An Investigation of the Factors that Influence Preservice Teachers’ Intentions and Actual Integration of Web 2.0 Technologies

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Abstract

This mixed methods study investigated factors that influence pre-service teachers’ intentions to use Web 2.0 technologies in their future classrooms during teacher education course and their ability to carry out their intentions into actual behavior during student teaching experience. Findings revealed that pre-service teachers’ attitude and their perceived usefulness of Web 2.0 technologies are strong indicators of their intention to use Web 2.0 tools during teacher education course. One year later, participants indicated that they were able to transfer their intentions during student teaching experience. Use of Web 2.0 during student teaching was influenced by their perceived usefulness of Web 2.0 technologies, technology support, self-efficacy, and knowledge of various Web 2.0 tools. These results suggest that given the presence of facilitative factors, preservice teachers are able to transfer their intentions to use Web 2.0 technologies into actions to support student learning in their classrooms.

Introduction

While the growing role of Web 2.0 technologies (wikis, blogs, social networking, etc.) in education has brought unprecedented opportunities for both students and faculty by providing access to information and facilitating easy communication, at the same time this has led to the need to better prepare pre and in-service teachers to create socially active learning environments that encourage interaction and collaborative learning (Coutinho, 2008). In recognition of this need, preservice teachers must be prepared to implement advanced technologies in order to meet the needs of 21st century learners (American Association of Colleges for Teacher Education (AACTE) & P21, 2010; International Society for Technology in Education (ISTE), 2008; U.S. Department of Education, 2010). The National Educational Technology Standards for teachers (NETS-T) emphasizes the necessity for pre-service teachers to gain the fundamental knowledge, skills and attitudes needed to incorporate contemporary tools and resources into the learning process (ISTE, 2008).

Preservice teachers’ positive intentions toward using technologies have been shown to be a major predictor of their future use and successful integration in their classrooms (Myers & Halpin, 2002; Yushau, 2006). For this reason, a number of studies have explored influential factors that explain preservice teachers’ intentions to use various technologies including computers (Teo, 2009), software (Anderson & Maninger, 2007), and information technologies (Birch & Irvine, 2009). Although these studies have explored factors influencing the technology integration efforts of preservice teachers in general, little research has been conducted that examines the potential factors that determine preservice teachers’ intentions to use Web 2.0 technologies in a classroom. Furthermore, only limited studies have followed preservice teachers during their student teaching experiences to examine whether their stated intentions, during their teacher education programs, actually materialized into action. Cullen and Greene...
(2011) highlighted the need to examine how intention translates into practice when preservice teachers are given a choice to use technology during student teaching. A combination of factors that influence both intentions and actions of preservice teachers would provide more robust information to guide teacher education programs, charged with preparing preservice teachers to use Web 2.0 technologies in their future classrooms.

**Purpose of Study**

The purpose of this study was two-fold. The first was to investigate factors that predict preservice teachers’ intentions to use Web 2.0 technologies in their future classrooms to improve student learning. The second was to explore the transfer of intentions into actions during student teaching and the factors that influenced actual use. The following questions guided the study:

1. What factors best predict preservice teachers’ intentions to use Web 2.0 technologies in their future classrooms? How do preservice teachers describe the factors that predict their intentions to use Web 2.0 technologies in their future classrooms?
2. What factors facilitated or inhibited preservice teachers’ use of Web 2.0 technologies during their student teaching? How do preservice teachers describe the factors that facilitated or inhibited their use of Web 2.0 technologies in their actual classrooms?
3. To what extent are preservice teachers able to translate their intentions for using Web 2.0 technologies into action during student teaching?

**Theoretical Framework**

This study used the decomposed theory of planned behavior (DTPB) as its theoretical framework (Taylor & Todd, 1995). The DTPB extends Ajzen’s (1991) theory of planned behavior (TPB), which focuses on the formulation of an intention to behave in a particular way. TPB suggests that a combination of behavioral intention and perceived behavioral control determines one’s actions. The DTPB explores subjective norms and perceived behavioral control more completely by decomposing attitude, subjective norms, and perceived behavioral control into lower-level belief constructs and states that behavioral intention determines behavior and that attitude, subjective norms, and perceived behavioral control are direct determinants of behavioral intention. The DTPB provides a comprehensive way to understand how an individual’s attitude, subjective norms and perceived behavioral control can influence his or her intention to use Web 2.0 (Ajjan & Hartshone, 2008). Moreover, it helps examine the relationship of factors that impact the adoption and use of new technologies more specifically (Taylor & Todd, 1995).

**Methods**

A sequential explanatory mixed methods design in two different phases (see Figure 1) was used. In both phases, quantitative data were collected from online survey and qualitative data were collected from one open-ended survey questions and semi-structured interviews to validate and expand quantitative results with qualitative data (Creswell & Clark, 2007). The results of the two phases were integrated during the interpretation of the outcomes of the entire study.
Participants

The study took place at a Midwestern university during Fall 2010 and then follow-up during Spring 2012. In phase one, 189 pre-service teachers completed the online survey and 12 were purposefully selected to participate in the semi-structured interviews. Criteria for selection included varied majors, gender, and grade level interests. In the follow-up second phase, of the initial sample ($n=189$) only 22 pre-service teachers completed their student teaching. Out of 22 pre-service teachers, a total of 14 completed the surveys and six were selected to participate in the follow-up telephone interviews based on the survey responses. Criteria for selection included participants who reported using Web 2.0 tools and who did not use Web 2.0 tools during student teaching.

