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Exploring a New Determinant of Task Technology Fit: Content Characteristics

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ABSTRACT

Although task technology fit has received academic attention as a measure of information systems success, compared to other popular information systems success models it has received less empirical testing in the information systems field. One reason might be a relatively low explanatory power for the main construct, i.e., task technology fit, in the model. In this study, we suggest content characteristics as a new determinant of fit, and empirically test it along with the two existing determinants, task and technology characteristics with 105 users of a web-based learning management system. In order to verify the contribution of content characteristics to the explanatory power, both task technology fit models with and without content characteristics are tested and compared. The results support that the addition of content characteristics dramatically increases the explanatory power for the task technology fit.

KEYWORDS: Task Technology Fit, Content Characteristics, Information Systems Success

INTRODUCTION

Measuring the information systems (IS) success is an ongoing theme in the IS literature (DeLone & McLean, 2003). While several IS theories and models focusing on different aspects of information systems have been proposed and tested, only few of them have received substantial research attention in association with measuring IS success. Examples are the technology acceptance model (TAM) based on usefulness and ease of use (Davis, Bagozzi, & Warshaw, 1989) and the IS success model based on system quality and information quality (DeLone & McLean, 1992).

The task-technology fit (TTF) model (Goodhue, 1995) is another model that can evaluate IS success. The TTF model adopts the fit concept and assess fit between task and system characteristics, which is different from other popular models.

While the technology acceptance model focuses on individual acceptance of technology based on usefulness and ease of use (Davis et al., 1989) and the IS success model focuses on system use and user satisfaction based on system quality and information quality (DeLone & McLean, 1992), the TTF theory focuses on user evaluations of information systems by using fit between task and system characteristics (Goodhue, 1995). While both TAM and IS Success model have been extensively tested in empirical studies and extended in numerous ways (DeLone & McLean, 2003; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003), the TTF model has not.

There may be some disadvantages of the TTF model over other IS models that cause the lack of research attention. One disadvantage may be the limited explanatory power of the model for the main construct, task technology fit. The R^2 value has been used to compare the explanatory powers of models. While there is no absolute value for good models, the researcher can assume that the higher value of R^2, the greater the explanatory power and the better the prediction of the dependent variable in comparing models (Hair, Anderson, Tathem, & Black, 1998). For example, the explanatory power for the main construct of interest, usage, in the TAM study has been reported as 30% or higher (Davis, 1989), and the explanatory power for the main constructs of interest, system use and user satisfaction, in the IS success model as 30% to 55% (Rai, Lang, & Welker, 2002). However, the explanatory power for the fit dimensions has been reported as between 4% and 25% (Goodhue & Thompson, 1995) and between 11% and 30% (Goodhue, 1995) with two original determinants – task and technology characteristics.

In this study, we propose content characteristics as a new determinant of fit that can contribute to the explanatory power of the TTF model. The remainder of the paper is organized into four sections. First, we briefly review the background of this research. Next, we introduce our research model and methods. Then, we present the analysis and results of testing our research model. We conclude with a discussion of implications, limitations, and future research directions.

BACKGROUND

Task Technology Fit

The TTF model (see Figure 1) embodies a relatively simple but powerful perspective. It suggests that a better fit between technology and task will lead to better performance (Goodhue, 1995; Zigurs & Buckland, 1998).

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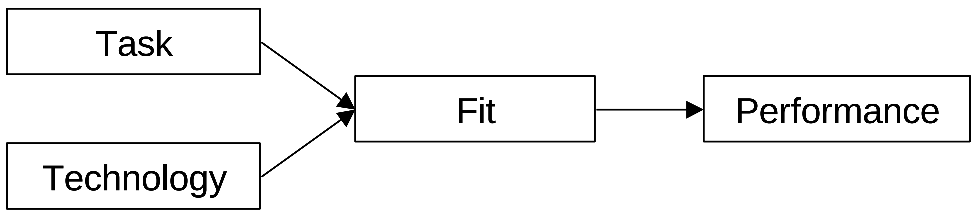
Figure 1: A General Model of Task Technology Fit



