J. EDUCATIONAL COMPUTING RESEARCH, Vol. 45(3) 321-338, 2011

RELATIONSHIPS AMONG PRESERVICE TEACHERS' TECHNOLOGY-RELATED ABILITIES, BELIEFS, AND INTENTIONS TO USE TECHNOLOGY IN THEIR FUTURE CLASSROOMS

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ABSTRACT

This study investigated relationships among students' technology-related abilities, beliefs, and intentions. Participants were 217 preservice teachers who responded to post-course surveys. Value beliefs were the best predictor of their intentions to use a variety of software and their intentions regarding frequency of technology use with students in their future classrooms. Self-efficacy for technology integration also contributed to the prediction of intentions to use a variety of software, and technological abilities contributed to the prediction of intentions regarding frequency of future technology use. Constructivist beliefs were moderately correlated with self-efficacy and value beliefs, as well as with both types of intentions. The results highlight the importance of relationships between preservice teachers' beliefs and their potential integration of technology in their future classrooms.

In a national survey of educators and future educators, the majority of school district administrators (60%) and principals (55%) reported that effective integration of instructional technology was extremely important to their core mission,

doi: http://dx.doi.org/10.2190/EC.45.3.d
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whereas only 38% of teachers and future teachers reported similar views (Project Tomorrow, 2010). Teacher educators bear the responsibility to equip future educators not only with prerequisite technological skills, but also with an understanding of the advantages of using technology in the classroom, as well as the willingness and ability to use it to improve instruction for K-12 students (Wright & Wilson, 2005-2006). Thus, it is important to understand factors that are related to prospective educators' anticipated use of technology with students in their future classrooms. Knowing this will help teacher education programs focus their efforts on strategies that are most likely to encourage the eventual integration of classroom technology by their graduates in order to meet the expectations of prospective employers and the needs of future students.

LITERATURE REVIEW

Although technological skill is necessary, it is not sufficient in and of itself to prompt teachers to use technology in their classrooms (Albion, 2001; Topper, 2004). Perceived technological competence was related to preservice teachers' anticipated use of information and communication technologies (Chai, 2010), student teachers' computer use (Negishi, Elder, Hamil, & Mzoughi, 2003), and classroom teachers' computer use (Becker, 2000; Hsu, 2010). However, teachers' beliefs about teaching, learning, and technology are also important influences on technology integration (Albion & Ertmer, 2002; Becker, 2000; Ertmer, 2005; Niederhauser & Perkmen, 2008). Teacher education programs can facilitate improvements not only in students' technology skills but also in their beliefs and intentions regarding integrating technology into instruction (Anderson, Groulx, & Maninger, 2010; Anderson & Maninger, 2007; Kay, 2006). Research findings on relationships between beliefs and intentions regarding technology use are discussed below.

Intentions

Research on information technology acceptance has demonstrated the importance of intentions in predicting usage behavior (Venkatesh, Morris, Davis, & Davis, 2003). The Technology Acceptance Model (Davis, 1989) and the Theory of Planned Behavior (Ajzen & Madden, 1986) delineate variables associated with intentions which, in turn, predict future use or acceptance of technology. Intentions reflect internal motivation to perform a behavior. Teachers' intentions to use technology significantly predicted their self-reported use of educational technology (Czerniak, Lumpe, Haney, & Beck, 1999; Salleh & Albion, 2004; Shiue, 2007). Also, preservice teachers' ratings of intentions and perceived usefulness together accounted for 38% of the variance in their self-reported computer use (Yuen & Ma, 2002).

