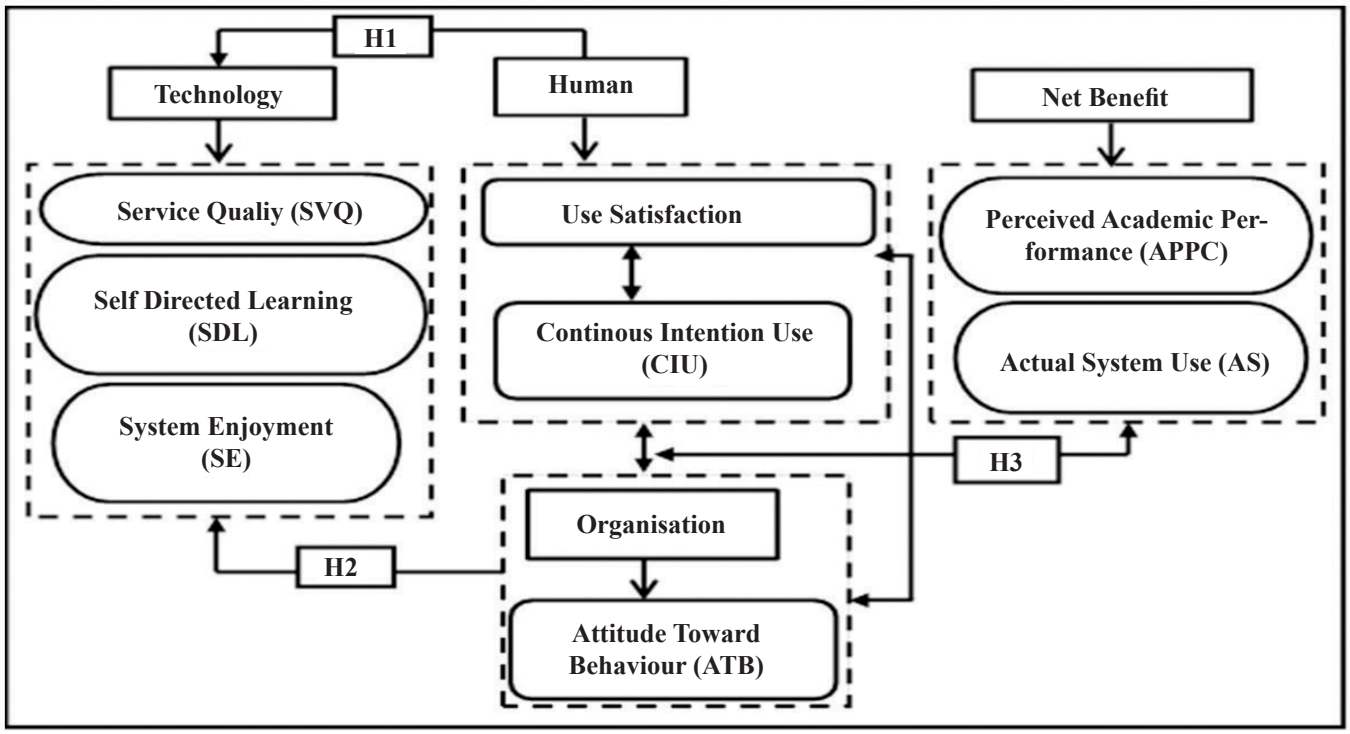

Figure 1. HOT-Fit information system framework relationship among variable.

Table 3. Experience using technology devices

Name	Frequency	Percentage (%)
ICT devices that you have		
Computer PC	27	3.47%
Notebook	331	42.49%
Smart phone	413	53.02%
Tablet	2	0.26%
Others	6	0.77%
Internet connection type		
Mobile data	385	49.23%
Broadband/ Wifi	383	48.98%
Others	14	1.79%
Websites can help users		
Yes	780	99.74%
No	2	0.26%
Internet usage frequency		
Everyday	650	83.12%
Once every 2 weeks	114	14.58%
Once a month	18	2.30%
Duration of time to access (hour)		
<=1	465	59.54%
2-3	264	31.50%
>= 4	70	8.96%
* N = 782		

- The third part is a question assessment statement representing each indicator and variable. Criteria testing begins by evaluating factor loadings, construct reliability and validity. The measurement results show that one ATB4 construct has a low value below 0.5, so it is considered weak and necessary to carry out data screening[31]. The results of factor loading, validity, and reliability testing are shown in Table 5.

