An Empirical Study on Relationships among Contents Quality, Trust, and Intention to Use of e-Learning

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ABSTRACT

A variety of Web Services are being existences based on the development of the Internet. Especially, e-Learning services in the Universities make the temporal and spatial constraints overcome, and e-Learning services have gained great popularity to the students who use because those provide various convenience and usefulness. e-Learning studies have been actively performed based on the spread of e-Learning in the various industries. A number of studies suggest the diffusion plan of e-Learning applying the Technology Acceptance Model studies. Those studies focused on the ease of use and usefulness of e-Learning. The explanation about educational contents perspectives, which is the key factor in e-Learning, is very weak. Therefore, this study suggested the strategy for spreading the e-Learning adoption through in terms of e-Learning educational contents and trust perspectives. This research results would provide the strategic implications to boost the e-Learning adoption in the various universities in terms of e-Learning educational contents and trust perspectives.

Key Words : e-Learning, Adoption, Trust, Contents, Quality

e-러닝 컨텐츠 품질, 신뢰, 이용의도의 관계에 대한 실증 연구

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요 약

인터넷의 발전에 힘입어 다양한 형태의 웹서비스가 출현하고 있다. 특히, 대학에서 e-러닝 서비스는 시간적, 공간적 제약의 한계를 극복해 주고, 여러 가지 편리성과 유용성을 제공해 학생들에게 큰 인기를 얻고 있다. e-러닝 확산에 힘입어 e-러닝 수용 연구는 매우 활발하게 이루어졌다. 많은 연구들은 기술수용모델 연구를 응용해 e-러닝 확산방안을 제시하고 있다. 이러한 연구들의 e-러닝의 이용 용이성과 유용성에 중점을 맞추고 있다. 그렇기 때문에 e-러닝의 핵심이 되는 교육 컨텐츠 측면에서의 e-러닝 활성화를 위한 설명이 미약한 측면이 존재한다. 이에 본 연구에서는 e-러닝 수용에 있어 e-러닝 컨텐츠 품질과 e-러닝 신뢰 측면에서의 접근을 통해 e-러닝 수용 확산 방안을 제시하였다. 본 연구 결과는 대학 당국에 e-러닝 수용 확산에 있어 컨텐츠 측면에서의 전략 수립에 유용한 시사점을 제공해 줄 것이다.

주제어 : e-러닝, 수용, 신뢰, 컨텐츠, 품질

1. Introduction

E-Commerce has been developed dramatically based on the development of World Wide Web (WWW). e-Commerce promotes not only the exchange of physical products but also the exchange of digital products [13]. The development of e-Commerce contributes the activation of services exchange through the Internet. For example, in public sectors, the service through the Internet provided the conveniences to us. For example, e-Government services or educational services through the online provide the many forms of usefulness. Especially, e-Learning in educational parts was firmly positioned in college and graduate level education as a very innovative education [21].

Currently, the universities in Korea are putting in great effort to provide systematic education to the students in terms of hardware, software, and contents of e-Learning. Recently, the Korean government requested the enough Information Technology (IT) infrastructure to strengthen the quality of the education system, so it is trying to develop the infrastructures for providing the high quality of e-Learning services [21].

Recently, e-Learning course registration is increased in Korean universities. The reason is that students can obtain the convenience and usefulness with overcoming the temporal and special limitation through the e-Learning course registrations [22]. In perspectives of increasing e-Learning demands by the students, the studies for providing the good quality of e-Learning services would offer the important implications for the e-Learning adoption vitalization.

Currently, the various e-Learning adoption related studies were accomplished. For example, e-Learning vitalization direction in perspectives of educators and students [11][19][30][31][32][33][35]. e-Learning activation plan through the ubiquitous technology [3][29], e-Learning activation plan in terms of user perspective, and e-Learning vitalization plan in terms of system perspectives [22], and so on. Presently, many e-Learning adoption and diffusion related studies are theoretically based on the Technology Acceptance Model (TAM). e-Learning Studies applying TAM focused on ease of use and usefulness in terms of e-Learning adoption [19][22][23][25][30][31][33].

Of course, the access to the ease of use and usefulness to vitalize e-Learning is very important. However, e-Learning contents are also very important to provide e-Learning services. Nevertheless, current e-Learning adoption studies are focused on applying TAM, and the studies on e-Learning adoption plan based on increasing e-Learning contents quality are insufficient. Therefore, this study would like to focus on e-Learning quality improvement.