Since intentions have been shown to predict actual use, many researchers have examined factors related to intentions instead of actual use (Wu, Chang, & Guo, 2008). In a variety of different countries (Canada, China, Malaysia, Singapore, Sweden, and the United States), researchers have identified significant determinants of preservice teachers' intentions to use technology in the future, including computer self-efficacy, value beliefs, perceived usefulness, perceived ease of use, attitude toward computer use, and constructivist teaching beliefs (Anderson & Maninger, 2007; Birch & Irvine, 2009; Kellenberger, 1997; Ma, Andersson, & Strieth, 2005; Sang, Valcke, van Braak, & Tondeur, 2010; Smarkola, 2007; Teo, 2009; Teo, Luan, & Sing, 2008; Yuen & Ma, 2002).

Self-Efficacy Beliefs

Adoption and use of technology is more likely when individuals have not only the necessary skills but also confidence in using these skills to successfully integrate technology. Self-efficacy, an essential component of Social Cognitive Theory, refers to individuals' "judgment of their capabilities to organize and execute courses of action required to attain designated types of performance" (Bandura, 1986, p. 391). Self-efficacy beliefs may affect how knowledge and skill are acquired, and conversely, those with better skills may then develop stronger self-efficacy beliefs (Pajares, 2002). Research has revealed relationships between technology-related self-efficacy and technological abilities (Anderson & Maninger, 2007; Kellenberger, 1996; Ropp, 1999). Evidence also suggests a strong relationship between perceived self-efficacy and computer usage patterns (Compeau, Higgins, & Huff, 1999). Technology-related self-efficacy beliefs predicted preservice teachers' intentions to use technology in their future classrooms (Anderson & Maninger, 2007; Sang et al., 2010; Teo, 2009) and their actual student-centered technology use (Chen, 2010). High levels of technology integration during student teaching occurred when preservice teachers' confidence in using specific technologies was strong, and their cooperating teachers also used those technologies in the classroom (Pope, Hare, & Howard, 2005).

Outcome-Related Beliefs

Teachers are motivated to use technology when they have a clear understanding of how it will improve their teaching and students' learning (Albion & Ertmer, 2002; Wu et al., 2008). Teachers who believe that using technology will benefit themselves and their students may persist in their attempts to use it over time in order to attain desired outcomes (Niederhauser & Perkmen, 2008). In studying the relationship between anticipated outcomes and technology use, researchers have examined comparable variables such as outcome expectations, value beliefs, and perceived usefulness.

Outcome expectations, an important element of Social Cognitive Theory, involve judgments about the likely consequences that a behavior will produce (Bandura, 1986). According to Pajares (2002), self-efficacy beliefs help determine outcome expectations since confident individuals often anticipate successful outcomes. Outcome expectations regarding job performance associated with using computers were positively related to computer use (Compeau et al., 1999) and preservice teachers' intentions to use technology during their practicum (Birch & Irvine, 2009).

A similar variable, value beliefs, involves perceptions of the importance or relevancy of a task for the accomplishment of future goals (Keller, 1983; Pintrich, 1990). Value beliefs were related to preservice teachers' self-efficacy for using technology (Anderson & Maninger, 2007; Chen, 2010; Kellenberger, 1996). Education majors' perceptions of the value of computer use predicted their anticipated future classroom computer use (Kellenberger, 1997), contributed to the prediction of intentions to use a variety of software in future classrooms (Anderson & Maninger, 2007), and significantly influenced preservice teachers' student-centered technology use (Chen, 2010).

Finally, another similar factor from the Technology Acceptance Model, perceived usefulness, is defined as "the degree to which a person believes that using a particular technology will enhance his or her job performance" (Davis, 1989, p. 320). Perceived usefulness has often been a significant predictor of intentions to use technology and actual technology use (Ma et al., 2005; Smarkola, 2007; Teo, 2009; Teo et al., 2008; Yuen & Ma, 2002).

