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The Roles of Instructional Technologist in Supporting K-12 CCSS Transition

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Instructional technologist plays an important role in K-12 CCSS transition. However, few studies were conducted to explore what roles instructional technologist has played in technology integration during CCSS transition. This study explored the roles of instructional technologists in technology integration. This study also investigated the strategies instructional technologists utilized to promote technology integration and the challenges instructional technologists faced during the process of supporting technology integration. Findings showed that instructional technologists' roles in K-12 schools included supporter, connector, filter, leader, catalyst, and lifelong learner.

Keywords: K-12, Instructional technologist, Technology integration, CCSS Transition

INTRODUCTION

The trend of discussing K-12 technology integration has been rising up because of the adoption of Common Core State Standards (CCSS) in public schools. CCSS is a set of high-quality national academic standards in English Language Arts or Literacy (ELA) and Mathematics and was adopted by 46 states and District of Columbia in 2010. Technology was integrated into CCSS and K-12 assessment has moved from traditional paper-pencil assessment to computer-based assessment (Goff, 2013). This change shows that technology is no longer an option but a requirement for K-12 education. Therefore, all public K-12 schools are working hard to help teachers and students successfully transition from previous education standards to CCSS standards to meet the technology requirements of CCSS.

Instructional technologists are the key to successful CCSS transition (Lorenz, Kikkas, & Laanpere, 2014). They are the change agents who lead the school's CCSS transition (Kaufman & Watkins, 2003; Kowch, 2005). Instructional technologist play an leading role in schools' instructional technology design, professional development, technology assessment design, and technology-rich learning environment development (Aslan & Reigeluth, 2013). According to Beglau, Hare, Foltos, Gann, James, Jobe, Knight, and

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Smith's study (2011), instructional technologists significantly increased the technology implementation rate from 15 percent to 85 percent in schools' CCSS transition.

However, instructional technologists were understood as professional development trainers or technical assistants (Nelson & Webb, 2015). They are more of encouragers than trainers or technicians (Vanderburg & Stephens, 2010). There is a need to address the importance of instructional technologists and identify what essential roles instructional technologists have played in supporting CCSS transition. The purpose of this study is to explore the instructional technologists' roles in supporting technology integration in CCSS transition.

LITERATURE REVIEW

Technology integration has different meanings for different people. Griffin (2003) used technology integration as technology usage and technology related activities in daily teaching and management. Effective technology integration was used in Protheroe's (2005) as new learning opportunities supported by technology. Holznogel (2005) defined effective technology integration as the ways and reason of using technology. In this study, technology integration refers to instructional purposes of using digital devices such as preparing course materials, interacting with students in class, and evaluating the effectiveness of teaching and learning.

Instructional technologists are understood as trainers and technicians because of continuous call for more professional development workshops (Kopcha, 2012). Inadequate professional development is identified as the primary barrier for effective technology integration (Brown, 2016; Hechter & Vermette, 2013). Therefore, professional development is the most widely used solution to ineffective instructional use of technology (Singer, Lotter, Feller & Gates, 2011; Zhang, 2014). School leaders tend to have instructional technologists focus on professional development workshops, which, consciously or unconsciously, started defining them as trainers at schools. Instructional technologists' main responsibility is to prepare and provide professional development workshops. In addition, professional development is the only opportunity for instructional technologists to officially meet with teachers (Kim, Kim, Lee, Spector, & DeMeester, 2013). If teachers do not meet with instructional technologists individually, it is difficult for teachers to understand instructional technologists' functions. This might be of the reasons that teachers understand instructional technologists as trainers rather than other roles (Inan & Lowther, 2010).

Instructional technologists' roles should be more than trainers (Lorenz, Kikkas, & Laanpere, 2014). International Society for Technology in Education Standards for Coaches (ISTE-C, 2009) has provided a comprehensive explanation of what an instructional technologist should do and what roles an instructional technologist has played in technology integration. According to ISTE-C (2009), instructional technologists should participate in and contribute to the development of a shared technology vision, assist teachers with effective technology use in teaching, learning, and assessment, build digital learning environments, conduct professional development, program evaluation, and promote digital citizenship. The ISTE-C standards did not place emphasis on any particular perspective of the standards, as each one is equally important. Surry (1994) also supported instructional technologists' diverse roles as consultants, developers, facilitators, and even connectors.

