Leadership and the Adoption of Innovative Planning

Dr. Gary L. Ackerman
Greenfield Community College, USA

ABSTRACT

Schools have become places filled with digital tools. Despite this fact, school leaders find technology planning to be an area of relative weakness. This chapter describes the experience of four school leaders who adopted an unfamiliar strategy for making technology decisions. The leader participated in a series of semi-structured interviews. Two leaders displayed characteristics of early adopters of the innovative planning strategy and two displayed characteristics of early majority user of the strategy. Profiles of the two types of leaders are presented. The aspects of the planning strategy that differentiated it from more familiar planning strategies for these leaders are discussed.

INTRODUCTION

As information and computer technology (ICT) has become more deeply embedded in curriculum and instruction, technology planning has become an essential part of school leadership. School leaders are expected to take steps to ensure students use technology for diverse learning activities, so infrastructure must be installed and managed, and teachers must be trained in its use and supported as they integrate it into instruction. School leaders play an obvious role in ensuring the decisions are appropriate for the classroom, aligned with established policy and procedure; and can be reasonably supported by the available resources. Because of the dynamic nature of this work, school leaders need on-going support and training, so they become effective and collaborative in this aspect of their work (Dexter, Richardson, & Nash, 2017; Millman, 2019). It is generally accepted that planning proceeds from goals which are articulated by school leaders; systems are developed and deployed to meet those goals, then the degree to which the goals have been met is established (Gülbahar, 2007). This approach to planning is applied to both plan for ICT used for instruction and ICT used for administrative purposes.

This chapter describes the experiences of several school leaders who led projects in which ICT was designed to improve the nature of curriculum and instruction. Each necessitated strategic planning, and the leaders agreed to follow a strategy that was grounded in educational design research (McKenny & Reeves, 2012), which is an iterative process for understanding a problem, designing an intervention to address the problem, then assessing the degree to which the problem was resolved. Educational design research is differentiated from other research methods as practitioners "attempt to solve significant real-world problems while at the same time they seek to discover new knowledge that can inform the work of others facing similar problems" (McKenney & Reeves, 2014 p. 131); it is also an activity in which practitioners attempt to design and understand the local nuances of a situation that affect the effectiveness of the interventions. The purpose of this study was to explore educational design research as a planning framework for school leaders.

The qualitative data reported in this chapter were collected after the projects were complete and focused on the experience of using innovative planning methods for the leaders. Analysis suggests the leaders share the characteristics of those who are either early adopters of innovations or in the early majority of users as defined by Rogers (2003). The leaders also appear to have internalized the methods of planning because of these projects. Each describes encouraging nonlinear approaches to planning and to encouraging those who are involved with implementing plans in their school to be more accommodating to changing situations and to redefine goals even as projects are incomplete.

BACKGROUND

Between 2014 and 2016, the author worked with several school leaders individually and in groups to plan and complete projects in which ICT was applied to instructional problems (Ackerman, 2017; Ackerman, 2018). The author had been retained as either an internal or an external consultant for the purpose of designing and deploying ICT for a purpose articulated by the school leader. One of the leaders captured the motivation of all of the participants in the email she wrote to request the assistance of the author; she noted, "this has been a 'thorn in my side' for more than a year, and we need to fix it." Each of the problems originally articulated was perceived to be acute for school leaders, and each saw ICT as an essential part of the solution.

Because the leaders were highly motivated to resolve pressing problems, each was amenable to trying new methods. The principal quoted the preceding paragraph explained her decision to adopt new methods of planning by noting, "we have had a few failed attempts at fixing this, so we need to try something new." Another of the leaders sought to create a system for instruction at a distance. This was a new initiative in her school and she realized she was taking a risk in accepting it; he observed, "the school board was skeptical, but I convinced them we could make it work."

Innovation is a term that can have many meanings. For innovation researchers, it is defined as "an idea, practice, or object that is perceived as new by an individual" (Rogers, 2003, p. 12). The school leaders who were the subject of this research experienced two innovations. First, the ICT-based practices they originally developed were innovations, and the planning methods they used to develop those systems were innovations as well. The leaders who participated in these projects recognized they were going to be following a method that was different from the planning methods they had used previously. While they did not seek explicitly to disrupt their practice, they did seek to improve their performance in making decisions about the role of ICT in their schools. Leaders often turn to innovative methods when they find current practices to be ineffective in meeting organizational goals (Yu & Hang, 2010).