Constructivist Beliefs

Constructivists typically believe that learning should be student-centered, collaborative, and active. Teachers who frequently integrate technology into instruction are likely to hold student-centered, constructivist pedagogical beliefs (Becker, 2000; Hermans, Tondeur, van Braak, & Valcke, 2008; Hernandez-Ramos, 2005; Martin & Schulman, 2006; Rakes, Flowers, Casey, & Santana, 1999). In addition, constructivist teaching beliefs had a significant direct relationship with preservice teachers' anticipated technology integration (Chai, 2010; Sang et al., 2010). Niederhauser and Stoddart (2001) found that teachers' pedagogical beliefs were related to the type of software they reported using, with those having the strongest learner-centered perspectives tending to use more open-ended software. In one study, teachers with strongly-held constructivist convictions did not necessarily use technology in a constructivist manner (Judson, 2006). But in other studies, teachers reported that technology helped support children's construction of ideas in student-centered learning environments (Ertmer, Ross, & Gopalakrishnan, 2000; Franklin, 2007).

Purpose

Understanding the relationships among the above constructs can help guide the efforts of teacher education programs in preparing prospective educators to use technology effectively in their classrooms. The current study investigated the relationships among preservice teachers' technology-related abilities, beliefs, and intentions after completing an educational technology course. It was designed to answer the following research questions:

- What are the relationships among preservice teachers' abilities, self-efficacy beliefs, value beliefs, constructivist beliefs, and intentions to use technology in their future classrooms?
- What parsimonious combination of factors predict the extent to which preservice teachers intend to use technology in their future classrooms?

This study builds on the work of other researchers who have investigated educators' intentions to use technology. However, this study is unique in the combination of variables investigated, which are derived from several different theoretical perspectives including Social Cognitive Theory, the Technology Adoption Model, and constructivism.

METHOD

Participants and Setting

The sample included 217 preservice teachers enrolled in semester-long introductory educational technology courses at a private university in the United States during eight consecutive academic terms. One instructor taught the graduate-level sections of the educational technology course (n = 41) and the other instructor taught the undergraduate sections of the course (n = 176). The course covered educational applications of various types of computer software and the Internet, different instructional approaches, and issues such as copyright and censorship. An online course management system provided access to a grade book, assignments, quizzes, threaded discussions, and links to Internet resources. Each week the instructor introduced a new topic, and then students created a classroom application related to the topic. Students also participated in fieldwork in which they observed and/or interacted with individuals who were learning with or about technology. The final project was an electronic portfolio containing work samples, reflections, lesson plans, web resources, and a position statement regarding future classroom technology use.

The majority of participants were female (82%) undergraduate (93%) students. The sample included 3% freshmen, 42% sophomores, 30% juniors, 18% seniors, and 7% graduate students. Many (54%) were interested in teaching at the early childhood level (pre-K through grade 4), while 19% planned to teach middle school (grades 4-8), 23% intended to teach high school (grades 8-12), and 3%

wanted to teach an all-level subject (e.g., art, music, physical education). Most students reported having convenient access to an Internet-connected computer (95%) and used a computer 10 or more hours per week (89%).

Instrument

The survey was a revised version of an instrument used in a previous study (Anderson & Maninger, 2007). Many of the previously-validated items were derived from the Texas Teacher Technology Competencies Certification Checklist (Education Service Centers of Texas, n.d.), the Teachers and Technology Snapshot Survey (Norris & Soloway, 2000), and the Teacher Beliefs Survey (Benjamin, 2003). The items addressed the following factors: abilities, self-efficacy beliefs, value beliefs, constructivist beliefs, intentions, and demographics (see Appendix A). In order to reduce the number of variables to a manageable number, the researchers combined items from each category into scales whenever possible. As shown in Table 1, Cronbach's Alpha inter-item reliability estimates for these scales ranged from .70 to .89.

Abilities

Students' ability to perform specific tasks for word processing, spreadsheets, databases, presentation software, and the Internet were measured by six items for each software category. Each item asked respondents to indicate whether they could perform the task.

