Developing a Survey to Measure Best Practices of K-12 Online Instructors

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Abstract

Limited data exists related to teaching and learning in K-12 virtual schools. This paper builds upon a recent study related to successful practices of K-12 online instructors. The paper describes the utilization of a survey built upon qualitatively derived best practices of K-12 online instructors and provides the opportunity to relate these practices to teacher's perceived professional development needs. Outcomes indicate that virtual school instructors identify online presence, diligent student monitoring and an enjoyment of technology among factors that contribute to virtual school instructor success. Instructors also identified face-to-face student mentors as a key component for success. Respondents felt that they would benefit from professional development focused on technological skills, content-based technological integration and evaluative resources for online learners. The paper concludes with a call for additional research to refine and implement the assessment.

Introduction

Although researchers have developed a strong body of knowledge regarding the instructional practices of face-to-face teachers, K-12 virtual schooling is still developing as a field of research, policy, and practice (Cavanaugh et al., 2004; Blomeyer, 2002). One specific area lacking research is a deep understanding of the instructional practices used by virtual school teachers. teacher practice (DiPietro, Ferdig, Black & Preston, 2008). Understanding the instructional practices of K-12 virtual school teachers is vital to the field of Internet-based education (Yang & Cornelious, 2005; Kurtz, Beaudoin, & Sagee, 2004; Beaudoin, 2002). It is a critical need because teaching in K-12 virtual, online schools requires skills that are unique from those used in face-to-face settings (Ferdig, DiPietro & Papanastasiou, 2005; Vrasidas, Zembylas, & Chamberlain, 2003). In online settings, teachers influence students' experiences and understanding through their use of pedagogy and technology; they also match curricular content and the mode of delivery (O'Neil, 2006; Schoenfeld-Teacher & Persichitte, 2000). Specifically studying the perceptions and practices of thriving virtual school instructors will further

develop the body of knowledge regarding best practices for online instruction (Sadik, 2003; Yang & Cornelious, 2005).

This paper describes the quantification of data derived through a qualitative exploration of successful teacher practices in a virtual school located in the upper mid-western United States. A qualitative analysis of K-12 virtual school teacher practice was initially completed (DiPietro et al., 2008). Based on the results of that analysis, a quantitative survey was created and then given to the entire school system. This paper presents the survey as a new tool for K-12 virtual school researchers; it also describes results from the use of the survey. The paper concludes with a call for independent empirical validation by other researchers.

Background

Qualitative data was collected through a series of interviews with 16 highly qualified virtual school instructors from a virtual school located in the upper mid-western United States. This data collection was part of a comprehensive analysis of virtual school practices initiated by the University of Florida's School of Teaching and Learning and funded by AT&T. Administrators of the virtual school facilitated the initial identification of instructors that fit the selection criteria outlined by the study. Those criteria included: having a teaching certificate, being highly qualified in their field of instruction, and having at least 3 years of face-to-face and virtual school teaching experience. Participants meeting the initial criteria were then sampled to represent practices across various content areas, specifically math, science, social studies, and English. Within these disciplines participants were also sampled to represent practices associated with varying instructional levels of a course, such as General and Advanced Placement. As the study focused on identifying the best practices of 'successful' virtual school instructors, the Executive Director and Instructional Manager of the virtual school provided the researchers with a list of suggested participants based on the above selection criteria as well as their designation of the teacher as a 'successful instructor.' 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).

Sixteen participants teaching virtual school courses were recruited to participate in the study. Each participant was asked to take part in a fifty minute individual interview session using the telecommunication software *Adobe Connect* . During the interview participants were asked to answer a series of questions designed to the general strategies they use, as well as their specific use in relation to the content area they teach, and the use of technology. Data collection and analysis was conducted using methods associated with constructivist grounded theory. This involved the use of three foundational techniques associated with constructivist grounded theory: coding data, using a constant comparative method, and data synthesis. Data collection and analysis were synchronous and recursive in order to facilitate the synthesis of participants responses, and ultimately form a description of the instructional practices of successful virtual school teachers (Charmaz, 2006; Corbin & Strauss, 1990). This analytic strategy involved the constant comparison of codes both within and between the sixteen data sets derived from the interviews to support the formation of categories and identification of analytic distinctions. The formation of a representative description of successful virtual school teachers and their practices was the outcome of this process. At the conclusion of this process, twelve personal characteristics and twenty-three pedagogical strategies emerged from the analyses. Personal characteristics included organizational skills, commitment, flexibility, technological aptitude and content area expertise. The pedagogical strategies related to the delivery of content and content-based activities included: providing support, assessing students, student engagement meaningful content, community and technology. (For a full description of all 12 personal and 23 pedagogical characteristics, see DiPietro et al., 2008). External validity was achieved by triangulating the characteristics that were

identified at the conclusion of the study with existing research exploring the practices of face-to-face and post-secondary online teachers.