Educational design research (McKenney & Reeves, 2012) comprises three phases. First, leaders define the problem they seek to resolve; they seek to completely understand the problem as it has been described in the literature as well as the local instantiation of the problem. Second, they design an intervention and construct it to reflect the local situation. Finally, they evaluate the degree to which the intervention met their needs and they reflect on the intervention to articulate generalizations. In each project described in this chapter, the author and the school leader completed the first phase of educational design research through a two-step process. First, the author conducted a semi-structured interview with the leader. Second, the author led a discussion with the leader and members of the organization who were to develop the intervention. The outcome of this discussion was a problem statement, but no specific outcomes were defined and no guidelines were placed on the expected solution. The members of the groups that were convened to develop and deploy the intervention were introduced to were introduced educational design research, and it was clear to those teams that they were expected to undertake several iterations of improvements as the interventions were developed and deployed.

During the initial projects, various qualitative data were collected during the work. These sources included research journals, meeting agendas and minutes, training materials used when deploying the interventions, observations of the interventions made by graduate students, and interviews with the participants (both the school leaders and others involved with the projects). Those data were analyzed following the constant comparative method (Glaser, 1965). Themes that were identified by multiple

readers of the data met the inclusion criteria for the original reports of the research. Negotiating the themes to make final judgements regarding interrater reliability for the original research led to author to conclude that issues surrounding leadership deserved further investigation as the theme was richly described in the data, but did not meet the inclusion criteria for the original studies.

METHODS

The author contacted the school leaders who were still employed in the schools where the original projects had been conducted. Four agreed to participate in a new round of interviews. In the invitation to participate the purpose of the interviews was described as "understanding your experience of leading [the project] and how your technology planning methods have changed since." The second round of interviews was model after Seidman's (2006) three-part in-depth phenomenological interviews. The semi-structured protocol was written to have the participants reflect on the strategies they used during the original project, their current leadership practices when making technology decisions, and the meaning the leaders' experiences.

The interviews were conducted in three separate video conferences, each separated by one or two days. Because of a limit on the length of recording that could be made, each interview session was limited to 30 minutes. These interviews were conducted between 12 and 30 months after the original projects had been completed. The conversations captured in the video recordings were transcribed and printed copies of the transcripts were reviewed using the constant comparative method (Glaser, 1965). The author and two other researchers who had no association with the original projects or with the leaders, coded the interviews. The two other researchers were both preparing to begin qualitative dissertations, and sought to gain experience coding interviews, so they accepted the invitation to participate in this analysis.

DATA

A theme that resonated throughout all four interviews was the fact that the planning used in these projects represented a different approach for the leaders. Each described taking a more active role in technology planning than they had previously. One principal observed, "I had a more central role in this [ICT] project than I ever had before. I usually deferred to the 'tech guys,' but we were focusing on curriculum first and technology second. That is my field of expertise." Her new role was similar to a second principal who noted, "we focused on teaching, not technology. As we tried things that didn't work, we asked, 'what can make this better for users?' rather than 'what can [technicians] build for us?'"

The more active role for the school leaders in these technology decisions appears to have been grounded in their ability to apply their judgement to four variables of the systems and to criticize the technology in these terms.

- **Improvement:** Which was summarized as "the degree to which the planning method solved the problem."
- **Ease of use:** Which was summarized as "the degree to which the planning method could be used efficiently without the need for training."
- **Perceived value:** Which was defined as "the degree to which the planning method addresses the problem as it is understood by members of the organization."
- **Demonstrability:** Which was defined as "the degree to which others found the planning method to be effective."

When the researchers met to refine the themes, two of the three had identified similarities between their initial list of common themes and the generalizations used by Rogers (2003) to describe the diffusion of innovations. Table 1 summarizes the researchers' codes, the corresponding generalizations from Rogers, and the rationale used to make the connections.

Table 1.

Codes applied to interviews and corresponding generalizations

Codes Applied to Transcripts	Rogers' Generalizations	Rationale for the Correspondence
Improvement	Relative advantage	Leaders expressed dissatisfaction with exiting systems (including hardware, software, connectivity) and how ICT was used. While Rogers focuses largely on economic measures, school leaders focused on performance measures.
Ease of use	Complexity	Each of these is grounded in the amount for difficulty in using the innovation. Whereas complexity is negatively associated with adoption, ease of use is positively associated with adoption.
Perceived value	Compatibility	Each of these factors are based on the needs of the users of technology to continue the work individual believe should be done.
Demonstrability	Trialability and Observability	Before adopting innovations, individuals need evidence that it operates as expected. The evidence can be in the experience of the adopter (trialability) or in the experience of others (observability). These researchers coded both together.

