Pilot Program of Online Learning in Three Small High Schools: Considerations of Learning Styles

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Abstract: This case study was conducted in three schools in Maine, United States. The goal of this qualitative research was two-fold: to describe the process used by a small educational consortium as it initiated formal online education, and to view this experience through the lens of students' preferred learning styles. The United States does not have a national curriculum. While the government of Maine offers some state-level support for schools, many educational issues and initiatives are controlled at the local level. Additionally, Maine is one of the most rural states in the country and the isolated nature of these schools adds to the dearth of curricular opportunities for students ages 14-18. Data was collected using the Felder & Solomon (1993) Learning Styles Questionnaire and semi-structured, bi-semester interviews with ten students. Open and axial coding was used to identify themes, which were subsequently triangulated with a document review and the two sets of interviews with the three adult coordinators. Findings fell within two groupings: data that substantiated prior research, and data that offer contradictory conclusions. Learning styles have an important place in online learning. However transactional distance, teacher response time, group work, and school filtering issues also emerged as critical. Conclusions carry implications for online educators, school administrators, and policy makers

Keywords: online education**,** secondary education, learning styles, case study; transactional distance

1 Introduction and rationale

For over 20 years, various types of online education have been available to high school students in the United States. These types can be placed on a continuum from being the only delivery method for courses to a single class supplementing a traditional face-to-face education to a solely independent learning opportunity. Large distance education (DE) institutions soon followed: Concord Consortium's Virtual High School (VHS) was established in 1996, and the first statewide online high school (Florida Virtual School) began in 1997 (Tucker, 2007). During 2009-2012 it is estimated that over 2 million students participated in online courses and several states (Alabama, Arkansas, Florida Michigan, and Virginia now mandate that all graduates must complete "an online learning experience" (iNACOL, 2013: 2).

Educators and researchers have proffered many reasons for the increasing number of secondary students who participate in education at a distance (Hannum, Irvin, Banks, & Farmer, 2009; Vrasidas, Zembylas & Chamberlain, 2003; Wicks, 2010). Changing demographics indicate DE's need for a more fluid educational method. Growing enrollments in some areas, shrinking budgets elsewhere, along with decaying school buildings and the parallel shortage of teachers have been cited as rationales for supporting DE in high schools. Desire for curricular equity is also a strong driving force. Information technology offers access to Advanced Placement courses even if schools can't afford to host such programs. In some cases, schools and students are interested in "credit recovery" as a solution for retaking a failed or dropped course. Higher education expectations often include DE learning as a requisite skill for today's students and there are clear benefits of acquiring college credits while in high school. Finally, DE serves specific populations such as home schoolers, migrant families, gifted and talented and students with disabilities.

The United States does not have a national curriculum. While each state has autonomy on the education of its students, 45 of the 50 states have approved the internationally bench-marked Common Core State Standards (National Governors Association, 2010). Within some states educational decisions are made at a county, or district level; Maine is one of these.

Educational change happens in many ways. A top-down process is illustrated by large school districts or entire states that enter formal relationships with national online institutions or create the infrastructure to build their own systems. However, schools in other states may not have such ready-made systems. In areas of strong local control, change may be accomplished in small steps by individual schools, educators, and students, with or without administrative initiation. This study explores how three rural schools within a proximity of 20 miles met student needs via a distance education solution. The results and conclusions from this study will

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inform rural school administrators, student support staff, and online educators who work in locally controlled institutions. They may better confront some of the challenges by understanding the concerns, stumbling blocks, and excitement of this new learning venue via the lens of students' learning styles.

This study explores the processes used by three small, rural, and locally controlled high schools as they seek to expand curricular opportunities by offering one or two classes in addition to their standard fare. The courses discussed herein serve to supplement traditional, in building classes. In addition, the experience of the ten participants are viewed through the lens of their preferred learning styles. The researcher chose the Felder & Solomon Questionnaire because it is common in higher education studies (e.g. Zhan et al., 2011) and therefore indicates a potential for future meta-comparisons. Validity and reliability analyses have been confirmed but come with a caveat: the results should be used "to help instructors achieve balanced courses instruction and to help students understand their learning strengths and areas for improvement" (Felder and Sprulin, 2005: 111).

