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Best practices in teaching K-12 online: Lessons learned from Michigan Virtual School teachers

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Abstract

Virtual schools are rising in popularity and presence. Unfortunately, there is a relative dearth of research related to teaching and learning in virtual schools. Although there are numerous handbooks addressing teaching online, there is little research on successful online teaching in the K-12 arena. Much of the existing research focused on teaching online is rooted in face-to-face content, not focused on content areas, built upon a post-secondary audience, or fails to use data from the teachers themselves to triangulate findings. This article reports on a study of 16 virtual school teachers from the Michigan Virtual School (MVS). It reports on best-practices from the interviews conducted with MVS teachers; and also provides research triangulation for those practices. The paper concludes with implications for policy, research, and practice.

Introduction

Teaching and learning in K-12 virtual schools has grown in popularity since their inception in 1996. In the United States, there are currently 24 state-led virtual schools and 12 states in the process of forming these institutions (Watson & Kalmon, 2006). The *National Center for Education Statistics* (<http://nces.ed.gov/>) reported that 36% of public school districts had students enrolled in distance education courses during the 2002-2003 school year. In 2006 Michigan became the first state to mandate virtual learning, and that each student should have a virtual learning experience prior to high school graduation (e.g. <http://www.eschoolnews.com>). This rapid increase in schooling has led some to suggest that online learning is one of the most important new approaches for K-12 schools (Blomeyer, 2002).

Unfortunately, while virtual schooling at the K-12 level has grown in popularity, research-based investigations into the teaching and learning process in this medium and at this level are still lacking (Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004). Very little is known about best practices specifically related to teaching in K-12 online settings. There has been some adaptation of face-to-face instructional practices for online settings in the guidelines and standards produced by leading organizations in teaching and learning. The principles of online teaching addressed in the 'best practices' literature are similar to those from face-to-face settings based on the mutual emphasis placed on content area expertise, communication skills, and instructional design. The American Federation of Teachers (Higher Education Program and Policy Council, 2000), Sloan-C (Sloan-C, 2002), and American Distance Education Council (ADEC, 2003) have each published recommendations and handbooks for teaching online courses that identify general practices associated with course effectiveness. In 2006, the South Regional

Educational Board (SREB, 2006) and National Education Association (NEA, 2006) released similar guidelines specifically targeting online teaching in secondary education.

While the documents from these organizations provide a basis for understanding instructional effectiveness and course design for online settings, they do not necessarily address the unique skills required to teach virtual school courses. The adaptation of face-to-face practices contained in these documents often neglect the unique skills of virtual school teachers, indicating the need for research that focuses on the instructional practices of K-12 teachers in virtual school settings. Lacking a body of research that focuses on the K-12 online arena, these documents also draw on research underpinning the instructional practices associated with post-secondary online settings.

In this paper, we present evidence from a study aimed at understanding best practice in K-12 virtual schools. The study was based on data collected from a series of interviews conducted with 16 highly-qualified virtual school instructors. Data evidence underlying the instructional practices identified by this study is presented and triangulated with existing research. In addition to reporting the results of the study, the positioning of the findings in relation to existing research exploring instructional practice in face to face and post-secondary online settings will identify virtual school instructional practices as an area in need of further research. We conclude with implications for research, policy and practice.

Best Practices in K-12 Virtual Schools

Virtual schooling is developing as a field of research (Cavanaugh et al., 2004). As such, there are some findings that have been suggested about virtual schooling and its teachers. For instance, online teachers need to be able to modify the instructional practices and pedagogical techniques used in face-to-face settings for the online environment (Boston, 2002; Lazarus, 2003; NEA, 2003; Savery, 2005; Tallent-Runnels et al., 2006). Often this requires the virtual school teachers to incorporate the skills of an interaction facilitator and an instructional designer into their role (Easton, 2003). The online teacher must also develop skills to foster interaction and communication with and between students during the online learning experience. This requires the utilization of pedagogical techniques that draw on and integrate the available telecommunication tools to support student collaboration and knowledge acquisition (Rovai, 2001; Swan et al., 2000). Volery (2001) identifies the online teachers use of communication tools to foster a high level of interaction as an important factor in facilitating student learning in online environments.

The skills needed for teaching in an online learning environment support a teacher's function as a point of intersection for pedagogy, technology, and content (Russell, 2004; Savery, 2005). The selection and coordination of pedagogy, technology, and content is a primary task for teachers in order to provide students with quality online learning opportunities (Kurtz, Beaudoin, & Sagee, 2004a; Olson & Wisher, 2002). Implementing these new strategies associated with the use of pedagogy, technology, and instructional design can require teachers to undergo a major shift from what they have experienced in off-line settings (Coppa, 2004; Lee & Hirumi, 2004b; O'Neil, 2006). As there is currently no standard for preparing in-service or pre-service teachers for the unique demands of teaching in an online environment, they can present a challenge to new virtual course teachers (Hsi, 1999).

These research findings only begin to address questions surrounding virtual schooling. Before taking the next steps to address additional questions, concerns regarding the lack of foundational knowledge focused on virtual school teachers and their instructional practices needs to be addressed. First, many of the claims made draw from research investigating postsecondary

online teaching (Blomeyer, 2002). Research suggests that virtual schools demonstrate a complexity that distinguishes them from other online learning contexts (Ferdig, DiPietro, & Papanastasiou, 2005); therefore, further investigation needs to be conducted to understand these distinctions in relation to the teaching and learning process engaged within these environments (Vrasidas, Zembylas, & Chamberlain, 2003). One such distinction requiring further investigation is the instructional practices of successful virtual school teachers. The direct transference of good instructional practice in face-to-face settings does not always translate to good teaching in online environments (Davis & Roblyer, 2005). Therefore, it is important to acknowledge the different set of skills for teaching in online learning environments.

Second, in face-to-face settings, instructional practices are made up of the strategies, activities, and techniques a teacher implements during a course to support student achievement of learning outcomes (Gauthier, Dembele, Bissonnette, & Richard, 2005). Serving the selection of the strategies, activities, and techniques is a teacher's understanding of the relationship between content and pedagogical knowledge (Shulman, 1986). A teacher pairs their knowledge of pedagogy with their understanding of the content area to integrate elements into their instructional practice that demonstrates a best fit to support student learning. This consideration should also be made for the use of technology, carefully directing its integration based on the teacher's pedagogical content knowledge (Ferdig, 2006). To begin forming an understanding for the best practices associated with virtual school teaching, the instructional practices used by successful virtual school teachers from varying content areas needs to be explored.