Self-Efficacy Beliefs

Perceived self-efficacy for integrating technology was measured by six statements to which students indicated their level of agreement on a 5-point Likert

Table 1. Descriptive Statistics and Reliability Coefficients for Each Variable

Scale	Number of items	Range	Mean	*SD*	α
Abilities	30	12-30	28.31	2.62	.81
Self-efficacy	6	18-30	27.57	2.57	.88
Value beliefs	5	8-25	21.76	3.06	.89
Constructivist beliefs	4	12-20	17.68	1.83	.70
Intentions variety	8	18-40	33.29	4.54	.77
Intentions frequency	1	1-5	3.49	1.14	n/a

scale. This six-item scale reflected participants' confidence that they could accomplish tasks such as selecting and using software, planning and implementing instruction that integrates technology, and using technology tools to perform administrative tasks.

Value Beliefs

Beliefs about the value of classroom technology integration were measured by five statements to which students indicated their level of agreement on a 5-point Likert scale. The scale assessed students' beliefs that technology integration would positively affect students, that using technology in instruction is a good use of class time, and that using technology would help them to be more effective educators.

Constructivist Beliefs

The extent to which students held certain constructivist beliefs was measured by four items, to which students indicated their level of agreement on a 5-point Likert scale. This scale reflected students' beliefs with regard to developing a classroom community of learners in which teachers partner with and guide students to expand upon their ideas and solve problems.

Intentions

To determine the frequency with which respondents intended to use technology, they were asked to indicate how often they envisioned using technology with students for instructional purposes, given convenient availability of computers and software. To determine the variety of software that participants intended to use, eight items prompted students to indicate their intentions to use particular software applications for instructional purposes, assuming convenient access. Applications included word processing, spreadsheet, database, presentation, graphic organizer, instructional software, teacher-developed web pages, and Internet search engines. Intention items were anchored by 5-point scales.

Other

Several items gathered demographic information including current level in school, gender, teaching experience, subject-area, and grade-level teaching interest. Other items inquired about technology usage, including the availability of an internet-connected computer and average hours per week of computer use.

Procedure

The survey was sent via an online course management system during the last week of each semester. An e-mail message provided introductory information

about the survey and a link to the instrument. Students could use class time to respond to the survey. In addition, the survey appeared when students attempted to enter the online course management system. Students were informed that their participation was voluntary, responses were confidential, and participation would not affect their course grade. The researchers could not identify the respondents unless they voluntarily provided identifying information. When necessary, the researchers sent a follow-up message to non-respondents to motivate them to respond to the survey. While most students responded to the survey (88%), not all the surveys were usable. The researchers eliminated surveys with one-third or more unanswered items. Of the 399 surveys sent to eligible respondents, 217 were sufficiently completed. Thus, the response rate based on completed surveys was 54%. There were 20 surveys with one or two missing values and two surveys with four or five missing values. These missing values were replaced with item means. Doing so did not appreciably change the results, but allowed all 217 cases to be included in the analyses.

RESULTS

Relationships Among Variables

Scale scores for each respondent were created by adding item scores belonging to each scale. Then, correlation coefficients were calculated to determine the strength of relationships among scale scores for abilities, self-efficacy beliefs, value beliefs, constructivist beliefs, intentions to use a variety of software, and intentions with regard to frequency of future technology use (see Table 2). The results revealed low to moderate statistically significant correlations, ranging from .18 to .58. All three types of beliefs were significantly correlated with each other, with the highest correlation occurring between self-efficacy and constructivist beliefs ($r = .55$, $p < .01$). Self-efficacy beliefs were also moderately correlated with value beliefs ($r = .42$, $p < .01$) and abilities ($r = .30$, $p < .01$). Value beliefs were moderately correlated with intentions to use a variety of software ($r = .58$, $p < .01$) and intentions with regard to the frequency of future technology use ($r = .49$, $p < .01$).