1.1 Research questions

- How does a small rural consortium begin to develop a systematic DE program? (i.e. document the design and development of this program.)
- How does a learning-style inventory of online students help to inform future planning for DE programs?

1.2 Definition of distance education

For the purposes of this study, *distance education* (DE) is defined as "institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors" (Schlosser & Simonson in Simonson et al, 2012: 7). DE, as used here, is distinct from discrete educational resources such as just-on-time learning by an individual using free and open source materials.

2 Literature review

2.1 Student support structure

A critical element in establishing any DE system is careful planning for support systems. "A key to successful supplemental online programs is the support they give their students. Many programs incorporate an on-site mentor for online students, someone housed within the school building and able to meet face-to-face with students" (Tucker, 2007: 3). Based on the results of their large scale study Roblyer et al. (2008: 105) made strong statements about support, "… environmental variables can play as important a role in students' success as the characteristics and background students bring to the course… Designating a school period and location for the online courses seems an especially effective strategy." A random sampling of rural schools found, "… less than 50% of respondents indicated that their district had barriers related to personnel" (Hannum et al, 2009: 7). In a case narrative Barbour et al., (2012) demonstrates the critical nature of considering appropriate strategies, especially for a shy and reticent student.

2.2 Access and skills

Researchers list lack of technology skills and access to hardware or the Internet (Blocher, 2002; Lemke, Coughlin & Reifsneider, 2009; Roblyer et al., 2008) as being potential barriers to successful online learning - even within the last decade. As obvious as these concerns may seem they were not a major factor in this study. All Maine middle school students were issued laptops in 2002 (Garthwait & Weller, 2005) to raise the students' technology competency levels and to bridge the digital divide. As a result of a 1996 telecommunications rate case and a combination of other funding sources all Maine schools and libraries obtained Internet access (MSLN, 2008).

2.3 Learning styles

It is clear in most education studies (Armstrong, 2011; Cavanaugh, 2004; Wang & Newlin, 2000) that online course completers are typically those who are self-motivated and are able to learn independently. In part, this

is a factor of students' cognitive stage (e.g. Piaget's preoperational, concrete operational and formal operational.) In other words, "Expert learners have better developed metacognition, a characteristic that children develop gradually" (Cavanaugh, 2004: 7).

In the last ten years there has been a growing focus on examining the characteristics of students in grades 5-12 (ages 10 – 18) online students. Roblyer and Marshall's study measured several student variables from thirteen different virtual classes. Their preliminary data narrowed the field to the four most critical factors contributing to success: achievement beliefs, responsibility and risk-taking, organization and self-regulation, and technology skills and access (2002: 248-9). Persistence (a trait that enables students to complete a course) in online classes was identified in an extensive literature review as being more complex than simply success: satisfaction, sense of belonging, motivation, support by family, peers, and the instructor as well as time management skills (Hart, 2012).

Crawford (2006) examined related questions in her doctoral research, comparing a small sample of high school students who completed online courses with those who didn't. However, she focused on specific prior computer habits. Her data showed that completers were better able to multi-task than non-completers. She also noted that "Although completers more often reported using the Internet to search for school related topics more frequently than did non-completers, non-completers reported they engaged in video gaming more often than did completers" (Crawford, 2006: 84).

Roblyer's large-scale, two-pronged study (learner and learning environment characteristics) was undertaken to develop a model useful in discriminating between successful and unsuccessful online high school students. The results replicated prior findings in that "students' past ability (e.g. as reflected in GPA) is a significant predictor of current success" (Roblyer et al, 2008: 105) and that "cognitive student characteristics (e.g. technology access and self-efficacy and achievement and organization beliefs) also make a significant contribution." Interestingly enough, they found that it was easier to potential predict success than failure.