Most studies have identified instructional technologists' roles in higher education (Kim, Kim, Lee, Spector, & DeMeester, 2013). However, what roles instructional technologists play in K-12 education are rarely discussed. Technology environment in K-12 schools is different from higher education institutes. Instructional technologists in K-12

schools usually need to serve several schools at the same time. It is difficult for K-12 instructional technologists to be available for every teacher all the time. Conclusions of instructional technologists' roles from higher education should not directly apply in K-12 schools. What roles instructional technologists play in K=12 schools are still unknown. There is a need to investigate instructional technologists roles in K-12 schools.

This study aims to gain a deeper understanding of the roles instructional technologists played in supporting K-12 school's technology integration regarding CCSS based on ITSE-C standards. Researching this topic can help administrators and teachers as well as instructional technologists realize importance of instructional technologists in schools and better understand how to cooperate with instructional technologists to support K-12 teachers' and students' technological needs. In addition, being aware of the challenges faced by instructional technologists, decision and policy makers are more likely to take instructional technologists into consideration when making technology integration policies. The following research question was investigated in this study:

- What roles did instructional technologist play in supporting technology integration in CCSS transition?

METHODS

This study chooses qualitative research design to investigate instructional technologists' roles in helping K-12 teachers with technology integration during the CCSS transition. This study focused on instructional technologists' real life experiences, therefore, a case study was used to explore this phenomenon in the unique context.

SETTING

This study was conducted at two public school districts in southern Mississippi. Both districts have a Technology Department with several instructional technologists. Each instructional technologist is responsible for at least four schools, ranging from kindergartens to high schools. An instructional technologist's job responsibilities include (a) developing professional development workshop, (b) providing one on one instructional technology support for teachers, (c) assisting teachers with technology class teaching, and (d) working with administrators on other administration tasks.

PARTICIPANTS

The participants of this study were four K-12 public school instructional technologists. The research participation letter was sent to all instructional technologists at the schools, with voluntary participation. Any instructional technologists who were interested on the topic could participate in the study by replying to the participation letter, with participation selection based on location convenience for the researchers. Once they agreed to participate, the interview and observation schedule were discussed with the instructional technologists. Based on the hiring requirements for the positions, all instructional technologists were required to have at least five years of teaching experience at K-12 public schools. Of the four instructional technologist participants, three were female, all with bachelor's degrees. Instructional technologist ITA has the longest working years. The other three technologists all had similar fewer years. Participants' age does not have significant difference. All participants were around 30 years old. The demographic information is summarized in Table 1.

Table 1. *Demographic information of instructional technologists.*

Name	Gender	Age	Experience (Years)	Education
ITA	F	35	8	BS
ITB	F	33	3	BS
ITC	F	30	1.5	BS
ITD	M	36	2.5	Ed.D.

DATA COLLECTION

This study lasted for four months and the data collection consisted of in-depth interviews, observation, and document analysis. In-depth interview is appropriate for researchers to explore participants' real life experiences and triangulating data is a good way of reducing potential research biases (Creswell, 2013). With document analysis as a way of strengthening the evidence from interviews and observations.

Interview. A recruitment email was sent to instructional technologists, with participants selected on a convenience basis. Each participant was interviewed once at the end of the school semester with in-depth interview questions (see Appendix A) derived from the ISTE-C standards. At the beginning of the interview, researchers explained the study's purpose and the participants' right to withdraw from the research. All the interviews were video taped and stored on the researcher's password protected computer.

Observation. After getting permission from the districts and the instructional technologists, researchers worked with each participant to decide on the observation time. Observations were held at school libraries and classrooms where trainings were conducted. Each observation was video taped and lasted less than one hour. Guidelines of observation is shown as Appendix B.