Because of the similarities between the coded themes in the interview data and the generalizations of innovators defined by Rogers (2003), the researchers decided to recode the interviews using Rogers' themes, but to identify differences in how the leaders understood, applied, or valued the factors as they made planning decisions. At their second meeting to negotiate commons themes, the three researchers concurred that two of the leaders described similar approaches to leadership during and since the projects, and the other two also appeared to have adopted similar approaches. Because of limited time availability, the author became the sole researcher to continue to analyze the data. The profiles of the leaders were analyzed in light of Rogers' (2003) stages of adoption and two of the leaders appeared to display the characteristics of early adopters and the other two appeared to display the characteristics of early majority users.

PROFILES OF THE LEADERS

Rogers (2003) observed the individuals within a community will begin using an innovation at different times. Further, he concluded the individuals who adopt an innovation at different times tend to share common characteristics. *Innovators* are the first to begin using a new method, and they tend to introduce an innovation into a community. In this study, the author represented the *innovator* who introduced planning modeled after educational design research (McKenney & Reeves, 2012) into the community; innovators comprise the first 2.5% of users who adopt an innovation. *Early adopters* are the first 13.5% of the adopters of an innovation; they tend accept the recommendations of innovators, but they accept only those recommendations that they believe will be effect in the community. Because early adopters tend to be leaders in the adoption of all innovations, and this can be a position of relative esteem and power in the community, these individuals make "judicious innovation-decisions" and "put their stamp of approval on a new idea by adopting it" (Rogers, 2003, p. 283). *Early majority users* (the next 34% of the adopters of an innovation) tend to be more careful adopters of innovations. They depend on

the opinions of the early adopters and have frequent interaction with early adopters, but they see themselves as following the early innovators rather than leading them. The seek to be the first to adopt innovations that have been successfully adopted by the early adopters.

Among innovation researchers, there does appear to be consensus regarding the nature of those who fall into the stages of adoption. In general; early adopters are more connected to others outside of the community, are advocates of change, more willing to take risks, and are more self-sufficient than those who fall into the other stages. Compared to those in the other stages; early majority users tend to be more pragmatic and focused on processes, they are less likely to take risks, and often need support when first adopting the innovation (Wani & Ali, 2015).

The profiles summarized in the following sections are compilations of the interviews recorded from the two leaders who were found to reflect each style. The early adopters were Rachel, the principal at a rural elementary school and Kevin, the principal at a rural high school. The early majority users were Mary, the principal at a rural 7-12 school, and Carol, the curriculum coordinator at a school district comprising four rural elementary schools and a single school where the students form those four schools attend grades 7-12. All of these leaders work in public schools. It is noted that the proportions users to define Rogers' (2003) stages of adoption do not align with the small number of participants in this study. Rogers described the characteristics of those who fall within each stage; those characteristics were used to identify users as early adopters of early majority users.

In the profiles that follow, the author adopts the perspective of the interview participants and wrote in the first person. The contents of the profiles were crafted from quotes and paraphrases of the text of the transcribed interviews. The profiles were edited for a consistent voice and style as the profiles are compilations of the words of different individuals.

Profile of Early Adopter

Our school had been struggling with some aspects of our educational technology. Both our teachers and our technology people were trying, but we seemed to be making little progress. It was clear we needed a different way to make decisions. When I first heard about educational design research and how we could apply it to our decision-making, I was unsure. I reached out to some of my friends from graduate school, but no one was really familiar with it. I did need a couple of days to read a little more about it, but I found some good summaries online, and the iterative nature really made sense to me. Once I really understood what this new planning was going to look like, I was enthusiastic to begin planning following educational design research.

Even though I could not point to other places were this new planning had been used, I understood it was going to be different. First, we were going to be very purposeful in our design. I often hear leaders say they want to avoid reinventing the wheel, but it always seemed to me that there were differences between my school and the school where an innovation had been started or where it was successful. Sometimes the community seemed different, sometimes the strengths of the faculty were different, sometimes the timing is wrong. With this new planning, we were going to be looking at models and also looking at our situation to see what others were doing and how we might want to adpt it.

Second, it was going to be iterative and allow us to react to what we learned as we went. I happened to be teaching a class at the local state college when I was doing this, and it struck me that the planning in the textbook the department had adopted was presenting planning as a step-at-a-time process. According to the book, leaders set goals, develop plans, then evaluate how well they did before setting new goals. I saw what we were doing as emerging. Our goals and plans were likely to change as we proceeded. We might set goals, then change them as were learned more about what tools we had, or as what we were really trying to do became clear.

