

E-Learning User Interface Acceptance Based on Analysis of User's Style, Usability and User Benefits

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ABSTRACT

E-learning does not function properly if the system is not in accordance with user needs. This study aims to establish an evaluation model for e-learning user interface according to user acceptance. The model is designed based on three categories: user learning style, usability and user benefits. Results of measurements of the three categories will determine the level of user acceptance of the e-learning interface. The data were taken using a questionnaire which was distributed to 125 ELS students from various countries. Then processed using SEM and Lisrel v8.80.

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1. INTRODUCTION

E-learning is a method of learning that is offered by many universities and educational institutions to support their learning process. Basically, the concept of e-learning is the provision of equal educational facilities to learn in a conventional school. The role of e-learning is expected to help the role of educational institutions an conventional training. E-learning process has different characteristic compare to common education. According to [18] E-learning has personalized for student, focused on student and is directly controlled by themselves, occurs only when required and has the strictly necessary duration, communicated by technology on the basis student has gotten knowledge and need proactive roles.

The e-learning is a distance learning system which offers training courses and custom tailors to the needs of learners. An integrated environment which combines the advantages of e-learning and traditional classroom is called as blended e-education [9]. But, unused user interfaces are probably the single largest reasons why on all sides of interactive system computers and e-learning fall in actual use. The design of applications purposes in term of ease of use is not an easy task [8]. E-learning will become less optimal if the system is not effective used in accordance with user needs [18].

2. RELATED THEORIES

2.1. User Interface Evaluation

The system interface is used to communicate with a user in interactive system. The system interface can be divided into two sections; a front interface (input) and back-end interface (output) [18]. E-learning interface design is especially critical, as the learning effectiveness and interface design are substantially intertwined. To design an e-learning interface should be determined by how people learn and the tasks they need to perform in the program. There are some features in the user interface still less efficient [8]. Many theories that discuss the interface evaluation design, but the fact still weak and does not work in accordance with the e-learning user interface expected [2].

"The often problem is that it is impossible to determine which user interface design variant is better" [3]. Empirical evaluation of subjective selection criteria cannot be the best interface. Therefore quantitative evaluation methods are needed user interface. Different interface designs can be evaluated with quantitative

methods priority criteria. While [8] argues that interface design e-learning should be a goal, an integrated component of the overall e-learning products.

User interface becomes the major channel to convey information in e-learning context: a well-designed and friendly enough interface is thus the key element in helping users to get the best results quickly. Interface settings will affect the quality of students learning that accommodates their needs in terms of personalizing the content, structure, and presentation [6].

2.2. User's Learning Style

User's learning or Style User's Style is student factors in learning such as, learning style, motivation, and knowledge ability. User learning style should be considered in the adaptive e-learning development in order to optimize learning process [17].

2.2.1. Learning Style

Learning style refers to how a learner perceives, interacts with, and responds to the learning environment; it is a measure of individual differences [4]. According to [14] User Learning Style is developed from the individual's physiological characteristic will be influenced by:

- a. Psychology development, social environment and education experience.
- b. Learning time, study habits, learning approach, gender, ethnicity, learning time, the learning resource and the process of learn
- c. Record the learning information for each student: the individual learning style, preferred study habits, learning approach, his dynamic learning situation and even detail information.

2.2.2. Motivation

Learning motivation is an individual's characteristic and consistent approach to organizing and processing information. The students learning motivation is divided into five categories: effort, confidence, satisfaction, sensory interest and cognitive interest [17]. From these categories, effort is a fundamental indicator of a student's motivation. The exertion of effort in learning can be as a positive parameter. The student's effort is the amount of time the learner spends on learning and participation.

2.2.3. Knowledge-ability

The student's ability is also another factor that should be considered. The student's ability can be seen from the level of knowledge in their learning performance. To measure the learning performance is recognising the knowledge objectively through evaluation, such as quiz, class exercise, and exam [17].

2.3. Usability Evaluation

Usability is a quality attribute that assesses how easy user interfaces are to use. The word "usability" refers to a method for improving ease of use during the design process [12]. Definition of usability based on 3 different standardization organizations: A set of attributes that bear on the effort needed for use and on the individual assessment of such use, by a stated or implied set of users (ISO/IEC 9126, 1991). The extent to which a product can be used by specified users to Achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (ISO 9241 to 11.1998). The ease with which a user can learn to operate, prepares inputs for, and interprets outputs of a system or component (IEEE Std.610.12-1990)

Usability is important to determine whether something is useful. It matters that something is easy but it is not what you want [3]. Although there are many individual methods for evaluating usability; they are not well integrated into a single conceptual framework that facilitates their usage by developers. There are several standards or conceptual models for usability, and not this entire standard or models describe the same operational definitions and measures [16]. It needs a measurement model and a structural model for evaluating the e-learning user interface acceptance model [4].