Document Collection. Documents collected during this study included the Mississippi Education Department technology plan, the district technology plans, the district technology department websites, teachers' teaching websites, instructional technologists' website, instructional technologists' training schedules and content, video tutorials, YouTube videos, pictures, and other training resources. The various documents and resources provided ample information, especially useful background information to better understand the instructional technologists' experiences.

DATA ANALYSIS

Since various data sources help the researcher gain a more complete picture of the context and better interpretation of the data (Yin, 2013), holistic coding and pattern coding were utilized to analyze the data. Holistic coding allows analysis of a wide range of data sources and helps researchers to quickly grasp the basic themes from the data (Saldana, 2013). Pattern coding is appropriate for the second cycle coding because it helps develop major themes and provides explanation for the data (Saldana, 2013). All interviews were transcribed into word processing files. Observation notes and related documents were also organized in word processing files. All transcripts and related word documents were imported into HyperRESEARCH, which was the software used to code qualitative data. All documents, including text documents, videos, and pictures, were read and categorized

into different major themes. Documents in each theme were examined again to generate sub-themes. All themes and sub-themes were summarized and discussed in the following section.

FINDINGS

The transcripts, observation notes, and documents were analyzed both individually and comparatively. Themes and sub-themes are organized in Figure 1.

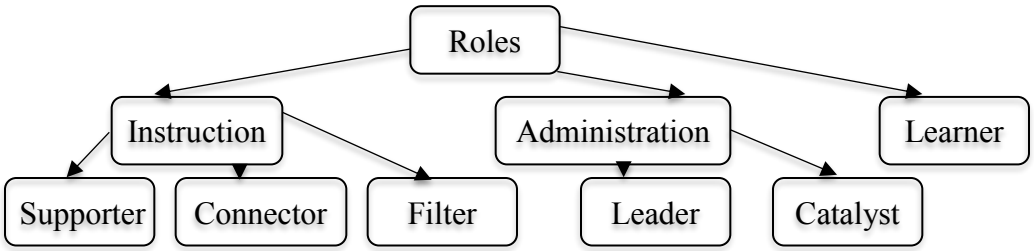

Figure 1. Themes of Instructional Technologist's Roles

INSTRUCTION

Instruction was identified as the most important responsibility of an instructional technologist. Most schedules and activities mentioned by the instructional technologists were planned with the intention to help teachers with their instruction as related to CCSS. Findings indicated that instructional technologist was the supporter, connector, and filter in assisting with instruction.

Supporter

Findings showed that supporter was the most important role for instructional technologists. All participants reported that they spent most of their time as supporters, including instructional support and classroom support. As a supporter, the instructional technologist developed training plans and strategies for technology choosing, learning assessing, standard-based testing, and teaching planning. As ITA stated, she collaborated with teachers to plan technology course by providing suggestions for technology choosing. ITB also mentioned her role as a supporter with helping teachers with technology choosing by suggesting that teachers should consider student's technology background knowledge during instruction.

Instructional technologist also works as a classroom supporter, including co-teaching with teachers, co-planning technology courses, collaborating with students, and modeling teaching with technology. ITD reported that co-teaching was an important part of his work because the students would learn new technology easier if the instructional technologist directly taught the class. All instructional technologists said that co-planning the course was essential for successful co-teaching. Teachers would ask the instructional technologists to co-plan the co-teaching classes. Co-planning is a good opportunity to ensure successful technology integration because teachers and instructional technologists would work together to prepare teaching materials. Instructional technologist would give suggestions of choosing technology for teachers to best present the teaching materials to students.

Connector

Findings indicated that instructional technologist connected teachers and the community together. Instructional technologists reported that they inform teachers and

administrators how other schools were implementing CCSS. ITA reported that she shared information from different schools with different teachers. Instructional technologists told teachers what and how the technology was used in other schools and encouraged the teachers to try the technology. The instructional technologists would also encourage schools to ask for help from the district as well. ITD reported that he asked principals to invite experts from another district to give teachers presentations about CCSS.

