Perceptions of Pre Service Teachers Concerns on Incorporating Technology in the 21st Century

Dr. Laura Isbell and Dr. Tami Morton

Knowing the importance of the incorporation of technology in Texas classrooms, the researchers looked into their pre-service teachers’ perception of this need in the 21st century classroom. This paper describes the results of the quantitative study examining two groups of pre-service teachers’ perceptions of using technology for instructional purposes in the classroom. The researchers used the Stages of Concern-Questionnaire (SoC-Q) from the Concerns-Based Adoption Model (CBAM) to examine their concerns. The researchers found that the pre-service teachers were at a justifiable level of concern in each district and that additional training would be beneficial with future residents at this stage in their student teaching.

In education, change is constant. Teachers are continually implementing newly adopted innovations to accommodate their students, their classrooms, or themselves. However, with innovation, resistance to change is inevitable. Teachers may show some signs of resistance because a new method of teaching and learning is forced upon them. In most efforts to change, some people will seem to resist the change, and some may even actively sabotage efforts for change (Hall & Hord, 2006). The success of any change process depends on how participants interpret and perceive the innovation. Teachers may experience change in different ways. Their perceptions about the innovation may influence the effectiveness. It may be that teachers’ willingness or unwillingness to change is the single determining factor in whether or not an innovation is adopted successfully (Brown, Pryzwansky, & Schulte, 2001). As a result, successfully adopting any innovation depends on understanding and managing people’s concerns.

In 2006, the Texas State Board of Education presented to the legislature a new plan called the Long-Range Plan for Technology, 2006-2020. This comprehensive plan describes in detail how teachers, parents, and students must open their minds from the traditional ways of learning, to those that incorporate digital resources. All professional educators must have proficiency with technology, which is currently mandated for all beginning teachers.

In order to fulfill this plan, all learners must have access to ample digital tools and resources. While this plan is ambitious, school districts throughout Texas have made technology a focus. Teachers are provided with professional development to support their learning. Those beginning teachers who have experience with using digital tools and resources will be valued by new schools and the principals who are hiring.

As teacher educators, we understand that many of our current students have been exposed to technology through the use of computers, smartphones, and tablets. Nevertheless, not all of our pre service teachers have looked at this technology as tools used for providing instruction. Understanding the importance of technology in the education in the state of Texas, we explored the concern of using technology for instructional purposes in the classroom.

Methodology
This study employed a quantitative method approach using a questionnaire and demographic survey. The target population for this study included 40 pre-service teachers during their last semester of field-based teacher education. The pre-service teachers are residents who are currently enrolled in the field-based program at a four-year university in East Texas. The study was based on data from pre-service teachers who participated in completing the SoC-Q. The data source for this study included a demographic questionnaire and the Stages of Concern-Questionnaire (SoC-Q). Scores from the SoC-Q were used to identify pre-service teachers’ concerns about new technologies.

Description of Instrument

Stages of Concern Questionnaire
SoC-Q is a 35-item, self-administered questionnaire that was designed to measure concerns associated with implementation of new technologies. Respondents were asked to read and consider the degree to which each statement reflected their levels of concern regarding new technologies. Then, respondents circled a number on a 7-point Likert scale that ranges from 1 (This statement is irrelevant to me) to 7 (Very true of me at this time). There are five items for each of the seven stages of concern. An example of an item representing Stage 2–Personal is the following: “I would like to know...”
how my role will change when I am using the innovation” (George, Hall, & Stiegelbauer, 2006, p. 27). The seven stages of concern are Stage 0–Unconcerned, Stage 1 – Informational, Stage 2 – Personal, Stage 3 – Mechanical, Stage 4 – Consequence, Stage 5 – Collaboration, and Stage 6 – Refocusing (see Table 1). Panew technologiesticipants’ responses to the items on the SoC-Q indicate their current concerns with new technologies as an innovation or how they feel about their involvement with new technologies as an innovation.