In the past, most of our technology decisions had been made with significant accommodation of the district technology coordinator. He was overworked and understaffed, so we were very deliberate in our planning. We had one chance, usually, to describe our goal with technology and what we needed, then he would go off and build it. More than once, we were not happy with the systems, and the response was

often, “well, it might not be what you wanted, but it is what you asked for” when we gave him feedback on the ICT systems he built. This was going to be a change for us, but it was needed. With the iterative nature of this new planning, we had permission to change our minds as we went along, and this was going to be key to give teachers a voice in the technology decisions.

Our project was going to have significant effects on what teachers did in their classrooms, so I knew that teachers had to be an important part of the planning and design from the beginning. I could see how some of our failed technology projects had been done “to teachers” rather than being done “with teachers.” I was going to lose credibility with teachers if I didn’t involve them. That was, however, going to be difficult for the technology people to hear. They were used to building what was easy for them. We needed the system to be easy for teachers and to be a really good tools for instruction, so teachers needed to be the primary decision-makers, but they don't always know what they want until they work with it in the real world.

I also knew our project was going to have to be built “on the fly.” We needed to get our technology up and running in a hurry as the school year was starting, and when we started we had nothing. We were also trying to serve some of the children of the most active and connected parents in our community. If we failed slowly, we were going to be heavily criticized in the community. So, the prospect of making improvements, then improving on our improvements was very appealing. Showing quick progress was going to put us in a good position. This also seemed a departure what we had done previously, especially with technology decisions. We really needed to go from having nothing to having a pretty sophisticated system in less than two weeks.

When it comes to technology, I find I am sometimes pretty unaware of what the options or the implications are. I might have an idea in my mind of what I want to see when I go into the classroom, but I might not know the details of how to do it or what the problems might be. This is not unusual for principals, and I know this causes some of my colleagues to avoid making technology decisions. We end up with deciding what is easiest or best for the technology people rather than what is best for the learners. With this way of planning and making decisions, there seemed to be a more active role for educators in technology decisions. To me, this was probably the biggest advantage even before we started. We were going to be making better decisions for education.

We had a very interesting outcome from all of this as well. A few months after our project was up and running, we had the chance to hire a new technology coordinator. Because of the success of this project, I asked to lead the committee searching for the person to fill this position. Usually, one of the high school administrators will lead the search committee for district-wide positions, but I was asked to lead this one. The others on the committee who had heard of our project were very interested in our story, so I spent about half of our first meeting talking about our project and how the new planning based on educational design research had worked for us. They all were convinced that we needed to find a technology coordinator who was going to be more accepting of this type of planning than the previous technology coordinator had been.

I was also able to convince some of the teachers who participated in the planning committee to make a presentation describing their work at a conference. I had been serving on a committee for a regional professional organization, and we are always looking for new presenters at our annual conference. They ended up having a roomful at their presentation, and it was wonderful to see them talking about what they had done and how it had resulted in a system that solved a big problem in the school, that had some unforeseen benefits for our community, and that had been sustained. We are still doing what we started a few years ago.

We have changed how we make technology decisions in the time since we did this original project. I have handed much of that work off to others, including the new technology coordinators. I do have conversations with his often, and repeat the expectation that they pay attention to the spirit of educational design research, although we do not have a formal model. We did have to focus on some other problems in my school since that project, so I have changed my focus. It is hard to say if I have changed my leadership style. I do still teach a leadership course at the local college, and I do share the experience with my students and I encourage them to think about different ways of making decisions.

Profile of Early Majority User

Our project started with me talking with another curriculum coordinator at one of our regional meetings. He was talking about how they were supporting teachers. Teachers were sharing web sites and resources, laboratory activities, discussion ideas, and things like that in an online classroom. I didn't really get what he meant, so he invited me to spend an hour in his office and he showed me exactly what his teachers were doing. Once I actually saw it, I decided to follow his lead. Of course, his district is larger than mine, so he had a full-time technology coordinator, more servers, professional development funds, other resources that I do not, but he was a great resource in helping me get a similar system up and running.

Just as important as the system they had built was the strategy they were using to make decisions. I was impressed with the steps they were taking. Rather than trying to build everything at once, they were using their online classrooms for one thing, then they added another. I decided to try the same thing. Because our schools are so much smaller, we just don't have the resources. At first we followed what he was doing pretty closely. My mentor helped me stop and understand some limitations that we had but that we didn't realize. Once we had those fixed, we could move forward. That was probably the biggest advantage for me, the fact that I was able to look at what we needed and to be able to describe it.