Moreover, trust is the one of the important factors for e-Learning adoption. Generally, trust in online e-Commerce is well known that it is the precedent factor in consumer's intention to buy the product or services [13]. In other words, building trust is the precedent factor to activate e-Commerce. Likewise, building trust would be the precedent factor to boost e-Learning adoption.

Accordingly, this study would like to analyze how e-Learning contents quality would influence trust and intention to adopt the e-Learning. This research results would suggest the alternatives to strengthen trust for using e-Learning and to implement the e-Learning contents preferred by the students.

2. Literature Review

2.1 Conceptual Framework

e-Learning was firmly positioned in college and graduate level education as a general regular curriculum due to the development of the IT [22].

This study is to suggest the alternatives for spreading e-Learning adoption by the university students. According to e-Commerce related studies, information quality (IQ) significantly influenced trust, trust significantly influenced intention to use of IT [13][17][27].

Therefore, based on the previous study on e-Learning application and utilization, this study drew the conceptual framework which e-Learning contents quality would influence trust towards e-Learning, and trust would influence intention to use of e-Learning adoption at universities in Korea (See [Fig. 1]).
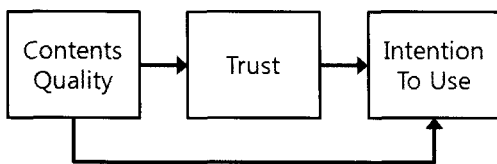
[Figure 1] Conceptual framework

2.2 e-Learning Adoption Study

Recently, e-Learning has been developed with various forms in the universities[21]. Various e-Learning's educational systems have been accomplished with various formations, such as connected lectures between online and offline lectures, pure online lectures, and increase of learning effect by adopting various multimedia technologies. e-Learning is the educational system for many people, and its importance has been recognized very widely, so now we pay attention to how e-Learning education can be easily adopted by people. a lot of e-Learning studies were done by using TAM based on these developments.

Looking at the characteristics of major researches related to e-Learning adoption, various studies were accomplished, such as study about e-Learning adoption expanding TAM related factors[5][15][22][23][25][26], study targeting for educational agents (professors, instructors, teachers,

and so on) [11][28][30][31][36], e-Learning adoption study according to the e-Learning user's learning styles [35], e-Learning adoption study according to community vitalization.

As analyzed in <Table 1>, in the basis of previous studies, the studies applying TAM perspectives focused on ease of use and usefulness [12][14][33][34]. Therefore, those could not suggest the basic alternatives for the e-Learning education medium. Thus, this study assumes that contents characteristics which the students would directly learn would be major impact on e-Learning, so we selected e-Learning contents quality as a research factor.

2.3 Quality, Trust, and Intention to Use

Consumers obtained their wanted information through the web surfing behaviors as the Internet was activated. Accordingly, companies made an effort to provide more good qualified information to the consumers. Likewise, e-Learning information, in other words e-Learning contents, would provide the important role in e-Learning. According to Song, Zahedi [27], IQ of the company in health areas which provides health information significantly influences trust, and it significantly influence to the intention to use. Likewise, providing trustful e-Learning contents would strengthen e-Learning trust, and would spread the e-Learning adoption.

There are various emphasized on role of trust in e-Commerce studies because Trust in e-Commerce is the major impact factor to strengthen consumers' intention to use [7][8][9][10][13][16][24]. The importance of trust was explained in other various studies, such as information systems (IS) adoption study [8], health information application study [20][27]. Those studies explained that trust importantly influences intention to use. The followings are the major previous studies related to