According to Hall and Hord (2006), the SoC-Q has “test/retest reliabilities range [of the SoC-Q] from .65 to .86” (p. 147). Hall and Hord (2006) also found that the SoC-Q has “α-coefficients [that] range from .64 to .83” (p. 147). Therefore, Hall and Hord (2006) concluded that the SoC-Q has “strong reliability estimates and internal consistency” (p. 147). See Table 1 for the expressions of concern and how they correspond to a phase and a stage of concern.

Pre-service teachers documented their concerns about new technologies with SoC-Q, their responses to SoC-Q were categorized in one of the seven stages of concern. A score based on responses to SoC-Q was calculated for each participant by summing the participant’s ratings of the five statements under each proposed phase and stage of concern (Unrelated–Unconcerned, Self–Informational, Self–Personal, Task–Mechanical, Impact – Consequence, Impact – Collaboration, Impact – Refocusing; Appendix A); The score for each phase and stage category of concern ranged from 0–35. The higher a pre-service teacher’s summed score was in a category, the more intense were the concerns of the pre-service teacher at that stage; the lower a pre-service teacher’s summed score was in a category, the less intense were the concerns of pre-service teacher at that stage. For purposes of this study, SoC-Q was also used to construct one cohort profile profiles for individual or group concerns by taking the summed score for each category and converting it into a percentile following the guidelines outlined in Quick Scoring Device, which provides both scoring and interpreting information for the SoC-Q (Hall et al., 1979; Hall & Hord, 2001). For this study, the researchers used one cohort score to illustrate pre-service teachers concerns about new technologies.

### School District Information

The pre-service teachers that participated in this study represented two districts that are located in

### Table 1 Expressions of Phases and Stages of Concern About Innovation

<table>
<thead>
<tr>
<th>4 Phases of Concern</th>
<th>7 Stages of Concern</th>
<th>Expressions of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact</td>
<td>6–Refocusing</td>
<td>Generating ideas about innovation that would work better</td>
</tr>
<tr>
<td></td>
<td>5–Collaboration</td>
<td>Becoming concerned about my practice relating to others</td>
</tr>
<tr>
<td></td>
<td>4–Consequence</td>
<td>Affecting learners</td>
</tr>
<tr>
<td>Task</td>
<td>3–Mechanical</td>
<td>Spending all of my time getting materials ready for innovation</td>
</tr>
<tr>
<td>Self</td>
<td>2–Personal</td>
<td>Affecting me</td>
</tr>
<tr>
<td></td>
<td>1–Informational</td>
<td>Becoming interested in learning more about innovation</td>
</tr>
<tr>
<td>Unrelated</td>
<td>0–Unconcerned</td>
<td>Remaining unconcerned about innovation</td>
</tr>
</tbody>
</table>


29
communities north of Dallas, Texas. The two school districts are about fifteen miles apart. They will be identified as District 1 and District 2.

District 1
District 1 has 3 elementary schools that our pre service teachers provide instruction. In this district, most schools have a Smart Board for each teacher to use to provide instruction, at least one iPad, and just recently many staff computers were upgraded to 2012 Apple Mac Minis. It is a goal of this district that all of the students will become masters of technology.

District 2
District 2 has 2 elementary schools that our pre-service teachers provide instruction. This district promotes the use of state-of-the-art technology in their schools. All classrooms have document camera, projector, and laptop.

Procedure
Before participating in this study, the researchers informed the pre-service teachers about the study and requested their voluntary participation in this study. At the informational meeting, the two researchers outlined, informed, and described the study to the pre-service teachers. The researchers informed the pre-service teachers that three e-mails would be sent to request their participation. The first email was sent February 7, the second email sent February 9, and the third email sent February 14. The participants were selected based on the following criteria:

• Participants must a resident in the teacher education program.
• Participants must be a university-based student who has successfully completed the intern semester and is in his/her final semester toward teacher certification.