Findings of this study showed that as a connector instructional technologist played an important role in demonstrating the relevance of technology with instruction to teachers. Once teachers see the relevance with their instructions, they are more likely to adopt technology in their classroom. Teachers cannot just hand devices to students and expect them to be able to handle the devices as well. Teachers would be more motivated if instructional technologist could present on topics that were related to their opinions and took teachers' opinions into account. ITC said that she needed to find something that teachers could use immediately in their class, otherwise teachers would not be interested in the new tools. The function instructional technologist played in this supporting process is to create a learning community with the purpose of promoting conversations within and between teachers and schools.

Filter

Findings showed that instructional technologist served as teachers' digital resources filter with the purpose of identifying appropriate digital tools for teachers, studying the resources and tools that teachers requested, and researching the effective ways of integrating digital resources into real classroom. Instructional technologists mentioned that most of their time was spent on researching to ensure instructional technologists could show different technology or different ways of utilizing the technology for different teachers and schools. According to schools' report, teachers relied on instructional technologists to learn technological skills. As instructional technologists reported that not all resources were appropriate for instruction. Therefore, whenever teachers requested new digital resources, instructional technologist would check the resources first and then work with the district to make those resources available for teachers.

ADMINISTRATION

Findings also showed that instructional technologists were important for schools' administration activities. The roles instructional technologists played in administration were leader and catalyst.

Leader

Findings indicated that instructional technologist served as a leader in assisting teachers with technology integration through professional development, and played an essential role in supporting CCSS implementation. Instructional technologist helped teachers to align their professional goals with CCSS standards during the CCSS trainings. Findings showed that as the leader instructional technologist needed to lead and provide opportunities for teachers to learn. All other instructional technologists also mentioned learning community as a strategy for promoting technology integration. In this study, instructional technologists reported that they created a CCSS learning community for teachers to collaborate and communicate with each other. Learning community was a good place for teachers to listen to others' experience and to look back on their own instructional activities. Learning community was also a safe and trusting environment that teachers could feel relaxed and be more willing to talk about their instructions.

Besides supporting teachers' professional development, findings showed that instructional technologist supported the school's and district's initiatives such as CCSS.

Specifically, instructional technologists in this study helped schools to initiate and manage the CCSS technology changing process. Instructional technologists worked with school principals to decide how many more devices were needed at the school and what professional developments were required for teachers to meet the CCSS requirements. In addition, instructional technologists helped with communication with parents because parents did not know CCSS and schools needed to explain CCSS to parents and to get their support.

Catalyst

Findings also indicated instructional technologist's role as a catalyst in CCSS transition process. Instructional technologist is always the first one on campus to know new technology and resources. Once instructional technologists found the tool that was beneficial for teachers, they would give the tool to teachers for tryout. If positive feedback were received from most teachers who used the tools, instructional technologist would plan a training session to get more teachers to use the tools. Besides, instructional technologist was also the catalyst for increasing device usage. Findings showed that the utilization of technology devices increased after instructional technologists came to the campus. Instructional technologists encouraged teachers to reserve the digital devices or the lab so that students would have the opportunity of using technology. Although schools did not have enough devices for every student, teachers were encouraged to switch to the devices such as iPads and Chromebooks instead of waiting for the lab.

LIFELONG LEARNER

Besides supporting instruction and administration, findings showed that instructional technologist was also a lifelong learner. All participants mentioned their continuous professional learning schedules and plans to learn new technologies. In this study, findings showed that social networking was a good way of supporting continuous professional learning for instructional technologists. Specifically, Twitter was the most popular social networking tool for instructional technologist to learn ideas of integrating technology into instruction. Google+ was also mentioned as a favorite learning community for instructional technologists. Findings showed that a lot of K-12 educators have a Google account and they post their experiences on there. Friends from Google+ helped instructional technologists to learn other educators' experiences and improve instructional technologists' own knowledge and skills by reading others' posts. Instructional technologists reported that they would reflect on their experiences with teachers when they saw posts from Google+. The reflection and evaluation process can help instructional technologists develop critical think skills that benefit the teachers.

