



## Examining the role of behavioral intention on multimedia teaching materials using FSQCA☆



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### ABSTRACT

This study shows the value of a set-theoretic comparative technique; that is fuzzy-set qualitative comparative analysis (fsQCA), as a method to complement other traditional techniques, such as Structural Equation Modeling (SEM). The study illustrates the technique to investigate more nuanced coverage of the role of behavioral intention impacts on other determinants than the conventional “net effect” symmetrical explanation. It also demonstrates that behavioral intention and its impact are contingent on combinations of complex antecedent conditions and several alternative paths. Specifically, the study expands to overthrow some findings by SEM to show that the degree of behavioral intention depends on the combination of “ingredients” in the perceived ease of use and attitude causal “recipes.” The study also shows that the deleterious influence of behavioral intention on instructor-related outcomes, such as perceived self-efficacy, perceived financial cost, perceived credibility, long-term consequence, perceived ease of use, and perceived usefulness, is conditional and depends on the combination of antecedent conditions that occur in the causal statements. For this study, the major contribution is to explore the instructors behavioral intention on multimedia teaching materials lead to high membership in the three outcome conditions: (1) PEU (Perceived Ease of Use), (2) ATT (Attitude) and (3) BI (Behavioral Intention) and the secondary contribution is to make a comparison with the results of both methods between SEM and fsQCA. Finally, it also proposes the viewpoints in the theoretical, methodological, and practical perspectives in the conclusion for this study.

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### 1. Introduction

Instructors can incorporate multimedia teaching materials into the process of teaching and learning, as to the aspect of text book. The use of multimedia teaching materials is an epochal, inevitable trend in teaching and learning. With its text, audio, still images, animation, video, and interactivity content forms, teaching and learning atmosphere has changed, improved and enhanced. This study investigates the factors affecting college instructors' intention to use multimedia teaching materials. The technology acceptance model (TAM) was designed specifically to explain multimedia teaching materials in the study. The external factors included are perceived credibility, perceived self-efficacy, perceived financial costs, and long term consequence.

The present study builds on the existing literature that underscores the value of fuzzy-set qualitative comparative analysis (fsQCA) (e.g.

Fiss, 2011; Woodside, 2013; Woodside & Zhang, 2013) and shows that the proposed methodological tool offers much in terms of understanding causal relationships, by virtue of providing the information that conventional methods provide. In this regard, the study implements fsQCA with the dataset collected 268 respondents from central Taiwan's colleges and universities and illustrates how this technique can offer a more holistic, combinatorial view of the examined inter-relationships.

This study explores the instructors' behavioral intention on multimedia teaching materials and the secondary contribution is to make a comparison with the results of both methods between SEM and fsQCA. The method of fsQCA enables examination of different configurations of conditions that give rise to an outcome of interest (Ganter & Hecker, 2014; Stanko & Oller, 2013). The value of this study lies in the effort to describe combinatorial complexities assuming asymmetrical relationships between variables, rather than symmetrical net effects that SEM estimates.

Section 2 summarizes the theoretical background of the study and offers important insights into SEM. Section 3 develops the hypotheses based on literature in the study. Section 4 introduces the method of fuzzy-set qualitative comparative analysis (fsQCA) to highlight the needs for new alternative techniques. Section 5 implements the proposed dataset collecting 268 respondents from central Taiwan's colleges

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and universities. Section 6 reports the empirical results. Section 7 concludes with theoretic and practical implications and suggestions for further research.

## 2. Literature review

### 2.1. Perceived self-efficacy

Researchers have suggested a positive relationship between experience with computing innovation technology and various outcomes, such as computer usage (Agarwal & Prasad, 1999; Harrison & Rainer, 1992). In particular, computer self-efficacy has been examined in TAM literature (e.g. Agarwal, Sambamurthy, & Stair, 2000; Hong, Thong, Wong, & Tam, 2001; Johnson & Marakas, 2000), which confirms the critical role that computer self-efficacy plays in understanding individual response to information technology adoption. Perceived self-efficacy herein is defined as the judgment of one's ability to adopt multimedia teaching materials. The proposed relationship between perceived self-efficacy and perceived ease of use is based on the theoretical argument by Davis (1989) and Mathieson (1991). Besides, the evidence of a causal link between self-efficacy and perceived ease of use has been presented (e.g. Agarwal et al., 2000; Venkatesh, 2000; Venkatesh & Davis, 1996). Based on the theory of planned behavior, Mathieson, Peacock, and Chin (2001) proposes that perceived knowledge resources have a significant positive influence on behavioral intention to digital leaning.