I think the biggest advantage for my teachers was that they could make small steps and feel like they were getting somewhere and the changes were helpful. At least as far as technology is concerned, we sometimes start with an idea, then start using it without a clear plan. Some call this the "ready-fire-aim" approach and they use it in a derogatory way. Teachers told me they liked this approach to planning as it was more organized, but still allowed them the options to adjust as they went along. It was organized, but less limiting than other models we had used for planning.

Because we have teachers who are leaders of projects like this, they have their regular jobs, so they have little time for these projects, and usually we don't have time to try out everything we want to do. For example, we were trying to figure out how to get teachers to organize the web sites and other resource they were sharing on the classroom we were using for professional development. Previously, I would have just done whatever someone else had done. My mentor in this new planning method encouraged me to demonstrate three methods for teachers and have them decide which method they wanted us to roll out and support. Teachers told me they liked having the choice and they actually did use the tags to organize the site more than I was thinking they would.

I also noticed that we were taking steps with this planning just like my mentor was doing. We would find something that worked, like tagging to organize the resources. Teachers would use that strategy, and then we would start thinking about what else we might want to do. Sometimes we had an idea and I would reach out to my mentor to see if they had done something like what we wanted to do. If he could tell me a way to solve the problem, then we would talk about it to see if we thought it would work for us. Of course, my teacher-leaders were also involved in selecting next steps. We talk about the stages of software development, and I started using the same terms with my faculty. It was strange to talk about proof-of-concept, alpha and beta testing, and production; but it really helped us organize what we did, and it helped us stay true to the iterative process.

As we were taking steps, we tended to return to the formal steps were started. For example, we wanted to start using electronic portfolios, but we had no idea how to proceed. So, we went back to the planning documents we originally used. We looked at the three phases, and used those to help us figure out how to start and what questions to answer. It was helpful to remind ourselves that this type of planning is supposed to be about the intervention and improving it. Our superintendent at the time was having us set goals following a different framework, and how we were planning was really different so we had to remind ourselves of how to do it. It became clear how limiting goals can be. I liked the fact that our planning allowed us to change our plans if we found out our original idea wasn't so good.

It has taken some time, to really learn how to use this educational design research thinking in our work. I am aware of it, have pretty good experience in using it so I know how to do it, but I have sometimes had trouble making the case for doing it to those who are unfamiliar. I usually end up sending

them to see my mentor, because I wanted them to have the good experience I did. It was funny that he has started sending people to us, so they can see how educational design research can be used.

It seems I tend to think about educational design research planning when I am making technology decisions but not necessarily when dealing with other problems. I am not sure if I just think about it only as a technology planning tools because that's where I first used it, or if it I am less confident with technology than with other parts of school. When I got to meetings led by my mentor from whom I first learned about this type of planning, I see he uses it in how he organizes his meetings and in some of the other successes he has shared, but I tend to use it only for technology decisions. It does work for me, however, so that is what I do.

These have been pretty successful for me as well. In education, we seem to jump around a lot, and when we stop the intense focus on a new tool or system or strategy, we revert back to what we were doing before we started. I like to call this horizontal reform as we just move from beginning one thing to beginning another. What we have done with educational design research planning has been sustained for far longer. I like to say this has allowed us to get vertical and actually change what we do. Especially with technology, we like to let things fall into disrepair then drop it for something new. We are now thinking of upgrading the system we use to support teachers' sharing right now, but our faculty are resistant as they want to make very sure none of their work is going to be lost and they are insistent that they not loose features they really like or that they have to spend lots of time learning a new system. They are telling us to be sure to use the methods we have been trying to get them to use.

DISCUSSION

Regardless of the stage of adoption that characterized the individuals whose profiles are described in the proceeding section, they all described the planning methods grounded in educational design research (McKenny & Reeves, 2012) as innovative. These methods represented a departure from the methods they had been taught in their graduate courses, that they had used previously, and that their colleagues currently used. Because of this, it is reasonable to conclude these methods are innovative. The leaders accessed information and interpreted it differently than they do when using other planning methods. They asked different questions and they set different goals as well as asking others to change how they made decisions and approached planning tasks. For these leaders, the innovative nature of this method appears to have been based in the focus on improving the intervention over achieving the outcomes they expected. The iterative nature of the planning also contributed to its innovative nature. For these leaders, as well, the technology planning grounded in education design research appears to have been successful. Each claimed the longevity of the projects they originally undertook was the primary indicator the plans they made were successful.