Finally, much of the existing writing about virtual school teaching does not come from interactions with virtual school teachers. In order to understand the practices of successful virtual school teachers, there is a current need for research that explores the perceptions held by K-12 virtual school teachers for their instructional practice (Frydenberg, 2002; Kurtz et al., 2004a; Rice, 2006). Research in face-to-face learning environments demonstrates the value of gaining teachers perceptions for understanding the relationship between their beliefs about teaching and their instructional practices (Feiman-Nemser, 2001; Prawat, 1992; Winne & Marx, 1982). In the relationship between teachers beliefs and instructional practice experience emerges as a critical factor, functioning as a filter through which their beliefs are translated into practice (Kagan, 1992). The perspectives of virtual school teachers in the K-12 virtual school arena remain relatively unexplored, leaving a gap of understanding for how virtual school teachers experience this transition, and how it translates to their instructional practice. Exploring this area of research is not only valuable for understanding instructional practice in virtual school settings, but also for identifying the best practices associated with the preparation of virtual school teachers and recommendations for the developing policy surrounding virtual schools.

Method

Participants

Sixteen teachers from Michigan Virtual School were selected to participate in this study. The Michigan Virtual School was selected as a source for teachers as it has recently partnered with the University of Florida and the AT&T Foundation to begin developing content-based best practices in K-12 online instruction. Employing approximately 100 virtual teachers per semester, the emphasis state government is placing on virtual learning has made the issue of quality teaching a priority of MVS. The legislation recently passed requiring each student to complete

an online experience sometime during their high school career exemplifies the type of attention state government drawing toward virtual learning.

Michigan Virtual School provides students with an opportunity to enroll in a variety of content-based courses that demonstrate innovation in their design and delivery. Foundational courses to complete high school requirements are offered in Math, Science, Social Studies, and English at the regular and Advanced Placement level. They also provide unique experiences offering courses such as Chinese. These courses are offered at differing pacing schedules: flex (self-paced; elective courses), self-paced, or semester paced (core A. P. & general education courses). By investigating the practices of successful teachers, MVS is using the results of the study to present a set of best practices for virtual school teaching. These results will also be used for teacher professional development.

Subjects were chosen for this study using a purposeful sampling method to identify successful virtual school teachers (Rossman & Rallis, 2003). A goal of utilizing this sampling method was to select participants that represented the variance of the instructional practices used by successful virtual school teachers based on the grade level and content taught. In this study, prior teaching experience and certification status served as the primary criteria used for sampling participants that represented successful virtual school teachers. Experience was defined by 3 years of virtual school teaching experience and was closely tied to the second criteria of certification status. The time period of 3 years was selected based on the requirements outlined by Title XI of the NCLB act for 'highly qualified instructors' (Bush, 2001).

In addition to experience and certification, participants were sampled across disciplines to include teachers of various content areas, specifically Math, Science, and English. Within these disciplines, the conceptions of successful instructional practice may change based on the grade level of the student audience and whether the course is General, Advanced or, A. P. Establishing the instructional level of the course as the third level of sampling will provide an opportunity to understand potential variations in instructional practices associated with a specific content area based on the audience. A current critique of virtual school research is the lack of variance in the studies conducted (Cavanaugh et al., 2004); sampling participants based on content area and target audience of the course can support the exploration of variation of virtual school teaching experiences and, in so doing, respond to this criticism. Ideally, sampling participants on the three levels of criteria (Figure 1) indicate differences in the conceptions virtual school teachers have for successful instructional practices based on the varying factors associated with a virtual school course.

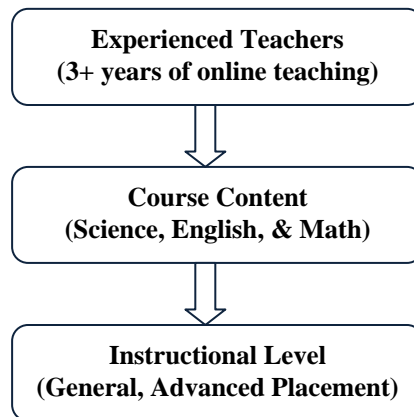


Figure 1. *Criterion for selecting research participants.*

The sampling procedure outlined above provided a basis for selecting 16 virtual schools teachers to participate in this study. The resulting number of participants supported the ability to explore the perceptions successful virtual school teachers for their instructional practice in depth.

Participant Recruitment

The Director of Quality Services met with the Executive Director of the Virtual School and the Instructional Manager to do the initial selection of instructors that fit the categories specified in the study parameters. Those parameters included: having a teaching certificate, being highly qualified in their field of instruction, and having at least 3 years of virtual school teaching experience. As the study focused on identifying the best practices of virtual school instructors, the Executive Director and Instructional Manager selected instructors they believed among the best in the content areas of English Language Arts, Science, and Mathematics. Participants were identified and invited to participate based on a review of instructor evaluations. Teacher evaluations were reviewed for teachers that demonstrated a history of being active in their course, maintaining effective communication with students, and used strategies that resulted in students successfully completing the course. An e-mail letter from the MVS President explaining the study was sent to each of the potential participants. In the letter, he asked each of the instructors if they would volunteer to participate in the study. Instructors were asked to respond to the Director of Quality Services as to their participation.

Data Collection

Participants were contacted twice during the study. The first interaction was part of the informed consent process, and provided an opportunity for the researchers to describe the study and answer any questions participants had. Since there was considerable distance separating the researcher and participants, the interviews were conducted and recorded using an online telecommunication tool called *Adobe Connect*. The inherent nature of virtual schools implies a distance between instructor and student, and the utilization of telecommunication tools such as *Adobe Connect* served as a bridge between them. *Adobe Connect* supports the use of streaming audio, video, and a shared workspace. For the purposes of this study, the interviews utilized the streaming audio feature of the software, built-in audio recording tool, and the shared workspace.