The partial validity test is used to measure the value of convergent validity, discriminant validity and the square root value of the AVE comparison. This test is to ensure convergent validity standards, for each indicator in the construct is above 0.5. Next, the construct reliability model was measured using the Cronbach alpha value reliability test and composite reliability above 0.6. Table 5 shows the consistency analysis between items in the instrument actually measuring theoretical concepts and correlates. This is shown by the results of the analysis which has an alpha value above 0.7 which is considered good.

4.1 Hypotheses Testing

The final stage is doing hypothesis testing to determine the influence of each variable on the HOT-Fit information system framework model as in Fig. 1. This test is to answer the second research objective. Model structure for testing hypotheses and evaluating construct relationships is also presented. The significance value of the t-value used is 1.96 (5 % significance level) and the p-value <0.05. Hypothesis testing results are shown in Table 6.

Table 4. Multiple linear regression test results

Dimensions	Original sample	Sampel mean	STDev	T statistics	2.50%	97.50%
Service quality influences use satisfication	0.486	0.485	0.045	10.852	0.398	0.574
Service quality influences the continous intention use	-0.034	-0.032	0.038	0.875	-0.108	0.042
Self directed learning influences use satisfication	0.374	0.376	0.046	8.087	0.278	0.458
Dimensions	**Original sample**	**Sampel mean**	**STDev**	**T statistics**	**2.50%**	**97.50%**
Self directed learning influences the continous intention use	0.158	0.157	0.044	3.544	0.074	0.245
System enjoyment influences the attitude toward behavior	0.728	0.729	0.026	28.277	0.671	0.773
Use satisfication influences the continous intention use	0.23	0.228	0.05	4.587	0.13	0.325
Attitude toward behavior influences contonous intention use	0.569	0.57	0.043	13.353	0.483	0.651
Continous intention use influences perceived academic performance	0.76	0.76	0.024	31.513	0.707	0.802
Continous intention use influences the actual system use	0.753	0.754	0.021	35.515	0.708	0.792

Based on the results of the analysis in Table 5 and the relationship between the variables of the proposed HOT Fit model, there are 8 acceptable hypotheses and 1 hypothesis is rejected out of 9 hypotheses.

The relationship between humans and technology.

The technology component has 3 dimensions, namely service quality (SVQ), Self-Directed Learning (SDL) and System Enjoyment (SE). Humans consist of satis-fation use (USAT) and Continuous Intention Use (CIU). Based on the test, it is stated that the service quality variable has a significant effect on user satisfaction, because t-statistics > t-table (10.85 > 1.96) then H1 is accepted. This means that the higher the quality of service produced by a system in supporting technology, the higher the level of user satisfaction. Meanwhile, service quality has no effect on continuous use intention because the t-statistic is less than 1.96, indicating that low service in supporting technology will influence the user's intention not to continue using the system. In other dimensions of the technology construct, the results of the hypothesis test are declared acceptable, each variable has a high value. So it can be concluded that the level of relationship between human variables and technology has a strong relationship (H1).

The relationship between organisations and technology.

The organisational environment has one dimension, namely Attitude Toward Behavior (ATB). This variable has a significant relationship with the technology variable. Both variables show both increases. The t-statistical test results > 1.96 are declared acceptable (H2).

The relationship between humans and organisations on the value of benefits in the system.

Human and organisational variables have a fairly strong relationship. The results of the analysis provide a positive beneficial impact on perceived academic performance (APPC) and Actual System use (AS) increasing the use of information systems (H3).