DISCUSSION

This study explored the roles instructional technologists played in supporting K-12 schools' technology integration during the CCSS transition by interviewing and observing four instructional technologists from two school districts. Results showed that instructional technologists roles included supporter, connector, filter, leader, catalyst, and learner in supporting K-12 schools' technology integration during CCSS transition.

The role as a lifelong learner is the new finding that has not been addressed in previous studies. Instructional technologists not only teach others how to use technology but also have to learn new things to meet teachers' continuous changing technology integration requirements. Social networking, such as Twitter, is an important tool for instructional technologists to learn from not only local educators but also educators from other districts and states. Online learning community, such as Google+, is also identified as good place

for an instructional technologist's continuous professional learning. An instructional technologist's continuous growth ensures teachers can always get high quality professional support. Thus, the role as a lifelong learner is also important for the schools' continuous development. In fact, the importance of being a lifelong learner has been mentioned in the ISTE-C standards as "content knowledge and professional growth" (ISTE-C, 2011). Instructional technologist is required to "engage in continual learning to deepen content and pedagogical knowledge in technology integration and emerging technology" (ISTE-C, 2011). However, few studies have discussed an instructional technologist's role as a learner. Instead, most studies focused on an instructional technologist's job responsibilities such as professional development. The importance of being a learner has been ignored.

Although this study has similar finding as Surry's (1996) study that instructional technologist plays the role as connector, the meaning of connector is different from Surry's (1996) study. Instructional technologist not only connects teachers with schools but also connects technology with instruction. As connector, instructional technologists help teachers see the relevance of technology with instruction by transforming learning goals into technological solutions. As mentioned by all instructional technologists in the study, once teachers see the relevance of technology in instruction, they will be more interested and confident in using technology in their classrooms, which echoes the prior studies (Kim, Kim, Lee, Spector, & DeMeester, 2013) in that teachers' belief is strongly related to teachers' technology integration. Instructional technologists play important role in improving teachers' beliefs in technology by demonstrating effective technology integration in instruction. Findings from this study showed that the role of connecting technology with instruction was more important than the role of conveying information from school to teachers. More importantly, instructional technologists need to help raise teachers' awareness of using technology in classroom and motivate teachers to see the relevance of technology with instruction. For instance, teachers are more interested in knowing how to integrate a specific tool into instruction rather than learning what functions the tool have.

The role as catalyst is similar to Kaufman and Watkins's (2003) and Kowch's (2005) studies, which indicate that instructional technologists are the best persons to consult on campus when schools have educational reforms, such as CCSS. Instructional technologists work very closely with teachers and know what problems teachers have through asking teachers questions and observing teachers' instructions. In the process of answering teachers' questions, instructional technologists are able to analyze and reflect on their own practices that prompt instructional technologists to realize the potential issues and conduct more research. Then, it is possible for instructional technologist to solve the potential problems ahead. Besides leading school wide changes, being catalyst, instructional technologists play important role in increasing device utilization. Instructional technologists in this study reported that their schools' digital devices amount and usage have increased after they began to work in the schools because the communication between instructional technologists and teachers encouraged teachers to use technology.

The findings of being supporter, filter, and leader are consistent with prior studies (Lorenz, Kikkas, & Laanpere, 2014; Surry, 1996). Instructional technologists' primary responsibilities are to provide instructional and classroom support, find appropriate resources for teachers, and lead the schools' technology changes. However, the focus of working responsibilities should move from technology demonstrations to instruction demonstrations. As filter, instructional technologists' responsibilities not only include searching for appropriate tools for teachers but also helping teachers to get access to the resources they want. As leader, creating more opportunities for teachers to communicate and collaborate with other teachers and educators are also important responsibilities for instructional technologists.