During the second interaction participants were asked to respond to a series of interview questions. Providing participants with the questions during the first session was a way of laying the ground rules for the 'interaction' that took place in the second interview, ensuring both parties knew upfront what to expect. The seven questions developed for the second portion of the interview were semi-structured, providing a general framework for the conversation. Using a semi-structured interview protocol provided participants with an opportunity to address aspects of successful virtual school teaching based on their own experiences. The questions were designed to prompt participants to provide a description for their pedagogical practice, in relation to the general strategies they use, their specific use in relation to the content area they teach, and the use of technology. The three topics that formed the foundation for developing the interview questions also provided an opportunity to analyze the data collected using several points of comparison.

Interview Questions

The following research questions provided a framework for the interview session. Probing and follow up questions were also used in response to participant's reactions when appropriate. The goal of using probing and follow-up questions was to gain more details regarding a participant's responses, and hence a greater depth of understanding for their replies.

1. What are the pedagogical practices you use to teach *insert content area (math, science, etc)* virtual school courses?
2. Why are you using these practices?
3. Drawing from your experience teaching different courses within your content area, do the pedagogical practices you use change based on the virtual school courses and the focus on the content included within it (Biology, Chemistry, etc)?
4. If so, how do these practices differ, and why do you use different ones?
5. How do you use different technologies (such as discussion boards, chat tools, wikis, etc.) within the virtual school courses to support your pedagogical practice?
6. How do you use technologies not built into your online course environment (such as web based tools & resources) to support your pedagogical practices?
7. What are your values/beliefs regarding virtual school teaching, and the pedagogical practices you implement?

Data analysis

The method of analysis utilized the four foundational techniques of grounded theory: coding data, using a constant comparative method, theoretical sampling, and data synthesis. In order to form a synthesis of participants responses at the conclusion of this study that represented their perceptions of successful instructional practice, the process of data collection and analysis was synchronous and recursive (Charmaz, 2006; Corbin & Strauss, 1990). In this study, analysis began by coding data after the completion of the first interview. The goal of coding was to identify those concepts that were repeatedly present in the data and was what ultimately lead to the synthesis and formation of the theory.

Along with the process of focused coding, a constant comparison of data sets provided additional means for forming categories and identifying analytic distinctions. Utilizing the constant comparison method provided a basis for establishing the study's validity, and demonstrated the symbiotic relationship between data collection and analysis. This recursive process continued until the data was 'saturated', and no new categories could be developed from the data collected. In the final stage of analysis, the constant comparative technique was used to form the synthesized description of successful virtual school teachers and their practices, representing a synthesis of consistent themes and categories derived from participant's descriptions. A primary means for establishing internal validity was the triangulation of data sources that result in the formation of categories and themes grounded in the data (Boeije, 2002; Creswell & Miller, 2000; Denzin, 1970).

Results

Two primary types of data were used to develop the list of practices - observations made by the researcher and interview data collected from the 16 participants who participated in the study. The foundation of analysis was the coding of participants responses to reveal points of

consistency. Points of consistency identified among participants responses were synthesized, and in addition to the observational notes, used to form the practice statement.

Twelve general characteristics, two classroom management strategies, and twenty-three pedagogical strategies emerged from the data analyses. These strategies and characteristics were represented, observed, or stated by all participants. General characteristics address personal and instructional characteristics that are associated with successful virtual school teachers. Practices and/or statements listed in the classroom management category indicate strategies to address behavior issues a student may exhibit in a virtual school course. Practices in this category also address the need to monitor activity and communications to identify ‘warning signs’ that a student may be in personal crisis. Pedagogical strategies relate to the delivery of content and content based activities in a virtual school course. The strategies are organized into sub-categories of - Community; Technology; Student Engagement; Meaningful Content; Supporting & Assessing Students.

Verification of the practices was achieved through qualitative data analysis; their formation was based on the consistent identification of themes in the data sets of all participants. Interview and/or observational data that were coded as demonstrative of a specific theme was included in the synthesis that served as the basis for forming each practice. A description paired with each practice serves to provide contextual information. Additionally, a direct quotation is presented in relation to each practice to exemplify the types of statements made by participants that were included in the synthesis underlying the practice. Finally, references are listed which triangulate the finding back to other research. While the references listed may not be directly related to virtual school research, they directly address a concept underlying or strategy associated with the practice in either face to face classroom environments, or post-secondary online courses. Identifying and providing these references serves as an additional means for validating the findings. Drawing from the existing face to face and post-secondary research to triangulate the findings of this study both reinforces the need for this study, and identifies the this topic as an area in need of additional research. Table 1 provides an overview of the findings and data used to validate the study.

Table 1

Overview of the findings

| General Characteristics | | | |
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| Practice: | Description: | Exemplar: | References: |
| MV teachers go the extra mile to support student learning | This practice represents a synthesis of statements made by participants that address the multiple ways teachers provide support for students, and their commitment to students’ success. The importance of ‘going the extra mile’ to support students was discussed as a means for increasing confidence with the content presented in the course and encouraging student course completion. | “The successful virtual teacher does all that he can to help all students succeed and this involves using the data that they have available to them, using the correct assessments, altering instruction, trying to address multiple intelligences, supporting the students, being available, again yet another challenge that is specific to the virtual world is just being there for the student.” | (Fenstermacher & Richardson, 2005; Hutchings & Shulman, 1999; Konings, Brand-Gruwel, & van Merriënboer, 2005; Scheines, Leinhardt, Smith, & Cho, 2006) |