Prior research on TTF has focused on extending the TTF theory and model to the context of different information systems such as group support systems (Dennis, Wixom, & Vandenberg, 2001; Zigurs & Buckland, 1998), database management systems (Dishaw & Strong, 1999; Goodhue, Barbara, & Salvatore, 2000; Mathieson & Keil, 1998), software maintenance tools (Dishaw & Strong, 1999), and wireless technology (Yen, Wu, Cheng, & Huang, 2010). In addition, some previous TTF studies have focused on improving the general TTF model itself by incorporating another theory such as the appropriation theories (Dennis et al., 2001) and the technology acceptance model (Dishaw & Strong, 1999). There have been several studies that attempted to improve the TTF model itself. For example, Goodhue (1995) and Goodhue and Thompson (1995) suggested and tested many different dimensions of fit to validate the fit measurement. However, no prior TTF research has suggested and tested any additional determinant of fit. Instead, only *task* and *technology* have been tested as two determinants of fit. This study suggests *content characteristics* as an additional determinant of fit, which may contribute to the explanation of TTF.

Role of Contents in Evaluating Information Systems

An information system can be defined as "an integrated set of components for collecting, storing, processing, and communicating information" (Britannica, 2010). While the definition above specifies *information* as the contents that information systems deal with, different types of information systems may use different terms for their contents. For example, knowledge management systems, defined as "IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application" (Alavi & Leidner, 2001), use the term of *knowledge* as the contents that they deal with, rather than information. Thus, information systems may include some contents to be processed as a form of data, information or knowledge.

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Prior research has identified *contents* as the main actor in information systems success research. For example, DeLone and McLean (1992) used the quality of *contents* in information systems, i.e., information quality, as a major category for measuring IS success or effectiveness. They also confirm in their updated study that *contents* play a key role in IS success (DeLone & McLean, 2003). In addition, Davis (1989) used the concept of contents in terms of relevance and ambiguity in developing the usefulness and ease of use constructs of the technology acceptance model.

While the current TTF model (Figure 1) focuses on the *technology* knowledge workers use and the *tasks* they are involved in, it does not indicate the importance of the contents transferred among knowledge workers. In order to better apply the TTF perspective to the IS context, we need to specify the role of contents in the TTF model. In this paper, we propose and empirically test an enhanced TTF model including contents as another determinant of fit. In the next section, we describe our research model, which is followed by a discussion of our methodology and results.

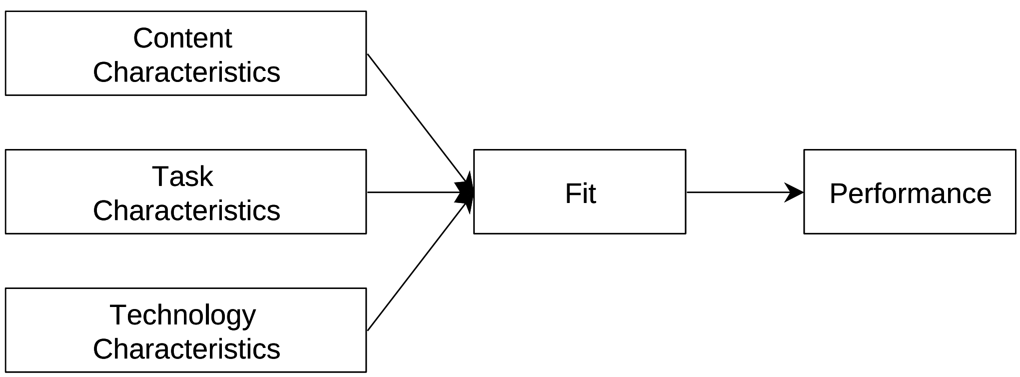
RESEARCH MODEL AND METHODS

Task, Technology, and Content Characteristics

Prior research has used task and technology characteristics as the two determinants of fit. Tasks are defined as "… the actions carried out by individuals in turning inputs into outputs" (Goodhue & Thompson, 1995, p. 216). Technology is defined as "computer systems (hardware, software, and data) and user support services (training, help lines, etc.) provided to assist users in their tasks" (Goodhue & Thompson, 1995, p. 216). Task technology fit refers to "the degree to which a technology assists an individual in performing his or her portfolio of tasks."