<Table 1> e-Learning adoption studies

Researcher	Research methodology	Contents
Kang et al (2009)	Empirical study	Suggestion of factors to increase e-Learning achievement
Yoo (2006)	Empirical study	Analysis of e-Learning adoption characteristics based on learning styles
Drennan et al. (2005)	Empirical study	The suggestion of factors affecting student attitudes toward flexible online learning in management education
Hu et al. (2005)	Empirical study	Examining e-Learning acceptance by school teachers: A longitudinal study
Lee et al. (2005)	Empirical study	Acceptance of Internet-based Learning Medium: the Role of Extrinsic and Intrinsic Motivation
Liu et al. (2010)	Empirical study	Extending the TAM model to explore the factors that affect Intention to Use an Online Learning Community
Ngai, et al. (2007)	Empirical study	Empirical examination of the adoption of WebCT using TAM
Ong, Lui (2006)	Empirical study	Gender Differences in Perceptions and Relationships among Dominants of E-Learning Acceptance
Saade, Bahli (2005)	Empirical study	The Impact of Cognitive Absorption on Perceived Usefulness and Perceived Ease of Use in On-Line Learning: An Extension of the TAM.
Selim (2003)	Empirical study	An Empirical Investigation of Student Acceptance of Course Web-sites
Sugar (2004)	Empirical study	Examining teachers' decisions to adopt new technology
Teo (2009)	Empirical study	Modeling technology acceptance in education: A study of pre-service teachers
Teo et al. (2008)	Empirical study	Examination about the teachers' behaviors about the computers
Teo et al. (2008)	Empirical study	A cross-cultural examination of the intention to use technology between Singaporean and Malaysian pre-service teachers: an application of the TAM
Wang, Wang (2009)	Empirical study	An empirical study of instructor adoption of web-based learning systems
Yuen, Ma (2002)	Empirical study	Gender differences in teacher computer acceptance

trust and technology adoption.

According to Pavlou (2003), trust and risk were emphasized in e-Commerce sectors, and trust strengthening and risk mitigation were emphasized for spreading online shopping adoption. In addition, according to Kim et al., (2008), trust provided important role for consumer's decision to buy for online shopping. They provided Trust-based Decision Making Model based on online e-Commerce process.

In the area of IS management and IT use, Wang, Benbasat (2005) emphasized trust for online recommending system adoption, Gefen (2004) emphasized trust by the organizational members for ERP adoption. In the area of health information, Song, Zahedi (2007) insisted the importance of trust formation to promote the use of online health informediary by the consumers. Luo, Najdawi (2004) suggested trust building method for spread of intention to use of health information by the consumers in portal sites.

In the basis of previous studies, trust is very important factor influenced to online consumer behaviors. Therefore, this study selected trust as a
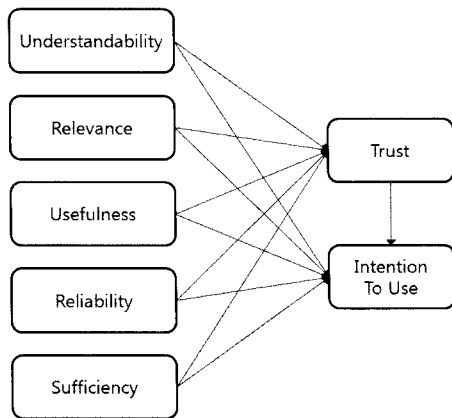
factor because we decide that trust would have a major impact to the intention to use in e-Learning adoption.

3. Research Model

3.1 Research Model

As mentioned before sections, this study would examine the impact by e-Learning contents quality, which is perceived by the students who enrolled the e-Learning subject, towards trust, in addition we suggested the research model and the hypotheses in [Figure 2].

As discussed previous sections, there are relationships among contents quality, trust and intention to use e-Learning. Therefore, we developed follows hypotheses.

[Figure 2] Research Model

[H1] Understandability of e-Learning contents significantly influences e-Learning trust.

[H2] Relevance of e-Learning contents significantly influences e-Learning trust.

[H3] Usefulness of e-Learning contents significantly influences e-Learning trust.

[H4] Reliability of e-Learning contents significantly influences e-Learning trust.

[H5] Sufficiency of e-Learning contents

significantly influences e-Learning trust.

[H6] Trust of e-Learning significantly influences intention to use.

[H7] Understandability of e-Learning contents significantly influences intention to use.

[H8] Relevance of e-Learning contents significantly influences intention to use.

[H9] Usefulness of e-Learning contents significantly influences intention to use.

[H10] Reliability of e-Learning contents significantly influences intention to use.

[H11] Sufficiency of e-Learning contents significantly influences intention to use.

3.2 Research Variables

Variables of this study are composed of previous studies' measurement items of e-Learning contents quality, trust, intention to use of e-Learning. The measurement items used in this study are proposed as follows in <Appendix 1>. Research variables in this study are e-Learning contents quality and trust. E-Learning contents quality means quality of the contents related to education which is provided by e-Learning lectures. This study amended health IQ measurement scales, which is suggested by Song, Zahedi (2007), to be suitable for e-Learning contents quality. This study referred Song, Zahedi, (2007), Kim et al. (2007), and Lim, Lee, (2009) and made e-Learning trust factor. Finally, this study made intention to use of e-Learning factor referred to Davis (1989) and Ngai et al. (2007) [4][22].