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| MV teachers are skilled with the basic uses of technology | This practice represents a synthesis of statements made by participants that identify the ability to successfully utilize technology and function in the course environment. Having skill with the basic uses of technology was discussed in terms of the benefit it has on instruction, such as knowing what tools are available in the course environment and their educational potential for supporting student learning. | “The same characteristics that apply in face-to-face certainly apply in virtual, but in addition to the face-to-face skills, a virtual teacher has to have some knowledge of technology. Just to operate the management system for the course delivery requires training and practice. “ | (Berge & Collins, 1995; Lee & Hirumi, 2004a; O’Neil, 2006; Schoenfeld-Tacher & Persichitte, 2000) |
| MV teachers are interested in and enjoy exploring new technologies that have potential value for virtual school environments | This practice represents a synthesis of statements made by participants which indicate an interest in exploring the potential for using a variety of web-based technologies (outside of the course environment) with the virtual school courses they teach. The interest participants had for using technology was discussed in relation to their desire to seek out and find high quality web-based tools to integrate into their instructional content. An interest in exploring technologies was also observed during the interview, as some participants expressed interest in having time to explore the medium used to conduct the interviews, <i>Adobe Connect</i> , for the potential value it could have for their virtual school course | “There’s so much change with the technology, so much change with the material that you really need to be opened to that change as the technology develops and not be [sic] static with your material. “ | (Hartley, 2007; Hsi, 1999; Hughes, McLeod, Brown, Maeda, & Choi, 2005; Muirhead, 2001; Salpeter, 2003) |
| MV teachers are flexible with their time | The twenty-four hour-a-day nature of virtual school courses makes being flexible an implied characteristic of a successful virtual school teacher. The extent to which flexibility was observed is worth noting and including in the list of practices. Participants were not only willing to schedule a series of two interview sessions, but in some cases rescheduled the pre-set interviews multiple times because of last minute technical problems they or the researchers experienced or unanticipated scheduling conflict. The researchers’ observation of ‘flexibility’ was further supported by statements supporting other practices, such as the willingness of virtual school teachers to ‘go the extra mile’ to support students at times when students and/or parents were available. | “You’re not doing day-to-day lessons with the kids as you are in a classroom, that information is there for them to work with and then it’s your job to cultivate that to even higher levels. This way teachers don’t have to spend all the time preparing the lessons, and allows them to use their time to take those lessons and build on them to a greater extent and I think that’s a unique quality of online teaching, you can devote more to communicating with student and giving feedback. It gives me time to provide [sic] students support over the phone, sometime’s there’s just no better way to explain something.” | (Easton, 2003; Kurtz, Beaudoin, & Sagee, 2004b; Lazarus, 2003) |
| MV teachers have a deep understanding of the varying learning styles of their students | This practice represents a synthesis of statements made by participants that identify the need for considering the student population enrolled in a virtual school course. MVS teachers combined this with the knowledge and nature of the content to guide decisions regarding how information was presented. Understanding the learning styles of students | “I try to present material to student in seven ways ... if you present material in seven different ways then the students should understand it, having [sic] to do with different learning styles, auditory, versus static, etc. So, I try to present materials in many | (Chickering & Gamson, 1987, 1999; Fenstermacher & Richardson, 2005; Hein & Budny, 1999; Muir, 2001; Neuhauser, 2002; |

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| | was discussed by participants as a means for ensuring the virtual school course is accessible to students with varying learning styles, as well as offering them the greatest opportunity to be successful. | different ways and in very different ways, from labs to videos to text, to try and engage students in their best way to learn.” | Papanikolaou, Grigoriadou, & Samarakou, 2005; Valenta & Therriault, 2001) |
| MV teachers establish a presence in the course to motivate students | This practice represents a synthesis of statements made by participants that discuss the motivational aspect of establishing presence in a virtual school course. Logging into the course environment regularly, providing quick replies to student inquiries and being active in the discussion board was identified as a way of maintaining student engagement, as well as motivating them to complete the course. | “Students thanked me for being “the constant source of motivation,” they saw me working, they knew that I was online every night, and they knew that there was no excuse for them to say that they couldn’t get help or that they failed, a couple of them teased me that they probably would have dropped the class, had they not known that I was always there to help them.” | (Anderson, 2004a; Bellon & Oates, 2002; Carey, Wallace, & Carey, 2001; Smith & Dillon, 1999; Weiner, 2003) |
| MV teachers have good organizational skills | This practice represents a synthesis of statements made by participants that refer to organizational characteristics as important for being a good virtual school teacher. Personal and instructional organization was addressed by participants as a foundational element for administering and maintaining virtual school courses. | “One of the most important aspects of being a successful virtual school teacher is organization above all ... The teacher has to make sure they are logging in at certain times every day, they have to make sure they’re checking certain areas of the course, for example, the message area, organizing the discussion board, having grades set, and [sic] sending grades back to students” | (Davis & Niederhauser, 2007; Savery, 2005; Swan, 2003) |
| MV teachers use student and course data, as well as other sources of information available to them to self evaluate the pedagogical strategies they use | This practice represents a synthesis of statements made by participants that address the need for virtual school teachers to constantly evaluate the instructional strategies they are using. The need for this type of self-evaluation was discussed in terms of the benefits analyzing the relationship between the mode of content delivery, characteristics of enrolled students, and types of assessment strategies used has for optimizing students’ content knowledge acquisition. | “When a student takes that quiz, all that’s really telling me is if [sic] they are very good reader or they are not. I need to find out a way to deliver material, assess that material, take that data and then move on in my instruction” | (Lee & Hirumi, 2004a) |
| MV teachers have extensive knowledge of and appreciation for the content area they teach | This practice represents a synthesis of statements made by participants that indicate the value of extensive content knowledge. The value of extensive content knowledge was discussed in terms of its implicit value for answering students’ content based questions, as well as directing the types of pedagogical strategies they used to support student learning. | “Virtual school teachers have to know the content well. For example, when I used to teach calculus, I was actually the first class that I taught, students would be e-mailing me every day, asking me questions about ... related to content that they couldn’t get from the textbook so I had to know the calculus material inside and out so I could be able to phrase my answer to them in a way they’d | (Gudmundsdottir, 1990; Lee & Hirumi, 2004a; Peck & Gould, 2005; Shulman, 1986; van Driel, Verloop, & de Vos, 1998) |