Data Collection

Surveys and interviews were employed to answer the research questions for both phases of the study (see Table 1).

Table 1. 
Overview of Research Questions, Data Sources, & Analysis Procedures

<table>
<thead>
<tr>
<th>Phases</th>
<th>Research Questions</th>
<th>Data Sources</th>
<th>Analysis Procedure</th>
</tr>
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<tbody>
<tr>
<td>Phase 1</td>
<td>Q1. Factors best predict pre-service teachers’ intentions.</td>
<td>- Post project survey: Path Analysis</td>
<td></td>
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<tr>
<td></td>
<td>- Description of predicted intent factors</td>
<td>- DTPB scale</td>
<td>QUANT + QUAL: Constant comparative method</td>
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<tr>
<td></td>
<td></td>
<td>- Semi structured Interviews</td>
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<td></td>
<td></td>
<td>- Open ended survey responses</td>
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</table>
Survey Instrument

**Phase One.** The survey instrument consisted of three sections and was partially adapted from previous studies (Hartshorne & Ajjan, 2009). The first section included four statements about participants’ intentions to use Web 2.0 tools and perceptions of pedagogical advantages. The second section of the survey consisted of modified items of the DTPB scale with a series of 7-point Likert-scale (Strongly agree to strongly disagree) to examine factors that influence pre-service teachers intentions to use Web 2.0 technologies in their future classroom. Items focused on behavioral intention, perceived behavioral control, attitude, and subjective norms. The third section of the survey included six multiple choice items to determine the demographics of the participants. Demographic and attitude scale data were analyzed with descriptive statistics and the DTPB results were analyzed using path analysis to test the research hypothesis related to determining factors and to estimate the degree of the linkage between variables that determine intention to adopt Web 2.0 technologies (Hartshorne & Ajjan, 2009).

**Phase Two.** The survey instrument consisted of two sections. The first section of the survey contained a question asking pre-service teachers whether or not they had used Web 2.0 technologies in their classroom followed by four open-ended questions exploring the factors that influenced their decisions to use or not use Web 2.0 technologies. The second section included six multiple choice items to determine the demographics of participants. Frequencies of responses were tabulated and percentages were determined in order to determine if the pre-service teachers were able to translate their intentions of using Web 2.0 into actual actions during student teaching experience.

**Interviews**

The interview questions in phase one were developed based on the Web 2.0 attitude and the DTPB constructs to further explore teachers’ survey results and gain additional insights. Follow-up semi-structured telephone interviews were administered in phase two were developed based on the research questions. Qualitative data in both phases were content analyzed using Miles and Huberman’s (1994) constant-comparison approach. Once all of the transcripts were coded, each category was then re-analyzed to determine the relationships between the codes. The statements were examined and grouped according to the research questions and by identifying emerging themes that provide further explanations.

**Results**

**RQ-1. Factors that best predict preservice teachers’ intentions to use Web 2.0 technologies**

The behavioral intention was a strong determinant of actual behavior or usage of Web 2.0. Regression results confirmed each of the three factors—attitude, subjective norm, and perceived behavioral control—explained a significant variance (70.8%) in behavioral intention (adjusted R2).

**Attitude:** The results indicated that the pre-service teachers’ attitudes and their perceptions of the usefulness of Web 2.0 tools are the strongest determinants of their intentions to use Web 2.0 technologies. Regression results confirmed each of the three factors, perceived usefulness, perceived ease of use, and perceived compatibility, and explained a significant variance (68.6%) in attitude (adjusted R2). Perceived usefulness was the most significant predictors of their intentions to use Web 2.0 in their future classrooms. All (n=12) interview participants mentioned that they will use Web 2.0 in their classrooms due to its potential positive impact on student learning.
Subjective norm. Regression results confirmed each of the three factors—superior, student, and peer,—explained a significant variance (79.5%) in the subjective norm (adjusted $R^2$). Student influence had the strongest influence on the subjective norm, which, in turn, had a strong influence on behavioral intention. From the interviews “students influence” also emerged as the biggest factor in determining whether or not the pre-service teachers intend to integrate Web 2.0 into their teaching. Most ($n=10$) of the pre-service teachers thought their students would influence their use of Web 2.0. For instance one participant stated, “If students want more integration of Web 2.0, I will definitely use more applications to keep them engaged.”

Perceived behavioral control. Regression results confirmed each of the three factors—facilitating resources conditions, facilitating technology conditions and self-efficacy—explained a significant variance (32.2%) in perceived behavioral control (adjusted $R^2$). All three factors were found to influence the perceptions of behavioral control, which also had an influence on behavioral intention of pre-service teachers to use Web 2.0 technologies, with self-efficacy having the strongest influence. The interviews revealed that pre-service teachers were motivated to use Web 2.0 technologies due to their high self-efficacy in using these technologies. For example, one participant reported, “I have a lot of experience and skills where I can go online, research things and find the right Web 2.0 tools to use.”