An additional goal was to transform the qualitative data into a quantitative instrument that could then be used with multiple participants. The goals of such a survey would be to: a) validate the characteristics developed from a smaller sample size; and b) to use an instrument to be able to assess current professional development needs of existing virtual school teachers.

Methodology

Survey Generation

A survey instrument was designed based on the characteristics and strategies of an earlier study (DiPietro et al., 2008; Appendix A and Appendix B). Utilizing Dillman's (2007) methods for question design and a content-matter expert for validation, a 20 question survey was developed. The survey consists of three sections: a demography section, a section with 20 questions related to the previously identified general characteristics and pedagogical strategies and a section requesting perceived professional development needs. The 20 questions were responded to with a five-point Likert-type scale of potential responses: strongly agree, agree, neutral, disagree, and strongly disagree. Participants checked the place on the scale that best reflected their feelings about the item. The other items were either rank-order, in the case of the professional development question, or free response, in the case of the demographics.

Participants

Data for this study was collected from 53 virtual school instructors at a virtual school in an upper mid-Western US state. The virtual school is not a degree granting institution, meaning that students are unable to enroll full-time. A partnering institution, typically a face-to-face school, facilitates the relationship between the virtual school and the student.

A request to fill out the survey was sent to all virtual school teachers (minus the 16 that had participated in the original survey). The sample that responded represented 73% of the virtual school instructor population. Respondents were contacted via email and asked to fill out a brief survey online. The survey responses were then downloaded to an MS excel file for coding and translation, upon completion of the coding process the file was unloaded into SPSS v.13. Cronbach alpha procedures and descriptive statistics were calculated utilizing the data.

Results

Instructor Background

All respondents held at least a bachelors degree; the majority of respondents (85%) held a masters degree or greater level of education. Respondents reported varied levels of virtual teaching experience, 13.2% of instructors surveyed had less then 1 year of virtual schooling experience, 28.3% had between 1 and 3 years of experience, 24.5% had between 3 and 5 years of experience and 34% of respondents had greater then 5 years of virtual schooling experience. The majority of respondents (88.7%) had more then 5 years of face-to-face teaching experience, indicating an experience cohort of educators.

Survey Results

Survey results indicate that responding teachers consider enjoyment of technology ($\bar{x}$=1.85, sd=.86), online presence ($\bar{x}$=1.42, sd=.72) and close monitoring of student progress ($\bar{x}$=1.42, sd=.57) important characteristics of successful online instructors. Further, the sample felt that virtual schooling provided unique opportunities for both students ($\bar{x}$=1.25, sd=.48) and teachers ($\bar{x}$=1.28, sd=.50). They also identify on-site mentors for virtual school students ($\bar{x}$=1.19, sd=.48) as a component that aids in success. Specific results for the characteristics and pedagogical practices can be found in tables 1-2.

Table 1
Survey Results (Likert response, 1 indicating strongly agree through 5 indicating strongly disagree)

Survey Question	N	Minimum	Maximum	Mean	Std. Deviation
1. Tech proficiency	53	1.00	5.00	1.85	0.86
2. Enjoy new tech	53	1.00	3.00	1.43	0.54
3. VS teachers flexible	53	1.00	4.00	1.72	0.79
4. Understand learning styles	53	1.00	4.00	1.92	0.70
5. Online presence motivates	53	1.00	4.00	1.42	0.72
6. Connect with VS students	53	1.00	3.00	1.77	0.67
7. Multiple strategies to address learning styles	53	1.00	3.00	1.70	0.57
8. Mentors important	53	1.00	3.00	1.19	0.48
9. Deadlines motivate	53	1.00	4.00	1.94	0.79
10. Communication meaningful	53	1.00	4.00	1.58	0.69
11. Closely monitor progress	53	1.00	3.00	1.42	0.57
12. Multiple channels of communication	53	1.00	4.00	2.11	0.95
13. Quick feedback motivates	53	1.00	3.00	1.45	0.54
14. Restrict technologies	53	1.00	5.00	2.94	1.08
15. VS teachers organized	53	1.00	4.00	1.77	0.75
16. VS teachers evaluate	53	1.00	4.00	2.15	0.79
17. VS unique for students	53	1.00	3.00	1.25	0.48
18. VS unique for teachers	53	1.00	3.00	1.28	0.50
19. Multiple forms of assessment	53	1.00	3.00	1.58	0.60
20. Alter course to reflect student interests	53	1.00	4.00	2.17	0.87