3.3 Survey Process

This study made the 7 point Likert scale ranging form "1 is strongly disagree" and "7 is strongly agree" questionnaire to measure previous factors based on literature reviews. And survey was carried out for university students who have been enrolled e-Learning lectures related to MIS,

and e-marketing subjects in Korean universities This study excluded students who had never enrolled e-Learning lectures in advance. The survey was performed from May 2010 to June 2010 and used online document program provided Google.com (http://www.google.com). This study obtained 97 questionnaires. This study analyzed with SMART PLS 2.0 which is PLS modelling software.

4. Empirical Analysis

4.1 Sample Characteristics

The characteristics of the respondents in this study are as the following. First, the gender characteristics were, 66 males covering 68% and 31 females, 32% of the total. Second, the academic background was that first year university students

were 9, 9% of the total, followed by second year (38, 39%), third year (21, 22%), and fourth year (29, 30%). The Internet usage time was; 27 people (28%) using the internet under 2 hours, 56 people (58%) under 4 hours, 11 people (11%) under 6 hours, and 3 people (3%) more than 6 hours. The experience of e-Learning classes were 43 people (44%) taking one class, 24 people (25%) taking two classes, 16 people (16%) taking three classes, and 14 people (14%) taking four classes.

4.2 Validity and Reliability

This research conducted a reliability and validity analysis through PLS method. Regarding the PLS analysis, reliability was evaluated through CSRI (Composite Scale Reliability Index). Generally if the CSRI value and Cronbach alpha value is over 0.7 in <Table 3>, it can be concluded that reliability is

<Table 3> Reliability Analysis

	AVE	$\sqrt{AVE}$	Composite Reliability	Cronbachs Alpha	Communality
INTENTION (INT)	0.744779	0.863006	0.852818	0.677318	0.744778
RELEVANCE (REV)	0.701782	0.837724	0.824057	0.584733	0.701782
RELIABILITY (REB)	0.837181	0.914976	0.911139	0.821361	0.837181
SUFFICIENCY (SUF)	0.750969	0.866585	0.857302	0.679193	0.750969
TRUST (TRU)	0.862019	0.92845	0.925896	0.839973	0.862019
UNDERSTAND (UND)	0.767941	0.876322	0.868496	0.704445	0.767941
USEFULNESS (USE)	0.798093	0.893361	0.887685	0.747979	0.798093

<Table 2> Correlation Analysis

	INT	REV	REB	SUF	TRU	UND	USE
INT	0.863006 *						
REV	0.548691	0.837724 *					
REB	0.495404	0.399304	0.914976 *				
SUF	0.542879	0.515968	0.618557	0.866585 *			
TRU	0.582896	0.623979	0.438125	0.636325	0.92845 *		
UND	0.379390	0.697339	0.562579	0.659946	0.548725	0.876322 *	
USE	0.556739	0.831292	0.400951	0.490729	0.650961	0.583300	0.893361 *
※ * Square root of AVE							

attained [6]. In addition, the research conducted a correlation analysis. The correlation coefficient of the research variables was between 0.3 and 0.7, indicating sufficient discriminant validity.

In result of factor analysis using structural model, we evaluated convergent validity with follows criteria. First, we adopted loading value of an item exceed 0.7. Second, we adopted Average Variance Extracted (AVE) value for a variables should be bigger than 0.5 [6]. The result of item loading on research variables are shown in Table 4. All variables in our study showed good convergent validity as all of the criteria were satisfied.

4.3 Result of Structural Model

This research carried out a PLS approach with regard to relationships among contents quality, trust, and Intention to use of e-Learning. We uses bootstrap analysis for evaluating path coefficient and testing SEM [1]. According to Chin (1988), PLS approach generally uses 1000 frequency of bootstrap option. In this study, we adopted on 1000 frequency of bootstrap option for testing research model [2].

Table 5 shows the results of structural equation model test. This modeling has been employed to test the proposed research model based on the sample groups. The results of the structural path analysis of the research model provide support to twelve hypotheses.