RQ-2. Factors that Facilitate or Inhibit Preservice Teachers’ Actual Use of Web 2.0 Technologies

Interview data revealed perceived usefulness of Web 2.0 tools to enhance student learning through interaction, self-efficacy and ease of using Web 2.0 tools, availability of technology/resources, technology access and support in the classroom, and knowledge of various Web 2.0 tools were the most important factors that influenced pre-service teachers’ use of Web 2.0 in the classroom. For instance, one participant stated, “Comfort with technology and access to websites, Internet, and computers were main factors for my use of Web 2.0.”

Although most of the preservice teachers used Web 2.0 technologies, a few were not able to use them. During the post-student teaching interview, two participants explained that even though they intended to use Web
2.0 technologies in their classrooms, they were unable to because of limited access to technology resources (e.g., computer labs, the Internet, blocked websites, etc.) and unsupportive cooperating teachers who were not accepting of new technologies.

RQ-3. Transfer of Intentions to Actions

A Pearson correlation coefficient was calculated for the relationship between post-course intentions to use Web 2.0 tools and post-teaching self-reported behavior. A strong positive correlation was found ($r (14) = .531, p < .05$), indicating a significant positive relationship between preservice teachers intentions and subsequent behaviors. Most (12 of 14) of the preservice teachers’ self-reported behaviors were consistent with their intentions (see table 2). According to the post-course and post-student teaching results of the 14 preservice teachers, the majority ($n=11$) of the preservice teachers who intended to use Web 2.0 tools ($n=13$), reported using Web 2.0 technologies and only one did not intend and use these tools during her student teaching. Of those ($n=13$) who intended to use these tools, two did not use Web 2.0 tools within the classroom during their student teaching experience.

Table 2
Preservice teachers’ intentions vs. actual use of Web 2.0 tools

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>11 (85%)</td>
<td>2 (15%)</td>
</tr>
<tr>
<td>No (0%)</td>
<td>1 (100%)</td>
<td>7%</td>
</tr>
</tbody>
</table>

Discussion and Conclusion

This study revealed that pre-service teachers had both positive attitudes and high intentions to adopt Web 2.0 technologies in their future classrooms to improve their student learning. The results of this study provide evidence that pre-service teachers’ attitudes and perceptions of usefulness of Web 2.0 tools are the strongest indicators of their intentions to use Web 2.0 tools. This perception of usefulness could be due to preservice teachers’ exposure to Web 2.0 technologies during the Web 2.0 project that helped them understand the value of using these technologies in the classroom. Thus, Teacher training experiences could include opportunities for pre-service teachers to develop actual lesson plans that integrate Web 2.0 technologies, micro-teach those lessons in teacher education courses, and reflect on their experiences. This might help improve their attitudes towards as well as enhance their perceptions of the usefulness of Web 2.0 technologies.

The findings revealed that when preservice teachers perceive the usefulness of Web 2.0 technologies, have support from mentor teachers and their students, and have high self efficacy as well as easy access to Web 2.0 tools, they are most likely to translate their intentions into actions. This finding corroborates Bullock’s (2004) conclusion from his study that a combination of “effective cooperating teacher mentoring and modeling, clear expectations, easy access to technology and technology support, and positive experiences with technology in the classroom” can facilitate preservice teachers’ uses of technology in a classroom (p. 236). Therefore, this finding suggests a connection between intentions and actions given the presence of facilitative conditions. On the other hand, two preservice teachers who had intended but did not use Web 2.0 technologies reported that poor access to technology and a lack of support from their supervising teachers acted as inhibitors. Thus, these results suggest that cooperating teachers and access to technology can act both as facilitating or inhibiting factors for preservice teachers’ transfer of intentions into actions. To help preservice teachers successfully translate their positive intentions into actions, teacher educators can prepare them to take advantage of the facilitating factors and deal with the possible challenges of Web 2.0 technology use within a classroom.

The follow-up results revealed that most of the pre-service teachers were able to translate their intentions
into actual use of Web 2.0 during student teaching. The findings support the conclusion that pre-service teachers’ positive intentions toward using technology are a major predictor for future use and successful integration of technology in their classrooms (Myers & Halpin, 2002; Yushau, 2006). Teacher educators need to look into promoting the translation of positive intentions towards technology integration into actual practice. Therefore, providing pre-service teachers opportunities to utilize their own technology enhanced lesson plans in an actual classroom situation with real learners might be a step in the progression between positive attitude and intentions to actual actions. Therefore, this study confirms that the DTPB is capable of predicting preservice teachers’ intentions and consequently actual behavior. Given the presence of facilitative conditions, these results substantiate a link between intentions and behavior.

This study contributes to the limited body of knowledge related to the factors that influence pre-service teachers’ intentions and the transfer of these intentions into student teaching experience. Such finding will help teacher educators gain a broader understanding of the factors and craft courses, programs, and experiences that take these factors into consideration, and better prepare teacher to teach with Web 2.0 technologies.

References