Some of the fit dimensions identified and tested by Goodhue (1995) and Goodhue and Thompson (1995) do not seem to concern fit between task and technology, but rather concern the contents such as data, information, and knowledge in the information systems. For example, Ahituv (1980) mentioned accuracy and compatibility as information characteristics, which have been used to measure TTF dimensions by Goodhue (1995). Swanson (1974) developed clarity ('meaning' dimension in (Goodhue, 1995)) and readability ('presentation' dimension in (Goodhue, 1995)) as information characteristics. King and Epstein (1983) proposed sufficiency ('right level of detail' dimension in (Goodhue, 1995)) and comparability ('compatibility' dimension in (Goodhue, 1995)) as information attributes. Thus, information or content characteristics have been involved in TTF research. However, they have not been specified as a particular construct in previous TTF studies, but rather they were embedded in the model as some dimensions of fit. We argue that the contents should play a role in the TTF model as an independent construct such as technology and task. This is because the content characteristics such as information quality have been evaluated as an independent construct in IS research (Rai et al., 2002; DeLone & McLean, 2003). In Figure 2, we specify the role of contents in the TTF model and propose content characteristics as an additional determinant of fit.

Figure 2: Content Characteristics as a Determinant of Fit



Content is defined here as all forms of knowledge, information, and data. Content characteristics are adopted from the concept of information quality in the DeLone and McLean model of IS success (1992). DeLone and McLean (2003) have also argued in their updated work on the IS success model that information quality captures the content issue in the e-commerce context. Their analysis of 16 empirical studies related to IS Success model shows that both information quality and system quality, which are regarded as content characteristics and technology characteristics respectively in the TTF model, are not interacting (DeLone & McLean, 2003). Instead, each affects system use, user satisfaction, individual impact, and organizational impact as an independent factor. Thus, our addition of content characteristics as a determinant of fit, not as a fit dimension, is empirically supported by the IS success literature.

Research Methods

The model in Figure 2 was tested through a survey of 105 junior students at a southeastern university in the United States. The questionnaires were distributed to users of a web-based learning management system (LMS), in a face-to-face management information systems course. The respondents received bonus points for completing the survey. The results in this survey research are unlikely to have been influenced by non-response bias because all the users asked to participate completed the survey anonymously and answered all items.

A survey instrument was developed based on items used in previous studies. Most items were rewritten to reflect the context. The final survey includes 4 demographic questions and 26 7-point Likert scale items (1 = very strongly disagree, 2 = strongly disagree, 3 = disagree, 4 = neutral, 5 = agree, 6 = strongly agree, 7 = very strongly agree). The constructs and measures in the survey questionnaire are summarized in Appendix A.

Content Characteristics. Content characteristics were measured in terms of a five-item scale that Swanson (1974) validated and used to evaluate the documentation generated by management information systems: relevance, redundancy, accuracy, conciseness, and readability. While Swanson (1974) originally developed seven items to evaluate the content aspect of management information systems, we have removed two items, timeliness and ambiguity, due to low reliability. In each item, “the contents” replaced the terms such as “the reports”, “the data”, and “the information”. Higher item scores indicate greater content quality.

Task Characteristics. Task characteristics were measured in terms of the task interdependence that Goodhue and Thompson (1995) suggested, but we have developed three items based on the concept of interdependence in the knowledge repository context. Higher item scores indicate greater task interdependence.

Technology Characteristics. Technology characteristics was measured in terms of a three-item scale that Goodhue and Thompson (1995) validated and used to evaluate the reliability of information systems: dependability, consistency of access, and uptime of systems. Although they used those items to measure the reliability dimension of fit, we have used them to measure *technology characteristics* because systems reliability has been widely used as a technology/system characteristic in the IS literature (DeLone & McLean, 1992). Higher item scores indicate greater systems reliability.

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Task Technology Fit. While IS researchers share some common understanding of the fit concept, they have used different dimensions to measure the fit. Goodhue and Thompson (1995) tested twenty one dimensions of fit and kept only sixteen dimensions, but Goodhue (1995) used twelve dimensions to measure the fit. In this study, we adopt the three dimensions suggested by Eason (1988) to measure the task technology fit: task match, ease of use, and ease of learning.

Eason (1988, p. 191) defines *task match* as "the ability of system functionality to serve user task needs." Task match is seen as a function of task and technology because a user can evaluate the degree of task match based on system functionality and task requirements. Consequently, evaluating *task match* means evaluating the functionality of the system by asking users how well the service matches their task requirements. Task match is universally applicable to any IS context without depending on any particular information system.