Table 2

Years of Teaching Experience

Type	N	Minimum in years	Maximum in years	Mean	Std. Deviation
Virtual School Experience	53	1.00	4.00	2.79	1.06
Traditional School Experience	53	1.00	4.00	3.79	0.63

Table 3
Professional Development

Professional Development Topic	**Teachers Requesting**	**Percentage**
Content Specific Training	6	11%
Technology Based Skills	31	58%
Online Classroom Management	9	17%
Effective Communication with Online Students	12	23%
Organizing and Structuring Online Instructional Content	18	34%
Strategies for Accommodating Different Learning Styles	19	36%
Finding and evaluating quality resources for my online classes	28	53%
Content based technology integration	30	57%
Other: including LMS specific training, time management and online curriculum development	7	13%

Reliability Analysis

In order to determine internal consistency, a Cronbach coefficient alpha was calculated based on the 53 respondents. The coefficient alpha for the 20 survey items (enumerated 1-20 in Appendix A) pertaining to general characteristics and pedagogical strategies was .69. This number indicated a satisfactory, though less then optimal, level of internal consistency. Inter-item correlations for the 20 survey items are featured in Table 4 and Alpha-if-item-deleted for the 20 survey items is featured in Table 5.

Table 4
Inter-item Correlations for 20 Survey Items

Survey Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1.00																			
2	0.31*	1.00																		
3	-0.18	-0.07	1.00																	
4	-0.15	0.04	0.13	1.00																
5	0.26	0.37*	-0.06	-0.09	1.00															
6	0.09	0.15	0.08	0.59	-0.07	1.00														
7	-0.13	-0.02	-0.02	0.43	-0.28	0.54*	1.00													
8	0.19	0.18	-0.02	0.11	0.20	0.16	0.15	1.00												
9	0.06	0.18	0.11	0.01	0.15	0.12	0.13	0.60*	1.00											
10	-0.01	0.21	-0.05	0.33	0.09	0.09	0.21	0.23	0.08	1.00										
11	-0.09	0.00	0.29*	0.18	0.10	-0.09	-0.20	-0.19	0.11	0.21	1.00									
12	0.02	0.18	0.06	0.28	-0.02	0.42*	0.19	0.21	0.10	0.30	0.18	1.00								
13	0.16	0.12	0.19	0.10	0.16	0.33*	0.12	0.13	0.17	0.08	-0.12	0.00	1.00							
14	-0.01	0.10	-0.12	0.13	-0.03	0.20	0.17	0.04	0.04	0.07	-0.12	0.21	0.03	1.00						
15	0.04	0.06	0.02	0.25	0.04	0.36*	0.21	0.12	-0.04	0.19	-0.16	0.27	0.31*	0.37*	1.00					
16	0.09	0.03	0.06	0.25	0.27*	0.07	0.01	0.20	0.29*	0.27*	0.28	0.11	0.24	0.10	0.21	1.00				
17	-0.07	0.09	-0.08	0.13	0.27*	0.18	0.07	0.04	0.05	0.29*	0.01	0.27	0.20	0.27	0.40*	0.25	1.00			
18	0.09	0.13	0.04	0.04	-0.01	0.22	0.13	0.06	-0.07	0.05	-0.16	0.31	0.20	0.24	0.40*	-0.04	0.27	1.00		
19	0.03	0.04	0.22	0.14	0.20	0.16	0.02	0.08	0.23	0.23	0.41	0.26	0.26	0.15	0.24	0.41	0.44	0.12	1.00	
20	0.34*	-0.06	0.25	0.27*	-0.34*	0.05	0.23	-0.31*	-0.29*	0.20	0.13	0.16	0.09	0.13	0.14	-0.13	0.04	0.16	0.11	1.00