2.4. The Technology Acceptance Model (TAM)

There are several models that are built to analyze and understand the variables that affect the user acceptance of information technology, among others; Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), and the Technology Acceptance Model (TAM). TAM models are developed from a psychological theory, which describes the behavior of computer users that are based on beliefs, attitudes, desires and relationships user behavior. These models aim to explain the main factors of user behavior on user acceptance of technology. This model places the attitudinal factors of individual user behavior with variables: ease of use (ease of use), utility (usefulness), use (Attitude Toward Using), behavior to keep using (Behavioral Intention To Use), the real conditions of use of the system (Actual System Usage).

3. RESEARCH DESIGN

3.1. Evaluation of user interface e-learning acceptance models

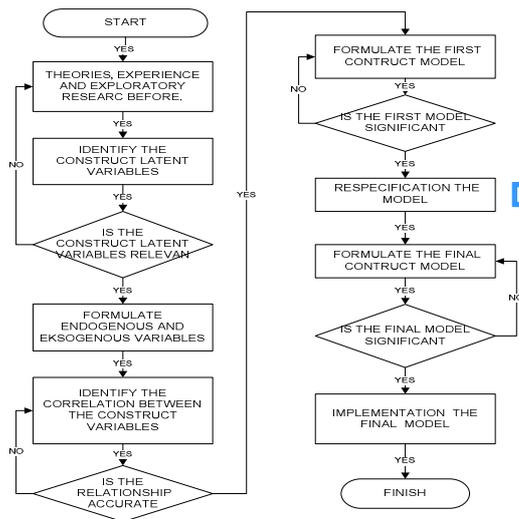


Figure 1. Research Procedure Design

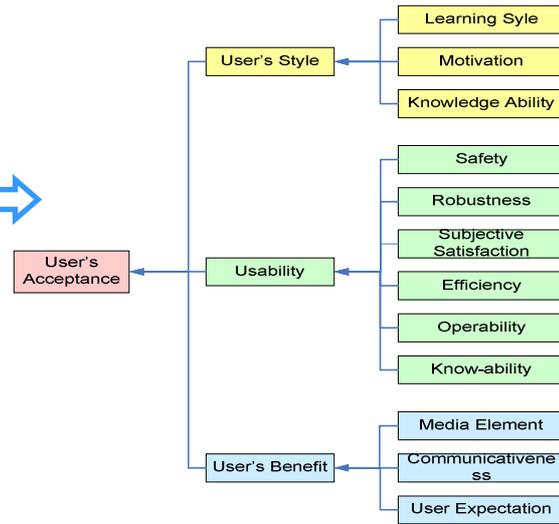


Figure 2. Research Hypotheses

3.2. Research Hypothesis Model

User interface acceptance in this e-learning interface evaluation focuses on 12 indicator variables [fig.1 & 2]:

1. User's learning style; learning style, motivation, knowledge-ability
2. Usability evaluation; safety, robustness, subjective satisfaction, efficiency, operability, know-ability
3. User benefit; media element, communicativeness, user expectation.

The complete description about this research variable that we can see in table 1.