Ease of use is defined by Eason (1988) as "the usability of system operating procedures." While Eason's definition of *ease of use* is somewhat system-focused, *ease of use* generally refers to "the degree to which a person believes that using a particular system would be free of effort (Davis, 1989, p. 320)." It is an attribute of an individual's use of a system, rather than of the system per se. Mathieson and Keil (1998) argued that variation in task would change fit as well as the way a system is used, which might affect perceived ease of use. Their study supported the hypothesis that 'the interaction of task and IS affects perceived ease of use.' Another study also showed that poor TTF is associated with low *ease of use* scores (Keil, Beranek, & Konsynski, 1995). Thus, both studies show that *ease of use* is a function of task and technology, not solely dependent on systems functionality, as ease of use is mostly associated with attempts to use specific facilities to achieve a particular task purpose (Eason, 1988).

Eason (1988) argued that the ease with which a system can be learned is a combination of the *ease of use* of its operating procedures and the adequacy of the user support facilities. He defined *ease of learning* as "the adequacy of the user support methods provided for user learning" (Eason, 1988, p. 191), which in turn leads to an individual's perceived ease of learning.

We have used two to five items to measure each of the three dimensions for task technology fit. Since the prior TTF research (Goodhue, 1995, 1998) does not provide appropriate measures of *task match*, we have developed three items for *task match* from the literature, reflecting the definitions of task match. Five items for *ease of use* and two items for *ease of learning* have been adopted from prior research (Davis, 1989; Rai et al., 2002). Higher item scores indicate greater fit between task and technology.

Performance. We have adapted five measures for performance from Rai et al. (2002). They measure whether using the information systems enhances the user's work performance. Higher item scores indicate greater work performance.

ANALYSIS AND RESULTS

Partial Least Squares (PLS) analysis (with SmartPLS version 3.0) was used as the primary analysis tool (Ringle, Wende, & Becker, 2015). PLS is an advanced statistical method that allows optimal empirical assessment of a structural model together with its measurement model (Wold, 1982). PLS first estimates loadings of indicators on constructs, i.e., the measurement model, and then iteratively estimates causal relationships among constructs, i.e., the structural model (Fornell & Bookstein, 1982). PLS is considered preferable to such traditional methods as factor analysis, regression, and path analysis because it assesses both measurement and structural models (Gefen, Straub, & Boudreau, 2000). In this study, we test two structural models with and without content characteristics, and compare their results in terms of path coefficients and R^2 values to evaluate the role of content characteristics in the model.

Measurement Model

Before testing the structural model, the measurement model must be established by examining the psychometric properties of the measures.

Convergent Validity. To evaluate convergent validity of each factor model, we first examined standardized loadings. The standardized loadings should be greater than 0.707 to meet the condition that the shared variance between each item and its associated construct exceed the error variance. As seen in Table 1, all the loadings exceed this threshold. In order to evaluate the internal consistency for each block of measures - construct reliability, we examined Cronbach's alpha, composite reliability, and average variance extracted. The threshold values for Cronbach's alpha and composite reliability are not absolute, but it is suggested that 0.70 indicates extensive evidence of reliability and 0.80 or higher provides exemplary evidence (Bearden, Netemeyer, & Mobley, 1993; Yi & Davis, 2003). However, even a score between 0.60 and 0.70 may be acceptable for exploratory research (Hair, Anderson, Tathem, & Black, 1998; Nunnally, 1967). As shown in Table 1, all of the constructs in the measurement model exhibited a Cronbach's alpha of 0.72

or higher, and composite reliability of 0.83 or higher. Average variance extracted (AVE) is a way of evaluating the amount of variance that a latent construct "captures from its indicators relative to the amount due to measurement error" (Chin, 1998, p. 321), which is suggested as a measure of construct reliability (Fornell & Larcker, 1981). The acceptable level for AVE is 0.5 or higher, meaning that 50 percent or more variance of the indicators is accounted for by the construct (Chin, 1998). As seen in Table 1, all the AVEs are above the threshold of 0.5. Thus, our evaluations of Cronbach's alpha, composite reliability, and AVE indicate that the construct reliability has been established satisfactorily.