Prediction of Intentions

To predict students' intentions regarding frequency and variety of computer software use in their future classrooms, the researchers conducted two backwards multiple regression analyses (see Table 3). Multiple regression allows researchers to examine the relationship between a dependent variable and one or more predictor variables. Predictor variables were abilities, self-efficacy, value beliefs, and constructivist beliefs. The researchers began by testing a model that included all four predictors. Then the model was modified using a backwards elimination

Table 2. Correlation Variables

Scale	Self-efficacy	Value beliefs	Constructivist beliefs	Intentions variety	Intention frequency
Abilities	.30**	.18**	.26**	.20**	.23**
Self-efficacy		.42**	.55**	.38**	.25**
Value beliefs			.35**	.58**	.49**
Constructivist beliefs				.34**	.28**
Intentions variety					.49**

**$p < .01$, two-tailed.

approach, by removing the weakest non-contributing variables (i.e., those with the lowest statistically non-significant regression coefficients), one at a time, until a parsimonious model was identified in which all the regression coefficients were statistically significant. To determine the contribution of each predictor variable to the regression model, the researchers compared the standardized regression coefficients (β). These coefficients are estimates of the expected change in the dependent variable for every standard deviation increase in a predictor variable, while controlling for other variables. In addition, the researchers compared the adjusted R^2 values of each equation. The adjusted R^2 value indicates the percentage of variance in the dependent variable that is explained by the predictor variables, adjusting for the number of predictors in the model.

In the first analysis, the initial model (including all four predictors) for intentions to use a variety of software was significant ($F = 30.59$, $p < .001$, adjusted $R^2 = .354$). Removing abilities and then constructivist beliefs resulted in a negligible decrease (.004) in the adjusted R^2 value. In the final model, value beliefs and self-efficacy beliefs accounted for 35% of the variance in intentions to use a variety of software ($F = 59.17$, $p < .001$, adjusted $R^2 = .350$). The standardized regression coefficient (β) indicated that value beliefs (β = .51) explained most of the variance in intentions to use a variety of software, with self-efficacy beliefs (β =.16) accounting for a smaller proportion of the variance.

In the second analysis, the initial model for intentions regarding frequency of classroom technology use was significant ($F = 19.69$, $p < .001$, adjusted $R^2 = .257$). First self-efficacy and then constructivist beliefs were removed from the equation, resulting in a negligible decrease (.002) in the adjusted R^2 value. In the final model, value beliefs and abilities accounted for 26% of the variance in intentions regarding frequency of classroom technology use ($F = 37.97$, $p < .001$, adjusted $R^2 = .255$). Again, the standardized regression coefficient (β) indicated that value beliefs (β = .47) explained most of the variance in intentions regarding

Table 3. Backwards Multiple Regression Predicting Intentions

Variable	β[a]	*t*	Adj R^2	*F*
Variety of software		.		
Value beliefs	.51	8.41***	.35	59.17***
Self-efficacy	.16	2.70**		
Frequency of use				
Value beliefs	.47	7.83***	.26	37.97***
Abilities	.14	2.34*		

[a]Standardized regression coefficients were used because variable scale ranges differed.
**$p < .05$, ** $p < .01$, *** $p < .001$.

the frequency of classroom technology use, with abilities (β =.14) accounting for a smaller proportion of the variance.

DISCUSSION

The findings of this study underscore the strength of value beliefs in predicting preservice teachers' intentions regarding the frequency with which they would use technology with students and the variety of software they would use instructionally in their future classrooms.

Relationships Among Variables and Prediction of Intentions

Value beliefs were significantly correlated with and were the best predictors of intentions to use a variety of software as well as intentions regarding frequency of classroom technology use. Several other studies have indicated that preservice teachers' ratings of the value of educational technology helped to predict their intentions regarding classroom technology use (Anderson & Maninger, 2007; Kellenberger, 1997). In addition, researchers have demonstrated that similar variables, such as outcome expectations or perceived usefulness, also predicted preservice teachers' intentions to use technology (Birch & Irvine, 2009; Ma et al., 2005; Smarkola, 2007; Teo, 2009; Teo et al., 2008; Yuen & Ma, 2002). Thus, it appears that these comparable variables are well-established predictors of preservice teachers' intentions to use technology in their future classrooms. Furthermore, these findings have been consistent across studies conducted internationally, primarily in Asia, but also in North America and Europe.