After sending out three notification emails for participation in the SoC-Q, 29 out of 40 pre-service teachers completed the questionnaire. The response rate for this questionnaire was 72.5%. To maintain confidentiality the researchers assigned a cohort label to the participants who completed the questionnaire. The cohort information will be kept in the SEDL database. The cohort title, titled Residents, holds no value or meaning but was a simple method to code and track participants anonymously.

Results
SoC-Q. The Soc-Q was used to measure participants’ intensities of concerns about new technologies. Data obtained from SoC-Q were scored using the Stages of Concerns Quick Scoring Device from SEDL (Hall et al., 1979). To score the data from SoC-Q, totals of participants’ responses to individual statements from SoC-Q were recorded to establish each participant’s mean relative intensity score for each stage of concern. The mean relative intensity scores were then used to create a line graph to show pre-service teachers’ concerns about using new technologies at a snapshot in time. We used a table and a line graph to represent the teachers’ percentile scores for stages of concern because according to Hall et al. (1979), graphic representations of percentile scores, such as the mean relative intensity score, can assist researchers in interpreting data from SoC-Q. A figure representing the data collected with the SoC-Q is illustrated below to show pre-service teachers’ concerns about new technologies at a snapshot in time.

As figure 1 illustrates, participants’ responses to the items on the SoC-Q indicated their current concerns with new technologies. The findings indicated that overall, participants’ concerns were highest in the self phase and lowest in the impact phase. Participants indicated that their concerns focused primarily on how new technologies affected students. The table and line graph below illustrate the mean relative intensity scores at each stage of concern.
them personally (i.e., the Self phase of concern) and less on how new technologies affected students (i.e., the Impact phase of concern.).

In response to our second research question, figure 2 shows a comparison of the stages of concern about new technologies between the two districts within the cohort. Results indicated that the students from District 1 have their highest score in Stage 0. This shows that these pre-service teachers do not believe that new technologies are a major concern to them. There are a number of other initiatives, tasks, and activities that are of concern to them. Pre-service teachers in District 1 continue on a decline in the stages of concern with the lowest point at Stage 4 (Consequence).

The students from District 2 show that their highest scores are in both Stage 1 and Stage 2. Stage 1 indicates that they would like to know more about new technologies, specifically the fundamental information about what new technologies will do in the classroom, as well as what would it involve.

High scores in Stage 2 indicates that the participants were more concerned about status, rewards, and the effects that new technologies would have on them. Similar to District 1, the residents in District 2 were also following a gradual decline with the lowest point at Stage 4 (Consequence).

Discussion

The researchers found that the pre-service teachers from District 1 had their highest score in Stage 0. This shows that these residents were not concerned about the innovation. The SEDL manual cautions researchers that if this score is high relative to the other scores, the other stage scores may have little significance (George, Hall, & Steigelbauer, 2006). District 1 has technology readily available in each classroom. This reality has attributed to the non-interest these students possess.

The pre-service teachers in District 2 had their highest concerns scores in Stages 1 and 2 demonstrating that they want more information about new technologies, and they have personal concerns about new technologies and its consequences for them. Our pre-service teachers from both Districts attend a seminar twice a month. It is during these sessions that residents from District 2 are exposed to various new technologies. It is evident with the high concerns score in Stages 1 and 2, that these students would benefit from an opportunity to learn more about new technologies.

These figures illustrated teachers’ mean relative intensity scores on the SoC-Q at one snapshot in time. Pre-service teachers’ concerns were highest in the self phase and lowest in the Impact phase at one snapshot in time. The self phase is associated with teachers’ focusing on how new technologies is affecting them personally. The impact phase is associated with teachers’ collaborating with other educators and focusing on their concerns about how new technologies is affecting students.