### 2.2. Perceived financial cost

Since multimedia teaching materials are chiefly generated by computer innovation technology, computer facilities including both hardware and software are required. Perceived financial cost is defined as the extent to which a college instructor believes that using multimedia teaching materials will cost. Actually, economic motivations and outcomes are the most popular topics of IS (information system) acceptance studies. Failed investments in technology may not only cause financial losses, but also lead to dissatisfaction among employees (Venkatesh, 2000).

### 2.3. Perceived long-term consequences

Triandis (1980) suggests that perceived consequences represent individual evaluation regarding the potential rewards and value associated with different actions which are made before making decisions. Consumer satisfaction comes from the confirmation of initial expectations and actual performance of products or services, thus, expectations determine satisfaction in post-purchase behavior (Oliver, 1980). Based on the cognitive dissonance theory, Szajna and Scamell (1993) found a positive relationship between realistic expectations regarding IS utilization and user satisfaction.

## 3. Hypotheses

College instructors may be motivated to adopt multimedia teaching materials while they find it is reliable to use multimedia teaching materials; whereas being frustrated to violate a security and privacy concerns. Therefore, based on the review of literature, the following hypotheses are presented:

**H1.** Perceived ease of use has positive significant effect on perceived credibility of adopting multimedia teaching materials.

Self-efficacy reflects the belief of the customers regarding their performance in using the system. A recent meta-analysis by Sitzmann and Yeo (2013) suggests that increases in self-efficacy attributable to prior improvements in performance may actually confound interpretations of the self-efficacy–performance relationship. Therefore, based on

the theoretical and empirical support from the literature, this study tests the following hypotheses:

**H2a.** Perceived self-efficacy has a positive effect on the perceived ease of use of multimedia teaching materials.

**H2b.** Perceived self-efficacy has a positive effect on behavioral intention to use multimedia teaching materials.

Yang, Lu, Gupta, Cao, and Zhang (2012) point out that perceived fee would negatively affect users' behavioral intention to adopt mobile payment services. Therefore, perceived financial resources are found to be a significant antecedent of the behavioral intention to use an IS (Mathieson et al., 2001), which leads this study to the following hypothesis:

**H3.** Perceived financial cost has a negative effect on behavioral intention to use multimedia teaching materials.

Accordingly, this study assumes that a positive relationship exists between expectations regarding computer use and user satisfaction. Based on the theoretical arguments and empirical findings of previous studies (e.g. Oliver, 1980; Szajna & Scamell, 1993; Triandis, 1980), this study hypothesizes that perceived consequences influence individual satisfaction with computer uses follows:

**H4a.** Long-term consequences positively affect college instructor's attitude toward multimedia teaching materials.

**H4b.** Long-term consequences positively affect college instructor's behavioral intention toward using multimedia teaching materials.

The concept of trust has long been an important issue in the usage of multimedia teaching materials. In order to enhance the usage of multimedia teaching materials, they must be both easy to learn and use. According to Wang, Wang, Lin, and Tang (2003), perceived ease of use is a significant antecedent to the perceived credibility of multimedia teaching material. Thus, the following hypotheses propose:

**H5.** Perceived credibility has positive significant effect on behavioral intention of adopting multimedia teaching materials.

**H6.** Perceived ease of use has a positive effect on the perceived usefulness of multimedia teaching materials.

Similar to perceived usefulness, perceived ease of use is one of the most important determinants of the TAM model (Davis, Bagozzi, & Warshaw, 1989). Consequently, if consumers perceive a service to be easier and more convenient for them to use, it directly influence their attitude toward to enhance the usage of multimedia teaching materials. The above discussion leads to the following hypothesis:

**H7.** Perceived ease of use has a positive effect on the attitude toward using multimedia teaching materials.

Previous studies have emphasized the role of the perceived usefulness on attitudes toward use (Davis et al., 1989; Suh & Han, 2002; Venkatesh & Morris, 2000). Davis (1989) argues that individuals who tend to undertake behaviors they believe will help themselves perform their job better and more efficiently. Hence, the following hypothesis is developed:

**H8.** Perceived usefulness has a positive effect on the attitude toward using multimedia teaching materials.

There is also an extensive research in the TAM stream that provides evidence of the significant effect of perceived usefulness on usage intention (e.g. Agarwal & Prasad, 1999; Davis et al., 1989; Hu, Chau, Sheng, & Tam, 1999; Jackson, Chow, & Leitch, 1997; Venkatesh, 1999; Venkatesh & Davis, 1996; Venkatesh & Morris, 2000). Attitude is the connecting

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