Self-efficacy with regard to technology integration was moderately correlated with and significantly contributed to the prediction of intentions to use a variety of software. In other studies, self-efficacy also predicted preservice teachers' intentions to use technology (Anderson & Maninger, 2007; Sang et al., 2010; Teo, 2009). As other researchers have found, self-efficacy was significantly correlated with technological abilities (Anderson & Maninger, 2007; Kellenberger, 1996; Ropp, 1999) and value beliefs (Anderson & Maninger, 2007). According to Pajares (2002), this is consistent with Social Cognitive Theory, which posits that those with greater skills may also have better perceptions of self-efficacy (and vice versa), and that confident individuals often believe that their actions will result in successful outcomes.

Constructivist beliefs were significantly correlated with both types of intentions but did not contribute significantly to the prediction of either type of intentions. However, two other studies found that constructivist beliefs were among the predictors of preservice teachers' prospective classroom technology integration (Chai, 2010; Sang et al., 2010). The disparity in these results may be due to dissimilarity in the way constructivist beliefs were measured and the differences in the combination of variables studied. In the current study, the strong correlation between constructivist and self-efficacy beliefs and the relatively low variability in the constructivist beliefs scale may have limited the ability of constructive beliefs to contribute to the prediction of intentions. A better measure of these beliefs may have yielded stronger results.

Abilities had a low positive correlation with and contributed significantly to the prediction of intentions with regard to the frequency of future classroom technology use. The weak relationship is most likely due to the fact that the survey was administered at the end of the educational technology course and, thus, the range of values was restricted and the distribution negatively skewed. Though scholars have recognized technological abilities as among the necessary prerequisites to teachers' use of technology in their classrooms (Albion, 2001; Becker, 2000; Hsu, 2010; Topper, 2004), only one other study was found that documented the relationship between preservice teachers' technological competence and anticipated technology integration (Chai, 2010).

Implications, Recommendations, and Future Directions

The current study is unique in that it investigated self-efficacy, value beliefs, constructivist beliefs, and abilities together. No other study was found that investigated this particular combination of variables. The results corroborate the findings of several similar studies that investigated predictors of preservice teachers' intentions to use technology. However, only two related studies were conducted in the United States (Anderson & Maninger, 2007; Smarkola, 2007). Since cultural differences could influence relationships among the variables studied,

it was important to establish whether results with preservice teachers in the United States were consistent with findings from other countries.

The results of the current study indicate that teacher educators should consider ways to influence students' value beliefs as well as their self-efficacy beliefs and technology abilities, since these factors help predict intentions to integrate technology in the classroom. Research suggests that technology training directly affects preservice teachers' self-efficacy and value beliefs, which in turn influence their student-centered technology use (Chen, 2010). Strategies that are likely to promote belief change with regard to teaching, learning, and technology include direct experiences, vicarious experiences, and social-cultural influences (Ertmer, 2005). Teacher candidates need opportunities to practice effective technology integration strategies in supportive contexts during technology courses, technology-integrated methods courses, and field experiences (Albion & Ertmer, 2002). Providing technology-related field experiences and/or incorporating multimedia case studies into assignments, such as those found in VisionQuest (www. edci.purdue.edu/vquest/ievqstart.htm), can help to accomplish this strategy. Viewing models of technology integration in university or K-12 classrooms or via electronic means can not only increase observers' knowledge of how to accomplish technology integration but also increase their confidence in performing such behaviors, an important prerequisite to belief change (Ertmer, 2005). Finally, the expectations, values, and opinions (i.e., subjective norms) expressed by influential people may help shape preservice teachers' beliefs and practices with regard to technology integration. Preservice teachers may come into contact with positive norms regarding technology integration via classroom or online discussions among faculty, peers, and teachers, as well as by collaboration with and mentoring from teachers who model technology integration. Research suggests that the more strategies used to introduce technology to preservice teachers, the more pervasive the effect on their technology use in the classroom (Kay, 2006).