* $p < .05$

Table 5
Alpha-if-item-deleted for 20 Survey Items

	Alpha if Item Deleted
1. Tech proficiency	.710
2. Enjoy new tech	.680

3. VS teachers flexible	.693
4. Understand learning styles	.660
5. Online presence motivates	.695
6. Connect with VS students	.654
7. Multiple strategies to address learning styles	.679
8. Mentors important	.682
9. Deadlines motivate	.684
10. Communication meaningful	.667
11. Closely monitor progress	.700
12. Multiple channels of communication	.661
13. Quick feedback motivates	.673
14. Restrict technologies	.679
15. VS teachers organized	.659
16. VS teachers evaluate	.670
17. VS unique for students	.668
18. VS unique for teachers	.677
19. Multiple forms of assessment	.661
20. Alter course to reflect student interests	.708

Discussion

The upper mid-western virtual school selected for participation recently partnered with the University of Florida and the AT&T Foundation to begin developing content-based best practices in K-12 online instruction. New state legislation has resulted in a new emphasis on discerning information about quality teaching practices and utilizing the information to facilitate training for the entire staff of approximately 100 virtual teachers.

Utilizing the survey, respondents provided valuable information with regards to both their perceived needs and characteristics that are important as virtual school instructors. Virtual school administrators should be heartened to learn that their online instructors both embrace technology and actively want to learn more. A majority of teachers agreed that there were three specific topics that would be beneficial for professional development (see Table 3): the development of new technology based skills, new methods for finding and evaluating resources for use with online classes, and content based technology integration. The three topics were highlighted as important by 58%, 53%, and 57% of instructors respectively. These three topics corresponded to successful beliefs held by online instructors based on DiPietro et als. (2008) work and supported by the survey respondents (see Table 5).

Administrators may be concerned to note the importance that virtual school teachers ascribe to on-site mentors. Mentors seem to play a

critical role based on previous research (Berge & Clark, 2005) and teacher responses; yet, there is no specific definition of a mentor. No standards exist for a mentor's training, level of education or involvement with students (Ferdig & Black, 2008). Without standards, it is quite possible that students are receiving varying levels of support based upon the qualifications (or lack thereof) of the on-sight mentor.

By pairing a virtual school instructors perceived needs to characteristics important to the instructors, administrators are provided a roadmap for the facilitation of professional development that is paired with successful practices.

Table 6
Professional Development and Success Characteristics

Professional Development Practice	Success Characteristic
Need for new technology based skills	I am proficient with technology.
Methods for finding and evaluation new online resources	I enjoy exploring new technologies.
Content based technology integration	Virtual school teachers need to alter course components to reflect the interests of their students.

The survey results confirm several important implications proposed by DiPietro, Ferdig, Black and Preston (2008). Foremost, the confirmed strategies provide a foundation for professional development specific to virtual schooling as well as principles to be assessed. Second, the confirmation of DiPietro's 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. Additionally, the survey results confirm that there are general characteristics that seem to be true of the majority of the online teachers interviewed in this study. The results can be used as ideals that may then be contextualized against needs that teachers have. From the perspective of a distance education administrator, the consistency with which the general characteristics emerged from the sample provides evidence that these characteristics can be applied with other virtual school teacher populations. This tool could be used in conjunction with other forms of evaluation as a measure teacher performance, or as a pre-screening measure for potential online instructors. Additionally, the results indicate the importance with which teachers describe specific aspects of virtual school practice. In particular, it should be considered that teachers felt quite strongly about student mentors. In some virtual school models, mentors provide face-to-face support for students. Unfortunately, no standards for mentors exists (Ferdig & Black, 2008). Of further note is the reservation that teachers felt about customizing course content for students and restricting technology due to lack of student access to high-speed Internet. This reservation related to customization could be attributed to the fact that in some instances, teachers and not able to alter course content, a potential limitation to their creativity and autonomy. Reservations related to technology restriction may also hinge upon an inability to alter course content, though it is likely, that limiting access to technology is not necessary given that a majority of students access course content in a traditional school environment.

Limitations and Next Steps

Limitations of this study include: the relatively low internal consistency associated with the survey, the small sample surveyed and the non-validated nature of the survey. In order to fully validate the survey presented in this paper, a larger sample of virtual school

instructors must be recruited and assessed. Assessment procedures should include a confirmatory factor analysis to affirm the five latent variables and theoretical path described in this paper. A principle components analysis applied to the results indicate a five factor solution, in agreement with the author's proposed latent variables. A full confirmatory analysis was not attempted due to the limited sample size. In order for a valid and reliable assessment of validity, a new sample should be based on a 10:1 subject to item ratio, meaning, the sample should exceed 200 individuals (Costello & Osborne, 2005).