Table 1 User Interface Acceptance Attributes

GOALS	ATTRIBUTES	QUESTIONERS
User Profile	Ethnicity (descriptive)	What is your gender? How old are you now? Where do you come from?
Knowledge ability	Grades	What is your structure grade?
Motivation (high/low)	CIEP Level	What level did you start in CIEP class? How many months have you learned in CIEP?
Learning style	learning time	How many hours do you need to finish your a week LTC task ? How many days do you need to finish your a week LTC task?
	study habits	With whom do you usually answer the LTC task? (alone/pair/in groups)
Knowability	Learnability,	It was easy to learn to use LTC interface system:
	Understandability	I quickly became skillful with LTC interface:
Operability	Memorability	I easily remember how to use LTC interface.
	Ease of use	It was simple to use LTC interface E system
Efficiency	Effectiveness	I can effectively complete my work using LTC interface system
	Flexibility	LTC interface system response is sufficient to my requests
	User workload	I am able to complete my work quickly using LTC interface system
Robustness	Efficiency	I am able to efficiently complete my work using LTC interface system
	Productivity	I believe I became productive quickly using LTC interface system
Safety	Error Management	The system gives error messages that clearly tell me to fix problems
	Trustfulness	The information provided with LTC interface system is clear and responsible.
	Errors	Whenever I make a mistake using LTC interface, I recover easily and quickly.
Subjective Satisfaction	Safety	The component of LTC interface system is clear and safety.
	Secure	The information of LTC interface are secure in helping me complete the task.
	Comfortable	I feel comfortable using LTC interface system
Media element	Attractiveness	LTC interface system is attractive and pleasant
	Compliance	I like using LTC interface system without difficulties.
	Satisfaction	Overall, I am satisfied with how easy it is to use LTC interface system
Communicative-ness	Usefulness	The LTC interface provided Text and Graphic are useful
	Completeness	LTC interface offers complete set of multimedia components facilities.
	Increase	LTC interface video is easy to understand and increase my capability.
User Expectation	Simple	Simple and Natural Icons and Menus.
	Intuitive	LTC interface has intuitive navigation and easy to use.
	Perceptive	LTC interface are perceptive, clear and understandable
User Expectation	User need	LTC interface provides all my needs.
	Capability	LTC interface has all the functions and capabilities I expect it to have
	Expectation	LTC interface does everything I would expect it to do.

Variables	Name	Lambda (λ) Gamma (γ)	T value	H_0	Research Hypothesis
Y5	Operability	0.84	6.12	rejected	H2b accepted (Significant)
Y6	Efficiency	0.66	6.89	rejected	H2c accepted (Significant)
Y7	Robustness	1.36	6.18	rejected	H2d accepted (Significant)
Y8	Safety	0.84	6.32	rejected	H2e accepted (Significant)
Y9	Subjective Satisfaction	1.74	6.47	rejected	H2f accepted (Significant)
Y10	Media element	0.93	5.58	rejected	H3a accepted (Significant)
Y11	Communicativeness	0.97	3.80	rejected	H3b accepted (Significant)
Y12	User expectation	5.54	6.66	rejected	H3c accepted (Significant)
η 1	User style	0.73	8.09	rejected	H4a accepted (Significant)
η 2	Usability	0.96	7.42	rejected	H4b accepted (Significant)
η 3	User Benefit	0.80	7.04	rejected	H4c accepted (Significant)

Table 3 Variance Extracted and Construct Reliability of model

Variables	Construct Reliability (>0.70)	Variance Extracted (>0.50)
User style	0.88	0.71
Usability	0.90	0.61
User Benefit	0.82	0.60
Acceptance	0.73	0.69

Table 4 GOF Statistics for E-learning Interface Acceptance Model

Goodness of Fit	Statistics Measurement Target	Model I	Model II
Absolute Fit Measures			
χ^2	Smaller grades is better	197.76	55.88
NCP	Smaller grades is better	146.76	16.88
SNCP	Smaller grades is better	1.82	0.51
GFI	GFI \geq 0.90	0.78	0.93
RMSR	RMSR \leq 0.05	0.80	0.31
RMSEA	RMSEA $<$ 0.08	0.158	0.061
ECVI	Smaller grades is better	2.19	1.16
Incremental Fit Measures			
TLI or NNFI	NNFI \geq 0.90	0.90	0.98
NFI	NFI \geq 0.90	0.90	0.97
AGFI	AGFI \geq 0.90	0.66	0.85
RFI	RFI \geq 0.90	0.87	0.95
IFI	IFI \geq 0.90	0.92	0.99
CFI	CFI \geq 0.90	0.92	0.99
Parsimonious Fit Measures			
PGFI	Higher grades is better	0.51	0.46
Normed χ^2	Minimum grades: 1.0 Maximum grades: 3.0	4.10	1.50
PNFI	Higher grades is better	0.69	0.57
AIC	Smaller grades (positive) is better	251.76	133.88
CAIC	Smaller grades (positive) is better	353.10	280.27

5. CONCLUSIONS AND RECOMMENDATIONS

High reliability in this study indicates that an indicator variable has a consistently high in measuring latent constructs. Test reliability by using two types of measurements that measure reliability or construct composite reliability and variance extracted measure, can be said to be good because the value of its construct reliability value of 0.70 and its variance extracted 0.50. Examination of the value of t is 1.96, and the charge factor 0.70, also illustrates the value of the relative suitability of each measure structural equation. Thus interface User Acceptance Model for E-learning can be accepted. This study has become one alternative model to get the user acceptance of e-learning interface. Hopefully this model can be considered in developing an e-learning application in the future.

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