Table 1: Item Loadings and Construct Measurement Properties

Construct		Item	Standardized Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Content Characteristics		CONT1	0.76	0.86	0.90	0.65
		CONT2	0.76			
		CONT3	0.85			
		CONT4	0.87			
		CONT5	0.79			
Task Characteristics		TASK1	0.81	0.85	0.91	0.77
		TASK2	0.91			
		TASK3	0.90			
Technology Characteristics		TECH1	0.81	0.72	0.83	0.62
		TECH2	0.77			
		TECH3	0.79			
Fit	Task Match	TM1	0.71	0.93	0.94	0.61
		TM2	0.80			
		TM3	0.81			
	Ease of Use	EOU1	0.80			
		EOU2	0.79			
		EOU3	0.77			
		EOU4	0.72			
		EOU5	0.82			
		EOL1	0.76			

Ease of Learning	EOL2	0.81			
Performance	PERF1	0.88	0.96	0.97	0.86
	PERF2	0.95			
	PERF3	0.95			
	PERF4	0.93			
	PERF5	0.92			

Discriminant Validity. We conducted two tests for discriminant validity. First, each indicator's loading on its own construct and its cross-loadings on all other constructs were calculated. Table 2 shows that each indicator has a higher loading with its intended construct than a cross-loading with any other construct. Moreover, each block of indicators loads higher for its intended construct than indicators from other constructs.

Table 2: Loadings and Cross-Loadings

Construct		Item	1	2	3	4	5
1. Content Characteristics		CONT1	**0.75**	0.15	0.24	0.49	0.49
		CONT2	**0.76**	0.13	0.27	0.41	0.49
		CONT3	**0.85**	0.09	0.21	0.55	0.51
		CONT4	**0.87**	0.26	0.33	0.60	0.65
		CONT5	**0.79**	0.18	0.28	0.61	0.55
2. Task Characteristics		TASK1	0.10	**0.81**	0.20	0.20	0.26
		TASK2	0.24	**0.91**	0.14	0.34	0.33
		TASK3	0.18	**0.90**	0.20	0.29	0.29
3. Technology Characteristics		TECH1	0.35	0.27	**0.81**	0.36	0.49
		TECH2	0.21	0.02	**0.77**	0.20	0.10
		TECH3	0.19	0.10	**0.79**	0.24	0.19
4. Fit	4-1. Task Match	TM1	0.49	0.25	0.18	**0.71**	0.45
		TM2	0.54	0.28	0.23	**0.80**	0.52
		TM3	0.60	0.25	0.26	**0.81**	0.55
	4-2. Ease of Use	EOU1	0.49	0.34	0.32	**0.80**	0.53
		EOU2	0.53	0.17	0.34	**0.79**	0.58
		EOU3	0.57	0.32	0.40	**0.77**	0.57
		EOU4	0.49	0.21	0.27	**0.72**	0.53
		EOU5	0.59	0.17	0.29	**0.82**	0.52

4-3. Ease of Learning	EOL1	0.39	0.25	0.21	**0.76**	0.35
	EOL2	0.47	0.31	0.27	**0.81**	0.39
5. Performance	PERF1	0.57	0.33	0.29	0.57	**0.88**
	PERF2	0.64	0.26	0.32	0.63	**0.94**
	PERF3	0.63	0.27	0.36	0.63	**0.95**
	PERF4	0.63	0.40	0.40	0.58	**0.93**
	PERF5	0.64	0.30	0.41	0.60	**0.92**

Second, we compared AVE for each construct with the shared variance between all possible pairs of constructs (Fornell & Larcker, 1981). Table 3 shows that the AVE for each construct is higher than the squared correlation between the construct pairs, which indicates that more variance is shared between the latent construct and its block of indicators than with any other construct representing a different block of indicators. Therefore, the tests above establish discriminant validity.

Table 3: AVEs versus Squares of Correlations between Constructs

Construct	Average Variance Extracted	CONT	TASK	TECH	FIT	PERF
Content Characteristics	0.65	-				
Task Characteristics	0.77	0.04	-			
Technology Characteristics	0.62	0.11	0.04	-		
Fit	0.61	0.45	0.11	0.13	-	
Performance	0.86	0.45	0.11	0.15	0.42	-