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| | | understand through e-mail.” | |
| MV teachers understand the impact of course pacing on course design and the pedagogical strategies they use | This practice represents a synthesis of statements made by participants that address the relationship between course pacing and the selection of appropriate pedagogical strategies. The importance of understanding this relationship was discussed in terms of the expectations participants had for students’ use of the discussion board, as well as emphasis placed on one-on-one instruction and teacher-student vs. student-student interaction. | “In the Flex 90 courses we don’t get the strong sense of community that we do in the AP class, because in the AP classes ...I don’t have deadlines for them, they just pace themselves better and they use the discussion board more to ask each other questions. They are able to do this [sic] more than students in the World Literature (Flex 90) class does. “ | (Cavanaugh et al., 2004; Löfström & Nevgi, 2007; Swift & Gooding, 1983) |
| MV teachers continually extend their content and technological knowledge | This practice represents a synthesis of statements made by participants that address the value of keeping up to date with the curriculum and technology. Continually developing knowledge in these areas was discussed in regards to MVS teachers’ value in being introduced to new strategies for teaching content and how that can meet the needs of diverse students enrolled in the course. | “(Successful virtual school) teachers must continually improve and continually educate themselves on the curriculum and the technology to provide the best opportunities for students [sic].” | (Darling-Hammond, 2000; Hughes et al., 2005; O’Neil, 2006; Pape, Adams, & Ribeiro, 2005; Salpeter, 2003) |
| MV teachers are committed to the opportunities offered by virtual high schools | This practice represents a synthesis of statements made by participants that identify the need for successful virtual school teacher to acknowledge the service virtual schools offer students, and their role in it. Acknowledging the opportunities offered by virtual high schools was discussed in terms of the importance for understanding the critical role teachers play in the helping to satisfy the legitimate need virtual school courses fill. | “My face-to-face school uses Michigan Virtual a lot and it allows us to offer courses that we can’t teach because we don’t have the money to... So, while we won’t have enough to fill up the whole classroom full of people the two or three students that need the class can take it online. I think how valuable that course is depends a lot on the teacher, a lot on the student and the way the course is set up.” | (Pajares, 1992; Prawat, 1992; Richardson, Anders, Tidwell, & Lloyd, 1992) |

Classroom Management Strategies

| Practice: | Description: | Exemplar: | References: |
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| MV teachers use strategies to address inappropriate or abusive behavior of students in public forums of the course | This practice represents a synthesis of statements made by participants that articulate the importance of addressing inappropriate behavior of students enrolled in a virtual school course. The importance of dealing with this behavior was discussed in terms maintaining a non-threatening course environment for students. Additionally, participants discussed the importance of establishing rules of conduct, and a presence in the course to prevent inappropriate or abusive behavior. | “One student made a comment that started a firestorm on the discussion board the language in the discussion board post was such that I felt that it could be threatening to students in the class. So, the first thing I did was I removed the post immediately and I saved it, but then I contacted that student to discuss what they had posted and I read the post to them and asked them [sic], this is how this (the post) can be interpreted, is that the message you were trying to | (Davis, Farnham, & Jensen, 2002; Waterhouse & Rogers, 2004) |

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| | | <p>portray? If it was not, please understand you have a right to your opinion but are there other ways we could phrase this so you feel like you have a voice, but you are not impinging on the voice or the learning environment of the other classmates“</p> | |
| <p>MV teachers monitor venues of public communication in their course to identify students in personal crisis</p> | <p>This practice represents a synthesis of statements made by participants that acknowledge the emotional turbulence of high school students and the importance of being active in the course to facilitate the identification of students in need. The identification of students in crisis and what measure should be taken to ensure their well-being were included in the statements made by participants.</p> | <p>“I had a student one time that just, he used the discussion board as a cry for help and just said, something to the effect of no one cares, I’m going to get a gun or something. We contacted the police right away and the school district and they got that... but issues like that really worry me, because you’re not on 24 hours, they’re not right in front of you.”</p> | <p>(Connor-Greene, 2000; Whitlock, Powers, & Eckenrode, 2006)</p> |
| <p>Pedagogical Strategies: Assessment</p> | | | |
| <p>Practice:</p> | <p>Description:</p> | <p>Exemplar:</p> | <p>References:</p> |
| <p>MV teachers use multiple strategies to assess student learning</p> | <p>This practice represents a synthesis of statements made by participants that identify the need for successful virtual school teacher to utilize multiple modes of assessment in their course. While all participants indicated the use of multiple strategies, there were significant differences in the types of strategies used based on the content area of the course.</p> | <p>“Depending on the course there are definitely different strategies and types [sic] of assignments ... for one of my courses [sic] each semester there is a collaborative learning unit - even though we’re going through a Flex course, I make all students do that at the same time, they work in collaborative groups. I try to organize these groups based on spreading out ability level, spreading out gender, spreading out where the kids are from, and then, they have to ... each take on a role. Then, they have to discuss from their perspective, the perspective that they research whether this should be done or not, and they have to come to a group decision. So, they actually have to work together to come up with a decision and then they create PowerPoint presentations individually and then they get to see each other’s PowerPoint presentations and have to comment about the way people have presented their information, what</p> | <p>(Borland, Lockhart, & Howard, 2000; Campbell, Floyd, & Sheridan, 2002; Carey et al., 2001)</p> |

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| | | they liked about the presentations and what they found interesting within those presentations.” | |
| MV teachers use alternative assessment strategies that allow students the opportunity to represent their knowledge in ways that are personally meaningful | This practice represents a synthesis of statements made by participants that address the benefits of integrating personal representations of knowledge as a strategy for assessment. Using this type of assessment strategy was talked about in terms of the instructional benefits it offers by making content more personally relevant to students and experiences with content more concrete. | “If I have a project and give students the outcomes, what I need them to understand [sic] Then I can ask them ... Now, how can you do that for me, what technology could you use? I would have kids come to me and say, well, I play with Flash, can I make a Flash movie? I didn’t even know what a Flash movie was, but said sure, go for it, surprise me.” | (Anderson, 2004a; McCombs & Vakilia, 2005; Von Secker & Lissitz, 1999) |
| MV teacher use alternative assessment strategies to accommodate the varying learning styles of their students | This practice represents a synthesis of statements made by participants that identify the value of utilizing alternative strategies for accurately assessing student content knowledge acquisition. Use of alternative assessments was discussed in regards to the opportunity they offer students to demonstrate their knowledge in a manner consistent with their learning style. | “I really feel that the assessments are much better online ... In an online environment you have many ways to be able to assess a student, discussion boards. I am sure you are familiar with those, is really good for students who may not be good test takers but [sic] are able to talk about what they are learning, so having them do that in a discussion board environment is a fabulous way to assess students.” | (Graham, Cagiltay, Lim, Craner, & Duffy, 2001; Krämer & Schmidt, 2001) |