Literature regarding course design for pre-college students suggests that learning styles be included in course design (Barbour, 2007). The learning styles inventory used in this study (Felder & Soloman, 1993) categorizes responses on continua in four areas listed in Table 1, each of which can be described as mild, moderate or strong. The resulting scores indicate a preference or tendency; the inventory is not intended to predict success, strength, or weakness but rather to inform effective learning opportunities (Felder & Spurlin, 2005). Another caveat included by the authors is that most people exhibit preferences for both sides of the scale, depending on multiple factors. While created for college-age students, this survey has been used with younger students (Filippidis & Tsoukalas, 2009; Wang et al., 2006).

Table 1: Learning Styles

Active	**Reflective**
Learns by doing, prefers to work in groups	Learns by thinking, prefers solo work
Sensing	**Intuitive**
Thinks concretely, practical, leans toward facts and procedures	Thinks abstractly, innovative, prefers theories and supporting meanings
Visual	**Verbal**
Drawn towards images, diagrams, charts	Prefers written or spoken explanations
Sequential	**Global**
Learns in small steps, linear thinking	Learns in big jumps, holistic thinking
Note: Table based on Felder & Spurlin (2005).	

Moore's theory of transactional distance (TD) (Moore & Kearsley, 1996) posits that the "distance" element of DE is more on a psychological or communications gap than it is of geographical or temporal. Murphy and Rodríquez-Manzanares (2008) apply this theory to high school students, concluding that TD is a useful lens for instructors but calling for an expansion of synchronous interactions.

3 Methodology

3.1 Study design, data collection & analysis

This bounded case study (Creswell, 2006) was conducted over the course of one academic semester in three locally controlled school districts that facilitated the pilot project. Originally there were eleven students registered for online classes from an out-of-state educational institution. The researcher first focused on student support systems, with data collected via observations, interviews with the online coordinator in each of the three schools, and a document review. In addition the researcher explored the experiences of each of the participating students via a learning style questionnaire, and beginning- and end- of semester interviews. (See Table 2.) A constructivist inquiry process, as proposed by Lincoln and Guba (1985), was used throughout the study.

Table 2: Data Collection Methods

Type	Examples	Research Basis
Document analysis	letters to parents, school memos, email messages from the planning group, minutes from consortium planning meetings	Lincoln & Guba, 1985
Observations	planning meetings, school visits	Patton, 1990
Interviews	Semi-structured interview with school level coordinators and students (Appendices A - C)	Spradley, 1979
Learning Styles	Questionnaire administered at the beginning of the semester	Felder & Soloman, 1993

All interviews were digitally recorded and transcribed within 24 hours. Learning styles surveys were entered into a spreadsheet, using pseudonyms chosen by students. These records, with relevant school documents, were reviewed and coded using open and axial coding to highlight specific concepts and to group them in categories. An inductive analysis approach followed searching for categories and relationships within individual data and between transcripts. The researcher chose to use a "collective case study" to report this research, thus illustrating multiple perspectives (Creswell, 2006: 74) using three students: Megan, Xavier and Rachel. These students were selected because they exemplified key findings as they related to learning styles.

The researcher's stance was explicitly stated: the collection and analysis of data was paramount. However, all qualitative research must address the element of trustworthiness, and background statements (Lincoln and Guba, 1985). Although the researcher lived within the consortium area and was acquainted with some of the students' parents and most of the adults involved, she had no stake in the outcome nor was she positioned as an "internal evaluator." The researcher teaches online graduate courses but did not harbor preconceived notions about the DE experiences of high school students.

3.2 Participants

The researcher became aware that a loose consortium of school districts ended the fiscal year with unspent funds due to careful budgeting. The local partnership decided to redirect the money and join a national online high school consortium. Three high schools within a 20-mile proximity opted in. (See Table 2.) The researcher wished to use this unique opportunity to examine how a de-centralized, locally controlled DE initiative unfolded. Unlike large state-wide initiatives this project began with very limited capital, essentially seed money. The selection of schools for the study was one of opportunity and convenience.