Recommendations

Further research is needed to substantiate this study’s findings about the new technologies currently used and implemented in the classroom. Specifically, monitoring and tracking this same group for three to five years to measure progress or regression using new technologies. Research about appropriate instructional materials should be systematic and ongoing (Wiener & Soodak, 2008). Researchers also need to explore qualitative methods of measuring new technologies used and implementations using interviews and observations based on the CBAM model. Interviews and observations based on the CBAM model may provide clarification of teach-

![Figure 2. Line graph of the comparison of District 1 participants and District 2](image-url)
ers’ actual concerns about new technologies. Additionally, during observations, researchers could monitor and document teachers’ behaviors and comfort using new technologies during instructional time with students.

After reviewing and analyzing the data collected in this study, we recommend that future researchers administer the SoC-Q at least twice throughout the school-year. The purpose for administering the SC-Q at least twice during a school-year is to track progress or regression with the use of new technologies, or any innovation, under analysis. As the results of this study revealed, pre-service teachers were highest in the self-phase and lowest in the impact-phase. It would be interesting to see if pre-service teachers’ concerns would increase or decrease at two different snapshots in time.

We also recommend instructional changes for our resident seminar. Future instruction with pre-service teachers should emphasize the value and importance of new technologies in the classroom. We, as teacher educators, will use this information to incorporate new technologies in our instruction to pre-service teachers. As a result, we will suggest that our residents implement new technologies in the classrooms they are assigned. Additional collaboration with mentor teachers and administrators is recommended to ensure new technologies are being introduced and implemented appropriately.

Conclusion

Pre-service teachers expressed concerns about the use and implementation of new technologies. The primary goal of future research should be to assist and guide pre-service teachers through the change process of implementing new technologies and to give them the supports, resources, and assistance they need to increase their comfort and familiarity with new technologies as innovations. Although this study has provided some insights into pre-service teachers’ concerns about new technologies it has only begun to reveal the importance and value of teachers’ participation and knowledge of new technologies to facilitate the change process successfully to impact student learning.

References


versity of Texas.


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Appendix A

STAGES OF CONCERN QUESTIONNAIRE

Stage 0 Awareness Concern
3. I don’t even know what new technologies are.
12. I am not concerned about new technologies.
21. I am completely occupied with other things.
23. Although I don’t know about new technologies, I am concerned about things in the area.
30. At this time, I am not interested in learning about new technologies.

Stage 1 Informational Concern
6. I have very limited knowledge about new technologies.
14. I would like to discuss the possibility of using new technologies.
15. I would like to know what resources are available if we decide to adopt new technologies.
26. I would like to know what the use of new technologies will require in the immediate future.
35. I would like to know how new technologies is better than what we have now.

Stage 2 Personal Concern
7. I would like to know how the effect of reorganization on my professional status.
13. I would like to know who will make the decisions in the new system.
17. I would like to know how my teaching or administration is supposed to change.
28. I would like to have more information on time and energy commitments required by new technologies.
33. I would like to know how my role will change when I am using new technologies.

Stage 3 Conflict Management Concern
4. I am concerned about not having enough time to organize myself each day.
8. I am concerned about conflict between my interests and responsibilities.
16. I am concerned about my inability to manage all of what new technologies requires.
25. I am concerned about the time spent working with nonacademic problems related to new technologies.
34. Coordination of tasks and people is taking too much of my time.

Stage 4 Consequence Concern
1. I am concerned about student’s attitudes toward new technologies.
11. I am concerned about how new technologies affects my students.
19. I am concerned about evaluating my impact on students.
24. I would like to excited my students about their part in this approach.
32. I would like to use feedback from students to change the program.

Stage 5 Collaboration Concern
5. I would like to help other faculty in their use of new technologies.
10. I would like to develop working relationships with both our faculty and outside faculty using new technologies.
18. I would like to familiarize other departments or persons with the progress of this new approach.
27. I would like to coordinate my effort with others to maximize new technologies effects.
29. I would like to know what other faculty are doing in this area.

6. Refocusing Concern
2. I now know of some other approaches that might work better.
9. I am concerned about revising my use of new technologies.
20. I would like to revise new technologies instructional approach.
22. I would like to modify our use of new technologies based on the experiences of our students.
31. I would like to determine how to supplement, enhance, or replace new technologies.