Pedagogical Strategies: Engaging Students with Content

| Practice: | Description: | Exemplar: | References: |
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| MV teachers build in course components to reflect the interests of students enrolled in the course | This practice represents a synthesis of statements made by participants that address teachers using student interests making the course engaging for students. Integrating knowledge about students’ interests was discussed in relation to the value this strategy has for facilitating engagement with the learning process and a level of enjoyment which can ultimately enhance the learning of content. | “We’re trying some different ways of integrating their interest, and [sic] their skills in teaching them, so they see how what they are learning prepares them for their future. “ | (Bellon & Oates, 2002; McCombs & Vakilia, 2005; Palloff & Pratt, 1999; Shin, 2006; Vandergrift, 2002) |
| MV teachers are flexible in their use of pedagogical strategies to accommodate varying learning styles | This practice represents a synthesis of statements made by participants that address the need for teachers to use student-centered pedagogical practices. Utilizing student-centered practices was identified as a means for addressing the various learning styles of students enrolled in the course, and meeting their instructional needs. | “A successful virtual school teacher uses a variety of ways to make sure that their students are engaged, and they see relevance in what they are being taught” | (Coppola, 2002; Gudmundsdottir, 1990; Herring, 2004; Vrasidas & McIsaac, 2000) |
| MV teachers establish strong | This practice represents a synthesis of statements made by participants that address the | “Well, beside making a connection with my students I also like to | (Davis & Roblyer, 2005; Feiman- |

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| relationships with mentors | important role of mentors in supporting student learning. Forming strong relationships with on-site mentors was identified as a critical factor for facilitating student learning by ensuring they have the on-site support needed to be successful. | form strong relationships with the mentors of their school because those are the people that ... if they know what's going on I have a much better chance of having the students pass my class successfully" | Nemser, 2001; Kurtz et al., 2004b) |
| MV teachers use multiple strategies to form relationships that support rich interactions with students | This practice represents a synthesis of statements made by participants that address the need to form strong relationships students enrolled in their virtual school course. Establishing and nurturing these relationships with students was discussed in terms of the impact it has on the quality of interaction in the course, as well as the formation of community. | “ We do look for having a very rich interaction with our students and if we have ... there are sometimes we will run a course with five kids, three of them start now, finish right away, and then we have another one come in and not do anything, and then we have another one come in. So, really the requirement of interaction on the discussion board can be hard to force because there isn't anybody there to interact with. Once again, that's where the teacher has to step in and meet that student halfway and say, okay, I will be that interactive force for you, I will give you a limited feedback, ask me questions and I will be the interactive person. Then they can actually get a greater advantage perhaps than they would from the peer interaction” | (Coppa, 2004; Coppola, 2002; Swan, 2004a, 2004b; Swift & Gooding, 1983; Woods & Ebersole, 2003) |
| MV teachers motivate students by clearly organizing and structuring content | This practice represents a synthesis of statements made by participants that emphasized the need for courses to implement effective strategies of instructional design. Participants talked about the importance of content based instructional design in relation to effectively meeting the needs of students, as well as providing a motivational element to support course completion. | “I like everything to be laid out for them so they can clearly understand the directions, clearly understand what I am asking for and then they know what they need to do and not do.” | (Anderson, 2004b; Bellon & Oates, 2002; McCombs & Vakilia, 2005) |
| MV teachers embed deadlines within the content structure to motivate students in self paced courses to complete course requirements | This practice represents a synthesis of statements made by participants that express the need for teachers to implement activities and deadlines within the course to propel students toward its completion. Encouraging students to actively participate in course discussions and remain on-task so they may excel in the course and meet all necessary requirements were also identified as valuable outcomes associated with this strategy. | “The teacher has to be very, very organized. I knew exactly what content needed to be covered, I knew exactly when we had to cover it, when we were finished. I had a calendar, and I started off ... being a little bit flexible, and I learned my fellow high school kids, flexibility is not always good, that they are natural procrastinators in an AP class, these are A students, they are involved in everything in their school, and if you offer them flexibility your class is always at the bottom of | (Graham et al., 2001) |

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| | | their priority list, and [sic] I am not saying that in a negative just they are over extended ... So, I learned to have very, very firm deadlines.” | |
| MV teachers provide students with multiple opportunities to engage content in ways that suit varying learning style. | This practice represents a synthesis of statements made by participants that describe a need to provide students with multiple opportunities for interacting with content. The integration of different mediums to deliver the same content, such as adding an audio component to a textual component, were discussed as means for encouraging students active participation in a course and maintaining their engagement with content. | “It’s so important to be able to navigate what’s out there and really utilize what’s best for the students because nowadays, you [sic] can have your whole lectures online, they can watch a video and they can hear and see you working out a problem step by step.” | (Hein & Budny, 1999; Neuhauser, 2002; Shin, 2006) |

Pedagogical Practices: Making Course Meaningful for Students

| Practice: | Description: | Exemplar: | References: |
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| MV teachers use strategies to connect with students | This practice represents a synthesis of statements made by participants that emphasize the need for establishing a strong teacher-student relationship. The importance of connecting with students was discussed in terms of the positive outcomes forming these relationships has on facilitating student interest. This connection establishes a foundation that demonstrates a commitment to student success. | “I think a lot of times asking the kids to come to us and say, here are my outcomes, how does that relate to your life? I found a lot of times with my most hesitant students, they just needed me to sit down with them and say, now, wait a minute, you’re a heck of a farmer because that’s where we live, we’re very rural, so you’re a heck of a farmer... maybe you live in a farm community but there are no fields available, or what type of farming will I go into and what are some of the struggles they will go into? They watch the market, they have to know the economy, and it’s month to month for them, on paper they’re broke all the time. So, just having them come in and say, how [sic] does this relate directly to your life. “ | (Coppola, 2002) |
| MV teachers engage students in conversations about content and non-content related topics to form a relationship with each student | . This practice represents a synthesis of statements made by participants that affirm the need to demonstrate interest in students’ out-of-course lives. Forming an understanding for students’ out-of-school lives was discussed in relation to the instructional opportunities such knowledge offers teachers for making the course personally meaningful to students, as well as providing a means for communicating their vested interest in the course. | “My students wanted to connect with me as a teacher, they were still face-to-face natives of the classroom. So, they would send me their prom pictures, and they would tell me about their basketball games, and the longer I taught online, the less students do that and that worries me because that tells me that they are getting used to the idea that I turn it in, I get a grade, I walk away and I’m | (Berge & Collins, 1995; Hara, Bonk, & Angeli, 1998; Kanuka, Liam Rourke, & Laflamme, 2007; Oren, Mioduser, & Nachmias, 2002) |