The eleven hypotheses were tested collectively using PLS approach [2]. The path significance of each hypothesized association in the research model was examined. Eight hypothesized associations except [H1], [H4] and [H7] were strongly significant at p < 0.001. The trust of e-Learning in this study explained 56% of the variance of the intention to use (R2 = 0.561022), and intention to use explained 50% of the variance (R2 = 0.504568).

Trust was jointly predicted by relevance of e-Learning contents (H2 : β = 0.139592, T-statistics = 3.810190 ***, p < 0.001), usefulness of e-Learning contents (H3 : β = 0.346259, T-statistics = 7.774516 ***, p < 0.001), reliability of e-Learning contents (H4 : β = 0.205068, p < 0.05), and sufficiency of e-Learning contents (H5 : β = 0.228134, < 0.05). However, understandability and reliability of e-Learning contents ware failed to

<Table 4> Factor Analysis

	INT	REV	REB	SUF	TRU	UND	USE
itou1	0.786647						
itou2	0.933137						
qa1		0.894064					
qa2		0.777312					
qad1				0.811041			
qad2				0.918777			
qt1			0.864161				
qt2			0.963114				
qu1						0.834782	
qu2						0.915982	
quf1							0.878844
quf2							0.907646
t1					0.926033		
t2					0.930860		

predict trust of e-Learning (H1) and (H4) due to its β (-0.020466 and 0.004478) and low T-statistics value (0.490128 and 0.185939). Intention to use of e-Learning was predicted by trust (β = 0.225851, T-statistics = 5.924115 ***, p < 0.001).

The qualities of e-Learning contents influence intention to use of e-Learning (See Table 5), relevance of e-Learning contents had an effect on intention to use of e-Learning (H8, β = 0.313610, T-statistics = 6.362305 ***, p < 0.001). Usefulness of e-Learning contents also had an effect (H9, β = 0.119693, T-statistics = 2.593796 ***, p < 0.001) on intention to use of e-Learning. Reliability of e-Learning contents also had an effect (H10, β = 0.267505, T-statistics = 10.691502 ***, p < 0.001) on intention to use of e-Learning. Sufficiency of e-Learning contents also had an effect (H11, β = 0.236717, T-statistics = 6.433377 ***, p < 0.001) on intention to use e-Learning. However, understandability of e-Learning contents quality was didn't affect intention to use of e-Learning.

5. Conclusions

5.1 Discussion and Implications

This study analyzed the relationship among e-Learning contents quality, trust, and intention to use for spread of e-Learning adoption. After empirical analysis like [Table 5], we found that sufficiency, relevance, and usefulness of e-Learning contents significantly influence trust, and reliability, sufficiency, relevance, and usefulness of e-Learning contents influence intention to use of e-Learning adoption that e-Learning trust significantly influences intention to use of e-Learning. However, the hypothesis, understandability and reliability of e-Learning contents would influence e-Learning trust, was not adopted and understandability of e-Learning contents would influence intention to use of e-Learning.

The implication of this study is like followings. The results showed that relevance, usefulness, and sufficiency in e-Learning contents quality perspective significantly influence establishing overall trust base for e-Learning. First of all, understanding of e-Learning contents is very important factor for formulating e-Learning trust which students think. However, it showed that understanding of e-Learning contents did not significantly influence trust and intention to use of e-Learning because there is big difference between

<Table 5> SEM Result

Hypotheses	ß	T-Statistics	Result
• [Hypotheses 1] UND ⇒ TRU	-0.020466	0.490128	Reject
• [Hypotheses 2] REV ⇒ TRU	0.139592	3.810190 ***	Accept
• [Hypotheses 3] USE ⇒ TRU	0.346259	7.774516 ***	Accept
• [Hypotheses 4] REB ⇒ TRU	0.004478	0.185939	Reject
• [Hypotheses 5] SUF ⇒ TRU	0.405117	7.958705 ***	Accept
• [Hypotheses 6] TRU ⇒ INT	0.225851	5.924115 ***	Accept
• [Hypotheses 7] UND ⇒ INT	-0.343377	9.154046 ***	N/S
• [Hypotheses 8] REV ⇒ INT	0.313610	6.362305 ***	Accept
• [Hypotheses 9] USE ⇒ INT	0.125889	2.593796 ***	Accept
• [Hypotheses 10] REB ⇒ INT	0.267505	10.691502 ***	Accept
• [Hypotheses 11] SUF ⇒ INT	0.236717	6.433377 ***	Accept
※ * p < 0.05, ** p < 0.01, *** p < 0.001 ※ R Squared : Intention to use (0.504568), Trust (0.561022)			

each student's thought regarding e-Learning contents and e-Learning adoption.