To determine the effectiveness of these methods in influencing preservice teachers' beliefs about integrating technology into instruction and to get a more complete picture of the direct and indirect influences on preservice teachers' intentions to use technology in their future classrooms, more research is needed. The impact of strategies such as modeling and mentoring on preservice teachers' beliefs related to technology integration should be studied to determine their effectiveness. Future research should also include variables such as ease of use, subjective norms, and facilitating conditions, which previous research and theories have shown to be related to intentions to use technology. Including such variables may increase the percentage of variance that can be explained by a predictive model. Follow-up surveys or longitudinal studies with student teachers and beginning teachers could also elucidate the nature of the relationship of these factors with intentions as well as with actual classroom technology integration over time.

APPENDIX A

Abilities Scale (Respondents checked skills they could perform.)

Word Processing:
- Create and then enter text in columns
- Create and use headers or footers
- Set character, line, and paragraph spacing options
- Insert graphics into a document
- Use the drawing tools
- Use design principles to communicate effectively

SpreadSheets:
- Apply number formats (e.g., currency, percent, dates, and commas)
- Modify row and column size
- Adjust number of decimal places
- Enter and revise formulas in a cell
- Create and modify a chart or graph
- Match the chart style to the data type when creating charts or graphs

Databases:
- Plan and create a database by defining fields and entering data
- Add and delete records
- Create a calculated field
- Sort records
- Use queries to locate information by various criteria
- Display data in different ways (e.g., list, form)

Presentation Software:
- Enter and format text on a slide
- Add a picture from clip art or a file
- Insert a button or hyperlink
- Add a sound from clip art or a file
- Add a video
- Animate text and graphics on a slide

Internet:
- Find information on the Internet that I can use in my teaching
- Evaluate electronic information for accuracy and validity
- Properly cite sources of digital information
- Follow acceptable use guidelines, including copyright rules
- Download digital files and images
- Create my own web page

Self-Efficacy (Scale: 1 = strongly disagree to 5 = strongly agree)

I feel confident that I could:

- select appropriate software and use it for a particular task.
- use technology to collect and analyze data, interpret results, and communicate findings.
- plan and implement instruction that integrates technology into my curriculum.
- teach students how to locate, retrieve, and use electronic information.
- use technology to perform administrative tasks such as attendance, grading, and communication.
- appropriately evaluate students' technology-based projects and portfolios.

Value Beliefs (Scale: 1 = strongly disagree to 5 = strongly agree)

- I believe that I will be a better educator when I use technology for my work.
- I believe that using technology in class activities will be time well spent.
- I believe that students will be more motivated when they use computers for assignments.
- I believe that when students use technology, they will create products that show high levels of learning.
- I believe that the positive effects of computer use on my students will outweigh any negative effects such use might have.

Constructivist Beliefs (Scale: 1 = strongly disagree to 5 = strongly agree)

- I believe in developing my classroom as a community of learners.
- I believe that expanding on students' ideas is an effective way to build my curriculum.
- I plan to function in my classroom as a learner and partner in learning with my students.
- I plan to guide students in finding their own answers to academic problems.

Intentions Variety (Scale: 1 = highly unlikely to 5 = highly likely)
Assuming convenient availability of computers and software in your future workplace, how likely is it that you will use the following types of software with students for instructional purposes?

- Word Processors
- Spreadsheets
- Databases
- Presentation Programs
- Graphical Organizers
- Instructional Software
- Teacher-Developed Web Pages
- Internet Search Engines

Intentions Frequency (Scale 1 = less than once a month to 5 = daily)
Assuming convenient availability of computers and software in your future workplace, about how often do you envision using technology with students for instructional purposes?

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