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| | | done with it.“ | |
| MV teachers encourage and support communication between students | . This practice represents a synthesis of statements made by participants that indicate the value of encouraging student-student communication in a course. The value of encouraging these relationships was discussed in terms of the social climate that forms as a result and the opportunities offered by establishing a community of learners. | “Kids are going back, some of them are posting three, four times to a thread because they get engaged in the conversation, the material is interesting. But they talk about other things too like, football. Whatever it is about using the boards, it has the ability to make it (the content) very interesting for them.” | (Blignaut & Trollip, 2003; McIsaac & Craft, 2003; Swan et al., 2000) |
| MV teachers seek out and make available a variety of supplemental support tools to meet the diverse needs of students | This practice represents a synthesis of statements made by participants that discuss the importance of teachers recognizing the range of learning needs of students enrolled in their virtual school course. Participants discussed the need for identifying and integrating appropriate supplemental materials to support student success. | “So basically in [sic] our blackboard environment a list appears ... which has all kinds of additional material and access to all kinds of sites that they can get more information if they're struggling. They get [sic] access to different things. For specific students that are struggling and ask me for specific help I will do more specific things with them. Maybe send them to different places or do more one-on-one with them.” | (Koszalka & Bianco, 2001; Papanikolaou et al., 2005; Phipps & Merisotis, 2000) |

**Pedagogical Strategies:
Providing Support**

| Practice: | Description: | Exemplar: | References: |
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| MV teachers monitor student progress closely and interact with students to determine where gaps in knowledge may exist. | This practice represents a synthesis of statements made by participants that discuss methods for determining when a gap in student knowledge exists. This was addressed by participants in relation to the strategies used to identify gaps in students' prior content knowledge and methods for remediation of that knowledge. | “VS teachers need to be intuitive, meaning they need to know what questions to ask the students to really make sure that they understand the material because it's, you know, if you're sitting right next to somebody .. they can show the step-by-step process and you can say 'oh, well, that's where you went wrong'. So you really need to be intuitive and ask the right questions to understand where they're lacking the understanding.” | (Bransford, Brown, & Cocking, 1999) |

**Pedagogical Strategies:
Communication & Community**

| Practice: | Description: | Exemplar: | References: |
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| MV teachers facilitate the formation of community by encouraging content | This practice represents a synthesis of statements made by participants that identify the importance of providing students with a space in the discussion board to support the formation of connections between students. Forming a social | “We would post what I called random thoughts, miscellaneous topics, question of the week is what we use to call it. And somebody would post a question of | (Bernard, Rubalcava, & St-Pierre, 2000; Gunawardena, 1995; Swan, |

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| and non-content related conversations among students | community was discussed in relation to the value student-student connections have for providing additional venues of support. | the week, it might be what's your favorite song at the moment, and sometimes they were content related discussions, sometimes they were just random things, but it's funny because after the class you think about as an adult, what you remember about high school? You don't remember the content, you remember all the little stories and the little silly things that you did, and I was reading my students under the year evaluations, that's what they remembered, it's all about miscellaneous discussions we had in our random topics." | 2004b) |
| MV teachers interact with students using multiple channels of communication (telephone, IM, etc) provide support | This practice represents a synthesis of statements made by participants that identify the multiple tools used to support student-teacher communication. These communication tools were discussed in relation to their facilitation of a climate promoting open communication between teacher and student to support discussion and provide support. | "They know that I am here, they know that if they have questions for me, they can call me. I talk to my students all the time on a phone, or they can e-mail me, but I am here, I am really a teacher, I am really a person and I really want them to learn ... no matter what class I teach." | (Howell, 2001; Kanuka et al., 2007) |
| MV teachers provide students with quick feedback to maintain their motivation for completing the course | This practice represents a synthesis of statements made by participants that discuss the importance of providing feedback. Providing students with prompt, meaningful feedback was discussed in relation to instructional outcomes and the positive impact it has on student motivation and engagement with the course. | "When the instructor doesn't respond at all ... the kids lose their drive for excellence because they don't feel that they are working toward impressing anyone. So, the communication is really important and in particular when students asks questions, Michigan Virtual requires a 24-hour turnaround during the week, and I think that's crucial because in a classroom setting, you raise your hand, you ask the question, it's answered, you can move on and in virtual studying you don't have that luxury and the longer these things are not there I think, the more likely they are to just drop off." | (Swan, 2004b; Swift & Gooding, 1983) |
| MV teachers model what 'formal' online communication looks like in discussion boards and emails. | This practice represents a synthesis of statements made by participants that address the need for modeling interaction in a virtual school course. Modeling interaction was identified as a critical element in teaching students about effective online communication strategies. | "The other challenge is that often times in spoken communication ... We don't have to think through our sentence structure and our spelling and our word choice, but when you are an online teacher, every word you say is captured, it's frozen in time and it's documented. And so, if you don't take the time or don't have the skills to communicate | (Rovai, 2002) |

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| | | accurately, I think you lose creditability with your students. That was one of the downfalls with one of the courses my student took this semester is, there were numerous spelling errors (made by the teacher), and yet he was being graded on his spelling. “ | |
| MV teachers effectively monitor the tone and emotion of their communications with students | This practice represents a synthesis of statements made by participants that describe the need for critically considering how communications can be interpreted by students. The importance of monitoring the written communications with students was discussed in relation to the ease with which students, lacking the visual and auditory reinforcement provided by facial gestures and vocal tone, can misinterpret the contents of a message. | “I have to use parenthetical in order to express what I am feeling to students, often times to soften the words I am saying so, they don’t read, let’s say anger or frustration, into the words.” | (Rovai, 2001, 2002) |
| Technology | | | |
| Practice: | Description: | Exemplar: | References: |
| MV teachers purposefully tie the use of tools built into the course environment to state benchmarks and standards to support student learning of content | This practice represents a synthesis of statements made by participants that address the need for integrating meaningful uses of tools to support students learning. These uses of technological tools were discussed in relation to identifying the specific academic goals using such tools will serve as well as clearly tying their use to state benchmarks. | “ The class I took over teaching [sic] had a discussion board component built-in, and basically every chapter had a content area topic, and ... whatever the topic was they would have to ask some question and ... then students were supposed to respond, and respond to another student’s response and I did that for the first two weeks,... I thought I was pulling teeth in itself. So that was something that it just wasn’t working for me. I redesigned [sic] at the discussion board and I matched up again with the objectives and the topic we would teach and I put all the topics out there and then under a particular topic every homework assignment had a thread attached to it meaning that if you have questions on this particular homework this is where you post your questions, and once it was specific to our class and the kids could see that -- again, it really wasn’t to promote communication, it was to provide help for students. Now, all of a sudden the discussion board became helpful, it didn’t become another assignment that | (Frydenberg, 2002; Revenaugh, 2004; U. S. Department of Education, 2005) |