In addition, it turned out that relevance, usefulness, and sufficiency of e-Learning contents were the major affected quality factors for trust in e-Learning contents quality perspective. Therefore, in the future, e-Learning department of the school should have a great interest for relevance, usefulness, and sufficiency of e-Learning contents for construct e-Learning trust by the students, and the next interest should be usefulness and sufficiency of e-Learning contents to establish e-Learning quality management and improvement strategy.

In addition, the results showed that relevance and sufficiency of e-Learning contents significantly influence the relationship between e-Learning contents quality and intention to use of e-Learning. In other words, we should recognize that relevance, reliability, usefulness, and sufficiency of e-Learning contents are the important factors through the analysis of direct effects about the impact from e-Learning contents quality towards trust and intention to use, and establish the e-Learning contents quality improvement plan based on the above results.

In addition, the results showed that regression coefficients of the impacts from e-Learning trust towards intention to use of e-Learning were high. This alerts that establishment of the trust for the students who use e-Learning is more important than other factors. Therefore, the school should make various efforts to promote trust building for students who use e-Learning, public relations about e-Learning, and administrative management plan, such as attendance management, project management, and grades management that students can trust.

The results of this study would provide the implications how e-Learning contents development directions for the university students should be, and how to spread the e-Learning adoption through the construction of e-Learning trust.

5.2 Limitation and Future Studies

There are some limitations in this study. First of all, sampling process was not scientific, and the number of samples was so few. The survey of this study was performed targeted for students who had been enrolled e-Learning classes and voluntarily answered the survey. This study did not control by grade, region, and gender. In addition, this study has a limitation to analyze the structural equation model with very small number of questionnaires [20]. Therefore, the future study should perform the survey based on the scientific sampling procedures.

Secondly, students have various reasons and purposes to enroll the e-Learning classes. For example, some students enroll the e-Learning classes because of long distance commuting, their schedule management, and their positive or negative opinion about e-Learning [18]. This study has the limitation in terms of not considering the characteristics of the e-Learning enrollment. Therefore, the future study should perform the research considering why the students enroll the e-Learning classes and what their purposes are.

Thirdly, students' perception and intelligence about the computer and computer infrastructure are very important to perform this study because e-Learning classes are held based on the Internet [18]. However, this study has the limitation not considering students' intelligence about the e-Learning and individual computer systems. Therefore, future study should perform the study considering capacity of the computer systems, and students about the e-Learning.

Fourthly, nevertheless understandability of e-Learning contents is the very important factor to build the trust and intention to use of e-Learning, this study has the limitation that the hypothesis,

understanding of e-Learning contents would influence e-Learning trust, was not selected and not supported. It is considered that there are big differences to understand e-Learning contents between each student who answered the survey. Therefore the future study should perform the in-depth study through the control of the level about e-Learning understanding for more specific analysis.

Fifthly, in this study, we measured the impact of contents quality on intention to adopt e-Learning. As shown in <Table 3>, the correlation values of each variable have the close relationships. Research variables can't be seen partially the differentiated features. Therefore, our study have partially some limitation. For measuring e-Learning contents quality more accurately, future studies will develop the items and variables by empirical tests.

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※ [Appendix 1] Measurement Items

- e-Learning contents are easy to be understood.
- e-Learning contents are easily acceptable by ordinary people.
- e-Learning contents are suitable for me.
- e-Learning contents are sufficient to be accepted by the novice people.
- e-Learning contents are useful.
- e-Learning contents are helpful for me.
- e-Learning contents are highly veracious.
- e-Learning contents are trustful.
- Sufficient quantity of e-Learning contents is provided.
- e-Learning contents provide various information.
- I trust overall effects of online education.
- Online education is the trustful medium as like as offline education.
- e-Learning education is trustful in the perspective of attendance management, project management, and grades management (dropped).
- e-learning education lectures, teaching videos are trustful (dropped).
- I will use e-Learning for online lecture participation, lecture download, and online communication with the teacher in charge.
- I will use e-Learning more in the future for study.

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