Structural Model

The structural model was assessed by examining path coefficients and their significance levels. Figure 3 shows the results of the original TTF model and Figure 4 shows those of the proposed TTF model with content characteristics. The explanatory power of a structural model can be evaluated by examining the variance explained, or R^2 value of the final dependent construct. *Performance* in the model had an R^2 value of 0.42, indicating that the research model accounts for 42% of the variance in the dependent variable. In this study, however, we are more interested in the R^2 value for TTF, the intermediate variable in the structural model, because the major focus is to understand the contribution of the new determinant of fit, content characteristics, to the explanation of the fit. The R^2 value for fit in the analysis of the original TTF model (see Figure 3) is 0.20 where the R-square value for each fit dimension is 0.12 for task match, 0.21 for ease of use, and 0.13 for ease of learning. This R^2 value of 0.20 in the original TTF model is within the range of previous TTF studies – 0.04 to 0.25 in (Goodhue & Thompson, 1995) and 0.11 to 0.30 in (Goodhue, 1995). However, the R^2 value for fit in the proposed TTF model with content characteristics (see Figure 4) is 0.48 where the R^2 value for each fit dimension is 0.40 for task match, 0.49 for ease of use, and 0.26 for ease of learning. This R^2 value of 0.48 in the proposed model is much higher than that of the original model and those in the prior research (Goodhue, 1995; Goodhue & Thompson, 1995). This increased R^2 value stands as compelling evidence of the contribution of content characteristics to the explanatory power for task technology fit.

We computed path coefficients in the structural model with the entire sample and employed the bootstrapping method (with 500 resamples) to obtain the t-values corresponding to each path. The acceptable t-values for two-tailed tests are 1.96 and 2.58 at the significance levels of 0.05 and 0.01. In the proposed TTF model, both *task characteristics* and *technology characteristics* had direct effects on *fit* (path coefficient = 0.161, $p < 0.01$ and path coefficient = 0.163, $p < 0.01$, respectively), which confirms the findings in prior TTF research. *Content characteristics*, the construct that we theoretically developed and proposed in this study, also had a direct effect on *fit* (path coefficient = 0.564, $p < 0.001$), which supports our argument for including the role of contents in the TTF model. *Fit* had a positive effect on *performance* (path coefficient = 0.65, $p < 0.001$) as originally established by Goodhue and Thompson (1995). Thus, all paths in the research model were significant at the $p < 0.01$ or 0.001 levels.

Figure 3: Structural Model without Content Characteristics

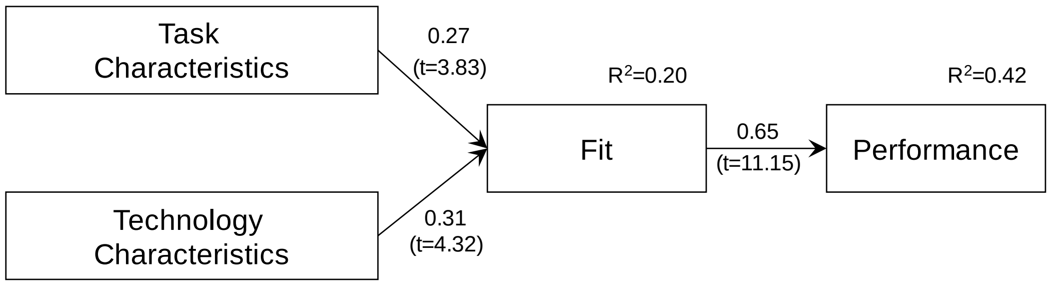
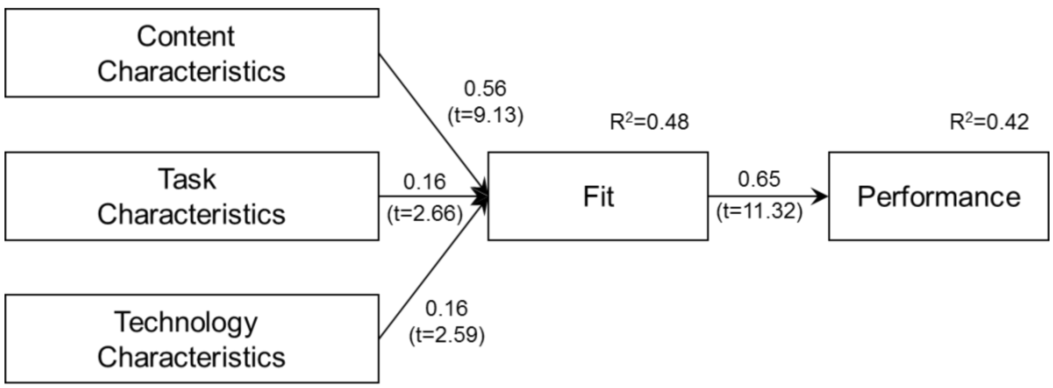


Figure 4: Structural Model with Content Characteristics



DISCUSSION AND IMPLICATIONS

This study extends the TTF model by proposing content characteristics as another determinant of fit and tests the extended TTF model. In addition, it suggests and empirically tests three dimensions of fit that would simplify the fit measurement. In this section, we discuss the two major contributions of this study – addition of the role of contents and simplification of fit measurement and – and some limitations and future research.