This research took place in Maine, a low population-density state, with a medium income of $36,745 (*InfoPlease*, 2010). Maine schools have a significant degree of governance autonomy, thus the term "locally-controlled." According to the principals, the ethnicity of the three schools closely reflected those of the state: 94.6% Caucasian, 2.3% African American; 1.4 % Asian / Pacific Islander; .76% Native American; and 1% Hispanic. Thirty-three percent of students were eligible for free or reduced lunch (*Maine DOE, 2008*).

Originally there were twelve pilot students registered; they had either self-selected to take an online class or had been identified by the school personnel as having the potential to benefit from online classes. However,

one student's parents did not agree to his participation in the study. Two weeks into the semester, a second male found the time commitment prohibitive due to an already heavy workload. As a result nine females and one male participated in the study; of these, one female student was in middle school. No two students registered for the same online class.

4 Results

4.1 Question 1: School support structure

By agreeing to participate, the three schools demonstrated institutional perceptions, attitudes and understanding (Neyland, 2010) that valued online learning. Each school designated specific study hall time and other support elements for students taking distance classes. However, each school structured this support differently. (See Table 2.)

Table 2: Student Support System.

School	Responsible Educator	Physical Space	Scheduled Time	Other	Conclusions
School A (564)	• School site supervisor • Gifted-Talented coordinator	Former storage room, now clean with keypad lock. Locked file box for storage of materials	Recommended study hall. Supervisor met weekly at start and every other week thereafter.	Required tutorial prior to embarking on class.	"Successful except for one student" "Learned how quickly things can fall apart."
School B (364)	• G/T coordinator / ESL teacher • School site supervisor	None	Recommended study hall *	Required tutorial prior to embarking on class. Provided laptops that could be taken home.	"Very successful" Stipulate required study hall.
School C (745)	• Achievement Center Coordinator (focus: study skills) • Consortium site supervisor	Supervised study hall room	Recommended study hall**	Required tutorial prior to embarking on class	Students "very committed, motivated and responsible." Critical: stress "student responsibilities"
Notes: Student population in parentheses * The student with no scheduled study halls dropped the online class. ** Xavier had no study halls in his schedule					

School A's site coordinator explained their goals for the pilot: providing more opportunities for advanced classes or courses in talent or interest areas, and easing scheduling woes for students out-of-sync with their peers. In School B "the goals were to give advanced students access to courses that are not offered [here]. We particularly chose to pilot [online institution] with students in the [gifted and talented] program in order to assure their ability to succeed." School B additionally invited a middle school student who continuously begged to "learn more." The consortium site coordinator emphasized the "pilot" aspect for School C, "the initial challenge was to have success, so that our expectations would be realistic for future students."

Each of the three schools defined "success" for this pilot project loosely, allowing for leeway in conclusions. School B's coordinator stated that success would be based on "students maintaining a high level of work (90% or above) and on student feedback regarding the course format, level of challenge, syllabus, interest, and ease of time management." While School C did not discuss formal criteria prior to the pilot year, administrators felt

"that success for this would be the same as success for any other course in that students would finish the courses satisfactorily... Of course we like the As and Bs but we would consider a C a successful experience." School A also included "anecdotal perception of rigor" as important to a successful pilot project.

Table 2 lists the simple conclusion of success for this pilot program, although each school judged success differently. Coordinators for Schools A and B mentioned surprise regarding the absence of technological glitches.

4.2 Demographics: prior computer skills, home access, and free time computer use

The ten students who participated in the study had a multitude of reasons for taking an online class, ranging from the common "this course wasn't offered in my school" to "my required schedule wouldn't allow for any social studies classes that I haven't taken yet." (See Appendix D for data on all students.) In order to flesh out the theme of learning styles and online education, this report focuses on three students.