Intervention over Outcomes

All four leaders whose interviews contributed to the two profiles indicated that planning modeled after educational design research changed the focus of the planning. "For years," observed Rachel, the principal of a school enrolling students in kindergarten through grade eight, who was an early adopter, "we have been told to measure outcomes. How we get there did not seem to matter." The project she had undertaken in her school focused on math instruction for students in grade eight who were enrolled in algebra; this was a relatively small and specialized population. While they were developing the technology-systems for teaching at a distance, she noted, "we were talking about how to make the instruction clearer and how to enable interaction between the sites." She contrasted that with the planning methods that focused to achieving SMART goals.

We spent so much time trying to decide if the goals were specific, measurable, and all of the other adjectives for the acronym, we had no time to think about what we were going to do. Even when we decided we had to adjust the goals, we focused on redefining the goals rather than explaining why we thought the goals needed to be changed. We never seemed to get to the root cause of the problem.

As she and the teachers developed a method so that here students could take an algebra course using video conferencing and other online learning tools, Rachel found the focus changed from defining and achieving the goal to creating and improving what was being done to deploy the system. “Perhaps we all knew the goal, which was to get students to take algebra. Perhaps it was because we were under such a tight timeline. Perhaps it was something else, but we didn’t talk about goals at all.” When she and her team were reflecting on the process, Rachel noted, “teachers commented on how refreshing it was that we were talking about the classroom experience for students. It was striking that we found that so different.”

Rachel observed a change in how all of the teachers in her school talked about math teaching after their algebra project. “Teachers used to talk about test scores, and what are the books or web resources that will help students score well, but now they talk about teaching, and what they are doing with students.” For her, the intense focus they showed on improving the experience of math instruction for her students became the narrative for subsequent leadership decisions. “Especially when it comes to decisions related to teaching, we turn back to the beginning of that year when we first built [the math education] system. We worried about better teaching, because without it, we realized the outcomes would never happen.”

Kevin, high school principal who was the other early adopter, also contrasted the planning methods he experienced to what had been encouraged by the top leaders in his school district. “Our superintendent is a real advocate for backwards planning. She wants us to identify our goals, then work our plan, and show evidence of our plan. When she asks about progress, she asks about goals.” Like Rachel, Kevin found the focus on interventions allowed by planning grounded in educational design research (McKenny & Reeves, 2012) to be a valuable aspect of the work. “Goals,” suggested Kevin, “can become a distraction. What matters is what we do with our students, and this seems to be where we go by default when we stop thinking about goals.”

Each of these early adopters of the planning method used it despite the fact that it appeared to contradict the methods advocated by other leaders in the organization, including those to whom these leaders reported. This appears to confirm the observation that early adopters tend to be more willing to take risks than other users (Wani & Ali, 2015). Further, Rogers (2003) observed early adopters of innovations tend to be less dogmatic than later adopters; these data appear to support that conclusion as well.

The rationale for adopting the planning methods grounded in educational design research for the early majority users in this study appears to have been grounded in the compatibility between this method and the beliefs of the participants. Carol, who is a curriculum coordinator who was an early majority user, posited the focus on the interventions was one of the factors that motivated the teachers who were leading the initiative in her schools. “No teacher will volunteer to spend their time defining goals, but with this, they spent their time thinking about improving teaching, and they were interested in dedicating tome to that work.”

These school leaders also appear to support the conclusion they adopted planning that was aligned with education design research (McKeney & Reeves, 2012) because they were able to try it and compare it to existing methods. Early adopters appear to have been very reflective when they first adopted the planning and they were attentive to the quality of the interventions and the experience of the planning on the professionals in their organizations. This appears to support the observation of Roger (2003) that innovations that can be demonstrated as effective and that users can try before they fully commit to adopting them are factors associated with innovation that are adopted more rapidly and innovations that replace existing methods.

Permission to Iterate and Deviate

The recommended steps in educational design research vary from four (Reeves, 2006) to 14 (Bannan-Ritland & Back, 2014), but a recurring theme in the frameworks and models of the method is iterations. The three phases are complete only after multiple cycles of planning and design, and

practitioners suggest iterations can extend to other phases. Each iteration also varies depending on what has been learned to throughout the process as well as changes in the setting and changes in the participants. McKenny and Reeves suggest the iterative nature "involves interaction with practice and contributes, directly and indirectly, to the production of theoretical understanding and the development of the intervention, which matures over time" (2012, p. 77). All participants in these projects, including the members of the organization who developed the interventions, were introduced to the iterative nature of the planning and it was an explicit expectation stated at the first meeting of each group of professionals who developed the intervention that they "improve what you build through several iterations or design cycles."