5. DISCUSSION

This research focused on adopting an e-learning system to evaluate user satisfaction at a micro level, assessing perceptions based on experience, performance, ease of use, and system accuracy. The ease of using technology significantly influences users' motivation to continuously use the system. The strong relationships observed among human variables, organisational factors, and technology indicate an increasing adoption of e-learning information systems. The evaluation of the HOT-Fit[14-32] system framework enhances understanding across all variables, particularly in assessing users' perspectives directly involved with the system. Additionally, it provides valuable insights into organisational aspects related to structural and environmental factors, such as planning, management, control, and financing.

Table 5. Factor loading, validity dan reliability

	Factor loadings	Cronbach's alpha	Composite reliability	AVE	VIF
APC1	0.809	0.887	0.917	0.689	1.930
APC2	0.796				2.045
APC3	0.864				2.561
APC4	0.853				2.407
APC5	0.826				2.173
AS1	0.843	0.898	0.924	0.710	2.371
AS2	0.860				2.614
AS3	0.870				2.714
	Factor loadings	**Cronbach's alpha**	**Composite reliability**	**AVE**	**VIF**
AS4	0.814				2.209
AS5	0.824				2.108
ATB1	0.824				2.006
ATB2	0.859	0.856	0.903	0.699	2.266
ATB3	0.871				2.280
ATB5	0.787				1.714
CUI1	0.876				3.373
CUI2	0.876				3.365
CUI3	0.860	0.911	0.933	0.737	2.563
CUI4	0.816				2.098
CUI5	0.863				2.628
SDL1	0.708				1.544
SDL2	0.838				2.157
SDL3	0.861	0.877	0.911	0.673	2.532
SDL4	0.870				2.630
SDL5	0.816				2.055
SE1	0.867				2.673
SE2	0.875				2.744
SE3	0.847	0.897	0.925	0.711	2.408
SE4	0.863				2.517
SE5	0.756				1.707
SVQ1	0.822				2.074
SVQ2	0.834	0.875	0.909	0.666	2.257
SVQ3	0.815				2.091
SVQ4	0.786				1.828
SVQ5	0.824				2.007
USAT1	0.839				2.540
USAT2	0.866				2.879
USAT3	0.869	0.916	0.937	0.749	2.800
USAT4	0.872				3.076
USAT5	0.879				3.219

Table 6. Hypothesis test

		Original sample	Sample mean	Standard deviation	T statistics	P values	Description
Technology	SVQ →USAT	0.486	0.485	0.045	10.852	0	Accepted
	SVQ → CIU	-0.034	-0.032	0.038	0.875	0.381	Not Accepted
	SDL → USAT	0.374	0.376	0.046	8.087	0	Accepted
	SDL → CIU	0.158	0.157	0.044	3.544	0	Accepted
	SE →ATB	0.728	0.729	0.026	28.277	0	Accepted
Human	USAT →CIU	0.23	0.228	0.05	4.587	0	Accepted
	ATB → CIU	0.569	0.57	0.043	13.353	0	Accepted
Organisation	CIU → APC	0.76	0.76	0.024	31.513	0	Accepted
	CIU → AS	0.753	0.754	0.021	35.515	0	Accepted

6. CONCLUSION

This research contributes significantly to evaluating the information system framework for adopting e-learning systems. The framework's flexibility allows for its application across diverse contexts and objectives, considering stakeholder perspectives from users, organisations, and technology suitability. Improvement the quality of successful e-learning from an information system perspective through planning, action, evaluation, and learning processes. The proposed research model indicates a technology suitability score of 78.36 % for continuous e-learning adoption, highlighting the importance of subjective factors in motivating students and instructors to actively engage with e learning systems.

7. RECOMMENDATION

This research is very useful for providing recommendations in developing digital transformation strategies from the perspective of implementing organisational readiness. Future research is recommended to evaluate the success of cloud-based information systems using user experience dimensions and an extended HOT-Fit framework model to accommodate new technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and Block chain. The usability applications can be developed in the public sector.

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