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Appendix A: Survey

Please provide information about your educational background. What was highest degree you have earned? ____

How many years of virtual school teaching experience do you have? ____

How many years of face-to-face teaching experience do you have? ____

All items were scored on a 5 point Likert-type scale:

1 - Strongly Agree
2 – Agree
3 – Neutral
4 – Disagree
5 – Strongly Disagree

1. I am proficient with technology.
2. I enjoy exploring new technologies.

3. Virtual school teachers are flexible with their time.
4. Virtual school teachers understand student learning styles.
5. Online presence is necessary to motivate students.
6. I connect with my virtual school students.
7. I use multiple teaching strategies to address student learning styles.
8. Relationships with mentors are important.
9. I believe that deadlines motivate students.
10. Communication between students makes a course meaningful for students.
11. In order to support students it is necessary to closely monitor their progress.
12. I interact with students using multiple channels of communication (e.g.: telephone, instant messaging, etc).
13. Providing quick feedback to students motivates them to complete the course.
14. I restrict the technologies in my courses because my students do not have high speed access.
15. Virtual school teachers are well organized.
16. Virtual school teachers use course data to evaluate their practices.
17. Virtual schools provide unique opportunities for students.
18. Virtual schools provide unique opportunities for teachers.
19. I believe in using multiple forms of assessment (e.g.: formative, summative, informal, and authentic).
20. Virtual school teachers need to alter course components to reflect the interests of their students.

_____

Please select 3 items from the list below based on your desire for professional development training. Prioritize these 3 items according to importance.

- Content specific knowledge
- Technology based skills
- Online classroom management
- Effective communication with online students
- Organizing and structuring instructional content
- Strategies for accommodating different learning styles
- Finding and evaluating quality resources for my online classes
- Content based technology integration
- Other, please specify _____

Appendix B: Successful Practices and Supporting References

General Characteristics	
Practice:	**References:**
MV teachers go the extra mile to support	(Fenstermacher & Richardson, 2005; Hutchings & Shulman,

student learning	1999; Konings, Brand-Gruwel, & van Merrienboer, 2005; Scheines, Leinhardt, Smith, & Cho, 2006)
MV teachers are skilled with the basic uses of technology	(Berge & Collins, 1995; Lee & Hirumi, 2004a; O'Neil, 2006; Schoenfeld-Tacher & Persichitte, 2000)
VS teachers are interested in and enjoy exploring new technologies that have potential value for virtual school environments	(Hartley, 2007; Hsi, 1999; Hughes, McLeod, Brown, Maeda, & Choi, 2005; Muirhead, 2001; Salpeter, 2003)
VS teachers are flexible with their time	(Easton, 2003; Kurtz, Beaudoin, & Sagee, 2004b; Lazarus, 2003)
VS teachers have a deep understanding of the varying learning styles of their students	(Chickering & Gamson, 1987, 1999; Fenstermacher & Richardson, 2005; Hein & Budny, 1999; Muir, 2001; Neuhauser, 2002; Papanikolaou, Grigoriadou, & Samarakou, 2005; Valenta & Therriault, 2001)
VS teachers establish a presence in the course to motivate students	(Anderson, 2004a; Bellon & Oates, 2002; Carey, Wallace, & Carey, 2001; Smith & Dillon, 1999; Weiner, 2003)
VS teachers have good organizational skills	(Davis & Niederhauser, 2007; Savery, 2005; Swan, 2003)
VS teachers use student and course data, as well as other sources of information available to them to self evaluate the pedagogical strategies they use	(Lee & Hirumi, 2004a)
VS teachers have extensive knowledge of and appreciation for the content area they teach	(Gudmundsdottir, 1990; Lee & Hirumi, 2004a; Peck & Gould, 2005; Shulman, 1986; van Driel, Verloop, & de Vos, 1998)
VS teachers understand the impact of course pacing on course design and the pedagogical strategies they use	(Cavanaugh et al., 2004; Löfström & Nevgi, 2007; Swift & Gooding, 1983)
VS teachers continually extend their content and technological knowledge	(Darling-Hammond, 2000; Hughes et al., 2005; O'Neil, 2006; Pape, Adams, & Ribeiro, 2005; Salpeter, 2003)
VS teachers are committed to the opportunities offered by virtual high schools	(Pajares, 1992; Prawat, 1992; Richardson, Anders, Tidwell, & Lloyd, 1992)
Classroom Management Strategies	
Practice:	**References:**
VS teachers use strategies to address inappropriate or abusive behavior of	(Davis, Farnham, & Jensen, 2002; Waterhouse & Rogers, 2004)