Each of the school leaders who participated in the study were licensed administrators in the states where they work, and each indicated their graduate studies had included coursework in which planning models were introduced. Further, each indicated they had applied those models both directly and indirectly over their careers as leaders.

Kevin, the principal at a rural high school who was identified as an early adopter of the innovative planning method, indicated he had been employed as a part-time instructor for others who were studying to earn school administrator credentials while he was involved with the original project. During one of the interviews for this study, Kevin illustrated the planning that was presented in the textbook by drawing a picture that has been replicated in figure 1. According to Kevin,

we were taught, I teach, and we have been expected to use what I can best describe as a linear method of planning. We set goals, use those goals to define a plan and actions to achieve the goals, then we evaluate how well we met the goal to set new goals. That always seemed dissatisfying and not really what we wanted to do. If we realized part way through that we were going in the wrong direction, we couldn't really stop. This was a big problem when the expectation of others was that we "follow the protocol." In the formal planning I have seen, we have steps that you must follow and the goals seem to become separated from the actions we take to achieve them. That makes no sense to me.

Insert figure 1 here.
Figure 1: Linear planning as drawn by Kevin

Kevin contrasted that model of planning with his own interpretation of the iterative planning he had followed as part of planning modeled after educational design research. He illustrated the differences with a drawing that has been replicated in figure 2; in the original drawing, Kevin included far more connections that are replicated, but his point is illustrated without creating a figure that is too cluttered. According to Kevin,

When following educational design research-based planning we are expected to start then go back and restart, jump ahead, then go back. For me the beast part of this is that we get to improve as we go. When we were looking at our original technology project, we realized as we started using it with students, that we had been wrong in what we were trying to accomplish with them. We went back and updated our goals, based on what we had learned, but we didn't have to wait until whatever timetable we had set for ourselves.

Insert figure 2 here
Figure 2: Nonlinear planning as illustrated by Kevin

Rachel made similar observations of the differences between the planning that was commonly expected to be followed by leaders in her school district and this planning. The project she undertook was highly technical, "there is no way I could set a realistic goal when I started," she said, "I knew what we

wanted to be able to do, but I could not have responsibly signed purchase orders based on what I knew." Rachel continued,

planning that was explicitly iterative gave me permission to not know what my plan was to be before I started. For me, this was an exploration and a learning by failure. I was figuring out what I wanted to do by figuring out what I did not want to do. Sure, it was inefficient, but it worked. Plus, we knew we were supposed to fail and fix, so we went back to fixing earlier than we would have if we were not following the iterative model.

All of the leaders articulated the expectation that they follow prescribed planning methods. Carol indicated the expectation had been formalized in her school district. "Once the state department of education started taking about SMART goals, we were supposed to show those in all of our action plans." When she talked with her superintendent about this project Carol noted, "I got some push back, but assured him that we would be able to report the work as having been SMART, then it ended." For Carol, this was a very meaningful event, and she indicated she had changed her approach to leadership.

That was a very uncomfortable situation. Now when I ask teachers to participate in projects, I give them permission to be iterative. For me, that is part of my plan, and I try to be a buffer between teachers who are developing plans and improving actions and the administrative rules that can get in the way sometimes.

For these leaders, the planning that was modeled after educational design research appears to have been both a departure from the methods that had experienced and that were the best practices as defined in their professional at the time. Further, these leaders appear to have found this method to be more effective than other methods. This appear to confirm the observation of Roger (2003) and Wani and Ali (2015) that those innovations that have a greater relative advantage tend to be adopted more quickly, diffuse throughout the population more rapidly, and replace existing methods compared to those with lesser relative advantage.

Longevity

Although the focus of this study was the planning methods that had been used rather than the original projects to introduce technology-based methods into their schools, each of the leaders commented on the longevity of the projects that had been undertaken. Each indicated the original project was still active. That longevity, along with the continued development of the project was credited to the value of the method.

Mary, the principal at an elementary school identified as an early majority user, observed, "it has been a couple of years since we started, but we still find one faculty meeting each month to look at the materials we developed." Mary's original project had focused on developing curriculum and instructional material to make use of newly arrived devices, so the project found teachers replacing exiting technology strategies, teaching practices, and planning practices.

Our teachers like the focus on the curriculum. Over time, the specifics of how grade levels work changed, but the idea of taking what we have and improving it is consistent, and the teachers value it. Even as the devices originally used have been replaced.