IMPLICATIONS

Implications for K-12 administrators include more administration support instructional technologists. First, more opportunities of directly working with teachers are necessary for teachers to understand how instructional technologists can help them with instruction rather than devices. Particularly, having some activities required for teachers can expand instructional technologists' influences on more teachers. Thus, it is possible for instructional technologists to be able to cover more teachers on campus regarding technology integration. Second, providing technology leading opportunities for instructional technologists to lead schools' technology change can better support schools' technology integration. For instance, having instructional technologists lead policies making regarding technology can better support teachers' technology needs because instructional technologists know better about teachers' concerns about technology integration. Finally, providing more local opportunities for instructional technologists to communicate and collaborate can support instructional technologists' learning needs. Local communication opportunities not only can reduce costs for instructional technologists' professional development but also are able to meet instructional technologists' personal growth needs as lifelong learners.

Implications for instructional technologists include transition from technology demonstration to instruction demonstration with the purpose of increasing teachers' beliefs about technology integration in instruction. As shown in this study, technology demonstration can not fulfill teachers' instructional needs. Effective technology integration into schools also needs instructional technologists to demonstrate instruction supported by technology to increase teachers' interests in using technology. The shifting technology need asks for instructional technologists' lifelong learning capabilities. As lifelong learners, instructional technologists need to understand how to reflect on their practices and look for methods to improve their practices to meet teachers' increasing needs for technology integration.

CONCLUSIONS

Teachers and schools rely highly on instructional technologists to create a digital learning culture and environment, offer continuous professional growth, and provide technical support. However, people mainly focus on an instructional technologist's role as a trainer and ignore other essential roles that an instructional technologist also have. This study examined the roles an instructional technologist plays in supporting teachers and schools in CCSS transition. The findings show that an instructional technologist's role is more than a trainer. An instructional technologist also works as the supporter, connector, filter, leader, catalyst, and lifelong learner.

The limitation of this study is the research participants. All instructional technologists came from the same area. The situation may be different in other schools. In addition, literature shows that gender has effect on instructional technologist's technology integration (Teo, Fan, & Du, 2015). In this study only one male participant was interviewed. It is hard to conclude how gender may affect an instructional technologist's attitudes and strategies of technology integration promotion. If more male instructional technologists can be included in the study, it would be possible to examine the difference between female and male instructional technologists. In Addition, the experience and educational background also have an impact on an instructional technologist's practices. As shown in this study, the instructional technologist with eight-year experience in the field was more skilled in communicating and collaborating with teachers and schools.

Further research is suggested to expand the diversity of participants and examine how an instructional technologist's gender, educational background, and experience may affect the technology promotion practices. Researchers can also dive deeper with each role reported in this study and conduct quantitative studies to find out the effectiveness of each role an instructional technologist plays.

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APPENDEX

APPENDIX A: INTERVIEW QUESTIONS

1. Could you please briefly introduce yourself?
2. What are the main responsibilities for your job?
3. How do you initiate and manage technology changing process?
4. How do you assist teachers using technology effectively?
5. How do you coach and model technology integration?
6. How do you address diverse needs and interests of all people?
7. How do you encourage people to use technology in their teachings?
8. How do you gauge your pace is appropriate for learners' understanding?
9. What instruments or measures do you use to determine technology is appropriate for learning?
10. How do you create and support digital learning environment?
11. How do you create and support effective classroom management and collaborative learning?
12. How do you maintain and manage digital resources?
13. How do you coach teachers in online and blended learning environment?
14. How do you select and evaluate digital tools and resources?

15. How do you communicate and collaborate locally and globally?
16. How do you plan professional development?
17. How do you evaluate professional development results?
18. How do you promote digital citizenship?

APPENDIX B: OBSERVATION FORM

Subject & Grade: Date: Class Length: Number of Students:	
Goals/Objectives:	
Considered Questions	Notes
What preparation teacher needs to do before class? What does the classroom technology environment look like? What hardware does teacher use? What software does teacher use? How the teacher is using technology? What support teacher has in the classroom? How do students response to technology? What are students' attitudes with technology in class? What can be improved regards technology?	