students in public forums of the course	
VS teachers monitor venues of public communication in their course to identify students in personal crisis	(Connor-Greene, 2000; Whitlock, Powers, & Eckenrode, 2006)
Pedagogical Strategies: Assessment	
Practice:	**References:**
VS teachers use multiple strategies to assess student learning	(Borland, Lockhart, & Howard, 2000; Campbell, Floyd, & Sheridan, 2002; Carey et al., 2001)
VS teachers use alternative assessment strategies that allow students the opportunity to represent their knowledge in ways that are personally meaningful	(Anderson, 2004a; McCombs & Vakilia, 2005; Von Secker & Lissitz, 1999)
VS teacher use alternative assessment strategies to accommodate the varying learning styles of their students	(Graham, Cagiltay, Lim, Craner, & Duffy, 2001; Krämer & Schmidt, 2001)
Pedagogical Strategies: Engaging Students with Content	
Practice:	**References:**
VS teachers build in course components to reflect the interests of students enrolled in the course	(Bellon & Oates, 2002; McCombs & Vakilia, 2005; Palloff & Pratt, 1999; Shin, 2006; Vandergrift, 2002)
VS teachers are flexible in their use of pedagogical strategies to accommodate varying learning styles	(Coppola, 2002; Gudmundsdottir, 1990; Herring, 2004; Vrasidas & McIsaac, 2000)
VS teachers establish strong relationships with mentors	(Davis & Roblyer, 2005; Feiman-Nemser, 2001; Kurtz et al., 2004b)
VS teachers use multiple strategies to form relationships that support rich interactions with students	(Coppa, 2004; Coppola, 2002; Swan, 2004a, 2004b; Swift & Gooding, 1983; Woods & Ebersole, 2003)
VS teachers motivate students by clearly organizing and structuring content	(Anderson, 2004b; Bellon & Oates, 2002; McCombs & Vakilia, 2005)
VS teachers embed deadlines within the content structure to motivate students in self paced courses to complete course requirements	(Graham et al., 2001)
VS teachers provide students with multiple opportunities to engage content in ways that suit varying learning style.	(Hein & Budny, 1999; Neuhauser, 2002; Shin, 2006)

Pedagogical Practices: Making Course Meaningful for Students	
Practice:	**References:**
VS teachers use strategies to connect with students	(Coppola, 2002)
VS teachers engage students in conversations about content and non-content related topics to form a relationship with each student	(Berge & Collins, 1995; Hara, Bonk, & Angeli, 1998; Kanuka, Liam Rourke, & Laflamme, 2007; Oren, Mioduser, & Nachmias, 2002)
VS teachers encourage and support communication between students	(Blignaut & Trollip, 2003; McIsaac & Craft, 2003; Swan et al., 2000)
VS teachers seek out and make available a variety of supplemental support tools to meet the diverse needs of students	(Koszalka & Bianco, 2001; Papanikolaou et al., 2005; Phipps & Merisotis, 2000)

Pedagogical Strategies: Providing Support	
Practice:	**References:**
VS teachers monitor student progress closely and interact with students to determine where gaps in knowledge may exist.	(Bransford, Brown, & Cocking, 1999)

Pedagogical Strategies: Communication & Community	
Practice:	**References:**
VS teachers facilitate the formation of community by encouraging content and non-content related conversations among students	(Bernard, Rubalcava, & St-Pierre, 2000; Gunawardena, 1995; Swan, 2004b)
VS teachers interact with students using multiple channels of communication (telephone, IM, etc) provide support	(Howell, 2001; Kanuka et al., 2007)
VS teachers provide students with quick	(Swan, 2004b; Swift & Gooding, 1983)

feedback to maintain their motivation for completing the course	
VS teachers model what 'formal' online communication looks like in discussion boards and emails.	(Rovai, 2002)
VS teachers effectively monitor the tone and emotion of their communications with students	(Rovai, 2001, 2002)

Technology	
Practice:	**References:**
VS teachers purposefully tie the use of tools built into the course environment to state benchmarks and standards to support student learning of content	(Frydenberg, 2002; Revenaugh, 2004; U. S. Department of Education, 2005)
VS teachers consider issues of student access to technology when integrating web based components into their course	(U. S. Department of Education, 2005)
VS teachers use their content knowledge and knowledge of students to drive the integration of technology	(Ferdig, 2006; Lee & Hirumi, 2004b; Shulman, 1986; van Driel et al., 1998)