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| | | they had to do. So, they started communicating with each other and they'd post a question, and if I wasn't available they knew that I talked during the day, but if I wasn't at home from the school or whatever they would help each other and I also found out after a while that as much as we had on the discussion board, again which is a major, major part of our class, they did equal communication using Instant messenger with each other." | |
| MV teachers consider issues of student access to technology when integrating web based components into their course | This practice represents a synthesis of statements made by participants that address the need to consider students access to internet and computer technology required to use specific web-based tools such as streaming media. | "I have not run into that (issues with student access to technology) as much as some of my colleagues, but it just depends on your students. I know, many of our rural students especially from the upper peninsula just do not have the technology and the support to be able to take part in some of our courses. I haven't seen that as much but it's always in back of your mind when you are designing the course and especially for thinking about alternative assessments." | (U. S. Department of Education, 2005) |
| MV teachers use their content knowledge and knowledge of students to drive the integration of technology | This practice represents a synthesis of statements made by participants that indicate the importance of making decisions regarding the use of technology based on their content knowledge and knowledge of their students. The considerations that were discussed identified various elements influencing decision-making regarding the use of technology, as well as the value it holds in relation to specific content areas. | "For us to say every course must have podcast I think is very shortsighted because then suddenly the teacher's expertise is limited because that teacher is focusing almost exclusively on how do I portray my podcast and how do I make that fit. When in fact the content [sic] would be better suited to capture using a whiteboard session on blackboard rather than doing a podcast, because kids really need to see it rather than just hear it. So, when it comes to the partnership between content and technology, I do think content has to be at the forefront." | (Ferdig, 2006; Lee & Hirumi, 2004b; Shulman, 1986; van Driel et al., 1998) |

Implications and Conclusion

Little research exists to address best practices of virtual school teaching in the K-12 context. Many of the publications and handbooks suggesting best practices have been based on face-to-face teaching research or on research of post-secondary online education. Much of the

work that does exist is content-free. This research study set out to provide that data. There are two potential limitations to this study. First, these 16 teachers were identified as exemplary based on their existing service and track record within the virtual school. Obviously, clearer definitions need to be established in the field regarding exemplary instruction. However, this is a recursive problem; without research on best practice, it is impossible to identify exemplary instructors. Without research on subjectively-defined exemplary instructors, it is impossible to determine best practice. This research study has set forth research-based best practices by which others can measure and test 'best practice.'

A second potential limitation is that due to the scope of this work, a tremendous amount of exploration into technological pedagogical content knowledge—or the differences between teaching different content matters online—was not fully explored. Both of these two limitations lead to a direct implication of this study. Namely, more research needs to be done that explores best practices within the context of specific content areas. There may be similarities between teaching face-to-face and online, teaching online secondary and online elementary, and teaching online math vs. online English. However, there are obviously differences; more research needs to explore these best practices. This research would then help set the stage for exemplary practice or 'best practices' within virtual schooling. The results of this study can influence the developing body of policy and legislation surrounding virtual schools, impacting professional development, in-service and pre-service teacher certification, teacher reciprocity, and national standards.

While the concern with quality instructors in face-to-face settings is mirrored by those of virtual schools (South Regional Educational Board, 2003), in online environments this concept is complicated by the unique skills required of virtual school teachers. As new policy and legislation is written, that will influence the formation of state led virtual schools, research is needed that indicates the characteristics of quality virtual school teachers (Watson & Kalmon, 2006). As this study will focus on successful virtual school teachers, indications of quality is a potential outcome and can impact policy by providing a basis for establishing virtual school teaching as an area of professional certification.

Recognizing these potential limitations, there are four other important implications for this work. First, each of these strategies provides a basis for professional development as well as standards to be developed and tested. Sampling participants from different content area provides a basis for reconsidering the professional development opportunities offered to virtual school teachers. While all virtual school courses are delivered online, there are no criteria facilitating the selection of courseware tools and online resources to support student learning in various content areas (Ferdig et al., 2005). The knowledge gained from the results of this study can be valuable for the content included in virtual school professional development programs, providing a basis for extending in-service teachers knowledge about the selection of pedagogy and technology that are appropriately matched to the content and medium of delivery (Russell, 2004).

Second, classroom management is an area of future research concern. Anecdotally, teachers sometimes suggest that the beauty of online instruction is that you don't have to worry about classroom management. There are no chairs to arrange or blackboards to clean. There is no detention or worry about Johnny and Sarah passing notes. However, in this study, classroom management in online education was a key component to quality online instruction. It helped build a community of practice within the classroom. Although these issues have been explored

in depth in face-to-face environments, they are—as of now—unexplored domains in online K-12 classrooms.

Third, the attention virtual schooling has gained from the K-12 arena leads to the consideration of blended, or hybrid learning environments where aspects of online learning are integrated into traditional, face-to-face settings. Having an established, research based set of practices associated with successful virtual school teaching can facilitate the exploration of the best practices for teaching in blended, or hybrid environments. Finally, there are general characteristics that seem to be true of all of the online teachers interviewed in this study. We have already suggested that these need to be explored related to specific content areas. However, we also need to find a way to examine whether these general characteristics are true of larger populations. Future research needs to take these findings and turn them into surveys or observation tools for broader use. Armed with valid and reliable feedback regarding best practices, it will possible to build the framework for an online education certification that will help to promote a standardized model for exemplary instruction in K-12 virtual schooling.

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