Rachel enrolled due to scheduling problems; she wished to take a forensics class offered in her own high school but had a jazz rehearsal conflict. The music teacher warned that he "would come after her" if she didn't show up for band practice. An excruciatingly shy student, Rachel avoided eye contact with everyone and usually responded to queries with monosyllables. Additional interview prompts rarely turned up new information. Rachel had the strongest preference for "reflective" learning.

Megan, on the other hand, found that she vastly preferred online classes because she was able to move at her own pace. She hoped to pass the final Advanced Placement (college level) psychology exam, but she emphasized her fascination with psychological topics.

Xavier chose to take an online course in a subject similar to a face-to-face class he was taking at high school, anticipating comparing the two. Highly organized and intensely focused, he speculated about potential questions as he prepared for his interview. Thus he was ready with an answer to the "why" question, stating that he loved to learn and listed several classes that he considered taking. Xavier expanded, "All my college guidebooks … say that a rigorous high school record is a 'Big Thing.' It's not all about that, but it definitely augmented my decision to go out on a limb and take an online course." Feeling very confident in his abilities, he chose NOT to schedule a study hall for online work. Oddly, Xavier wasn't certain whether he would even be getting academic credit for taking the class.

On a scale of 1 – 5 (least skillful to most skillful with computers) all three students rated themselves between 3 and 4; all had access to computers and high-speed internet access at home.

As far as home use of computers, Megan stated that she spent a huge number of hours on schoolwork. However, during her self-limited free time, she occasionally checked the social media site, *My Space* and email. On rare occasions she played *Sims*, a digital simulation game. Rachel listed her top out of school computer use as using the Internet; only reluctantly did she admit to playing online games. Xavier explained that he didn't play electronic or computer games at home, but he used his free time to listen to music on his computer and check his email.

4.3 Student expectations about online learning and self-evaluation of organizational skills

Rachel worried most about working in DE groups. Even at the outset, and even in an online course, she fretted about having to work with others, "I'm not a very social person. I get really nervous when I have to talk to people." Rachel used the school-issued paper assignment planner but did not show it to the researcher. At the beginning of the semester, she displayed an interesting bit of self-knowledge, "I usually procrastinate more than I should...."

Megan's school planner exhibited a sophisticated level of organization with color-coding by prioritization, neatly crossed-out tasks, and chunked long term projects. Even though she carries a plethora of pencils to loan to friends, she dislikes writing in pencil "because they smudge." Her parents thought that Megan was too worried about her grades, so they charged her $.50 every time she checked her grades. How often did she check? "Oh, many times a day. But my parents don't know."

At the beginning of the semester, Xavier speculated that online teachers wouldn't be able to require papers because, "They can't be right there to explain to you, how to do it, … It seemed to me that the whole online aspect of it wasn't going to be as difficult… because of the fact, that we are so far apart." He described himself as a "very academically disciplined person." "I have a little assignment book where I write down my assignments. And I have my Blackberry where I schedule everything into it. So in that regard, I do have habits of time management"

All three expressed initial concern about being able to understand DE expectations and the culture of online learning.

4.4 Student learning styles

Both sets of students interviews (semester's beginning and end) were coded and matched to students' results on Felder's learning style descriptors. (See Table 1.**)** It should be noted that the terms *mild, medium,* and *strong* indicate the strength of preference along the continuum of learning styles; a weak score simply demonstrates less of a preference for one style over another.