Content Characteristics as a New Determinant of Fit

This study extends the TTF model by suggesting a new determinant of fit. Specifically, a major contribution of this study to the TTF literature is to reconstruct the fit determinants by employing the concept of *content characteristics*. As seen in the structural model, the path coefficient of *content characteristics* is significant (path coefficient = 0.56, p<0.001) and is much higher than those of the other two characteristics (*task characteristics*: path coefficient = 0.16, p<0.01 and *technology characteristics*: path coefficient = 0.16, p<0.01). This confirms that content characteristics play an important role in evaluating the fit between the information systems and the tasks given. This is because the content itself is a key factor for the information systems dealing with contents such as data, information, and knowledge. However, it has not been suggested nor tested in the prior TTF research. From the results of this study, we would argue that contents characteristics are another valid determinant of fit.

Three Fit Dimensions

Another contribution of this study is testing the three new dimensions of fit – task match, ease of use, and ease of learning – suggested by Eason (1988). We believe that research replication is very important in popularizing a theoretical model. The TTF model has great research potential in the IS field, but has not become as popular as other IS models, such as TAM. This is likely because replication of TTF research is much harder than that of TAM research in terms of its measurement. This study employs three new dimensions to measure the fit construct, reflecting the meaning of task technology fit. It would help other researchers replicate and apply the TTF model in different IS contexts. This in turn could contribute to the popularization of the TTF model in IS research. In addition, the three fit dimensions have been empirically tested and confirmed in this study.

Limitations and Future Research

In this study, we tested the fit construct by combining its three constituent dimensions into one construct because this study mainly focuses on whether the new determinant of fit, content characteristics, can contribute to the explanatory power for the fit construct itself. While this helps us evaluate the validity of content characteristics as a new determinant of fit, it does not give us a full understanding of how fit determinants interact with each dimension of fit. Thus, examining the interactions of the three determinants of fit with the three dimensions would be valuable future research. Such research would also further validate the use of content characteristics as a fit construct.

While we believe that the proposed TTF model including content characteristics can be applied into many IS and task contexts, this study examines the model only in a specific type of information system for a specific task. Future research can replicate and apply the model in other types of information systems and tasks, which will extend the proposed TTF model in the study of information systems success. In addition, we believe that information systems may deal with different forms of content such as documents, videos, audios, animations, and graphs. Thus, future research replicating the proposed model should reflect these various forms of content and investigate how such different forms are related to user's evaluation of fit.

The task that we measured in this study was course work by students. In order to validate the model in this study, future research will have to test the model with other types of task or technology. For instance, Zigurs et al. (1999) distinguished between simple tasks, problem tasks, decision tasks, judgment tasks and fuzzy tasks. The role or contribution of content characteristics in the proposed model may vary with different types of task or technology.

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APPENDIX A. CONSTRUCTS AND MEASURES

Construct		**Item**
Fit	Task Match	My work in the course is well-supported by LMS.
		The functionality of LMS serves my needs very well.
		The services provided by LMS match my requirements.
	Ease of Use	I find it easy to get LMS to do what I want it to do.
		My interaction with LMS is clear and understandable.
		I find LMS to be flexible to interact with.
		I find LMS easy to use.
		LMS is user friendly.
	Ease of Learning	Learning to use LMS was easy for me.
		It was easy for me to become skillful at using LMS.
Content Characteristics		The contents in LMS are relevant.
		The contents in LMS are not redundant.
		The contents in LMS are accurate.
		The contents in LMS are concise, to the point.
		The contents in LMS are readable.

Task Characteristics	My coursework is dependent on receiving accurate information from others.
	I have to collaborate with others in my coursework.
	My coursework requires frequent coordination with the efforts of others.
Technology Characteristics	I can count on LMS to be “up” and available when I need it.
	LMS is subject to unexpected or inconvenient down times which makes it harder to do my work. (reversed)
	LMS is subject to frequent problems and crashes. (reversed)
Performance	Using LMS improves my performance in this course.
	Using LMS in my coursework increases my productivity.
	Using LMS enhances my effectiveness in my coursework
	Using LMS makes it easier to do my coursework.
	I find LMS useful in my coursework.