Rachel had a similar observation, but indicated the improvements they have been making in the distance learning project they continued was "largely driven by the teacher getting batter and finding little ways to make things better. We have decided this will be a permanent solution until the situation changes."

Carol also identified teachers' acceptance of the intervention she and her colleagues had developed as a reason that the project continued. "Teachers like the system we developed. As a matter of fact, when we changed our professional development focus from science—the subject we originally developed it for—to math, they wanted keep using the site, so we did, and we still do." In Kevin's school, the original initiative had emerged into something related but completely different. "The iterative steps resulted in the original project being replaced," Kevin observed, "when we were evaluating what we had done, we kept identifying great next steps, so that's what we did." The longevity of the technology plans and the planning methods provided further evidence planning strategies aligned with educational design research (McKenny & Reeves, 2012) provide a relative advantage compared to existing methods for school leaders.

Limitations

The author recognizes several limitations of this study. First, the original projects and original research occurred many months prior to the current study. While that time allowed greater time for the leadership methods that we being studied to mature, it also allowed for the leaders' recollection of the experience to fade and for other factors and experiences to affected his or her perceptions of the original experience.

Second, the only data that were collected were these interviews. A more complete understanding of the leaders' current planning methods and the degree to which their practices align with the iterative nature of educational design research would be obtained by observing the leaders facilitate meetings or by gathering data from the members of the schools they lead. From this limited data, it is difficult to know if these leaders are accurately describing their actions. Data that are not self-reported would improve the dependability of these observations.

Third, while the original projects were designing so that the planning strategies were informed by educational design research (McKenny & Reeves, 2012), the details of how the methods were implemented in each situation were created by the participants at the time. A more formalized structure with clear connections to the nature of educational design research would allow the findings of this study to be more accurately transferred to other settings.

CONCLUSION

For the school leaders who participated in this study, the strategies they used to make planning decisions appear to have changed as a result of an experience in which they modeled their planning after the principles of educational design research (McKenny & Reeves, 2012). They recognized differences between their previous methods and these new methods, and the adoption of the methods appears to have been characterized by Roger's (2003) stages of adoption. Further, the longevity of the original technology projects and the continued use of the planning methods appears to support the conclusion that these provided a relative advantage over other planning methods. A more formal framework for school leaders to follow when adopting these methods is the next step in this research.

REFERENCES

Ackerman, G. (2017). Strategies to increase technology acceptance. In M. Grassetti & S. Brookby (eds.). *Advancing Next-Generation Elementary Teacher Education through Digital Tools and Applications* (pp. 1-18). Hershey, PA: IGI-Global, Inc.

Ackerman, G. (2018). Open source online learning in rural communities. In I. Bouchrika, N. Harrati, and P. Vu. (Eds.). L*earner Experience and Usability in Online Education* (pp. 61-84). Hershey, PA: IGI-Global.

Bannan-Ritland, B., & Baek, J. Y. (2014). Investigating the act of design in design research: The road taken. In *Handbook of design research methods in education* (pp. 317-337). New York: Routledge.

Dexter, S., Richardson, J., & Nash, J. (2017). Leadership for technology use, integration, and innovation. In M. Young & G. M. Crow (Eds.), *Handbook of Research on the Education of School Leaders* (*2nd ed.)* (pp. 202-228). New York: Routledge.

Glaser, B. G. (1965). The constant comparative method of qualitative analysis. *Social Problems, 12*(4), 436–445.

Gülbahar, Y. (2007). Technology planning: A roadmap to successful technology integration in schools. *Computers & Education, 49*(4), 943–956.

McKenney, S. E., & Reeves, T. C. (2012). *Conducting educational design research.* New York: Routledge.

McKenney, S., & Reeves, T. C. (2014). Educational design research. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 131–140). New York: Springer.

Milman, N. B. (2019). School Leadership of a One-to-One Laptop Initiative. *Journal of School Leadership,* 1052684619852114. https://doi.org/10.1177/1052684619852114.

Reeves, T. (2006). Design research from a technology perspective. In *Educational design research* (pp. 64-78). New York: Routledge.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed). New York: Free Press.

Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (3rd ed). New York: Teachers College Press.

Wani, T., & Ali, S. (2015). Innovation diffusion theory: Review & Scope in the Study of Adoption of Smartphones in India. *Journal of General Management Research 3*(2), 101–118.

Yu, D., & Hang, C. C. (2010). A reflective review of disruptive innovation theory. *International Journal of Management Reviews, 12*(4), 435–452.