Table 3: Representative learning styles illustrations gleaned from interviews

Name	**Learning Style**	**Illustration**
Megan	Reflective (mild)	"I also really like how the other [online] students don't know me… A lot of the kids in my [f2f] classes just assume that I'm perfect at everything." (I-2) "I don't like to be copying people [in a digital forum]; it freaks me out. So usually if I'm not the first one -- I actually end up being the first to post for about half the assignments every week – but if I'm not, I don't read the other kids' assignments before I write mine. Before I submit it, I'll look over them to see if I'm along the same lines or if, somehow, by any weird coincidence, we have the same wording, I'll go back and change mine." (I-2)
	Intuitive (mild)	The DE teacher " tells us to take notes while we read but I've found that that's more confusing for me. Because then … I get confused about the whole main idea so I've stopped taking notes. And I just read straight through the sections. I actually understand it – I've been doing well… So the biggest thing I've learned is that you are the best judge of personality as far as school [work] goes. Your teacher doesn't necessarily know that." (I-2) "I would say, make use of Google when you don't understand something. Use web sites that you know that are reliable for things like that" (I-2)
	Visual (strong)	Color-coded assignment book
	Sequential (mild)	"Tests are a lot harder [online]. And the problem for me is, that when I take tests, I like to star the things I don't know and then I can just skip it and go back. I give it my best shot and then I kind of let myself process it. I'll go through the other questions and see if any of those give me a hint of the answer. With these tests, you can't go back." (I-2)
Rachel	Reflective (strong)	" I'm not a very social person. I get really nervous when I have to talk to people." (I-1)
	Sensing (moderate)	"I'm hoping to study forensics once I graduate from high school. I'm really interested in toxicology… goal of becoming a forensic detective." (I-1)

	Verbal (strong)	Liked taking online class because "you don't have all the distractions from other students. Which is wonderful but you do have distractions with the computer itself… the Internet. I'm one of those people who goes on Wikipedia and hours later, I'll still be sitting there, reading article after article. Just whatever I could find." (I-2)
	Global (strong)	"Multitasking isn't as easy as other people like to make it out to be." (I -2)
Xavier	Reflective (moderate)	An online teacher "just gives you everything you need to do and everything they want you to do, and says, 'Put it all together yourself.'" (I-1) "The group aspect… but I *seriously* disliked the online aspect of this group project because it's really difficult for me to get on and post and read thorough everyone's ideas ... It's different in a f2f group thing and I'm used to taking the leadership position in a group where I can sit with the students and go around the table, write things down and communicate with them. Whereas in the online class, the communication is erratic and sporadic." (I-2)
	Sensing (moderate)	"And the way that VHS is set up is that you can go through, 1-2-3; there's a very systematic go-down-a-list-and-check-things-off way to do things. And I LIKE that." (I-1) Online: "We do a lot of reading about cases and a lot of reading about theories - criminology theories. The cases are more interesting than the theories. The cases … they're kind of like a story. Whereas theories, yuck, they're so… " (I-2)
	Verbal (mild)	"When I give an oration or a speech – which, um, I like to do. I like to do it because it's a thing that I'm good at." (I-1) Strongest subject? "Anything, really, that involves communication, speaking and writing. … (Pause.) I'd say English or French. Latin! I forgot Latin!! How could I forget about that! I LOVE Latin!!" (I-2)
	Sequential (mild)	"We just did an online assignment where we had to sift through The English Bill of Rights and the American Bill of Rights: 'Put them on top of each other and see where they match up.' We had to do a very similar assignment for *Law and Ethics*. And I found that the doing it yourself … I found I learned MORE when I was doing it myself: when I had to sift through things and put the pieces together" (I-1) "Sometimes when I was prioritizing … because I had to because I was busy. I'd think "Well, should I go on and write the essay that I need to write or I could go and write my online essay." So when deciding between those two. I'd think, "Who am I going to see tomorrow? " (I-2)
I-1: Interview 1, beginning of semester I-2: Interview 2, end of semester		

Both Megan and Xavier received 'A's in their online class. Rachel dropped the online class shortly after the last interview and did not receive a final grade.

Megan exhibited mild preferences for three of the four areas and scored strongly in the visual area of the learning styles questionnaire. She was already adept at several strategies suggested by Felder and Soloman (1993) as seen in her tightly organized and colorful planner. Concisely, she articulates a learning strategy that works for her, "Just Google it. Usually that's a lot easier because I can find a bunch of different links so I can

see it in a multitude of different ways, rather than just having the teacher's way or my classmates, so I use that" (I-2). It was noteworthy that Megan voiced appreciation for the study hall room that only the DE students were allowed to use,

> *I LOVE this… I really like it because it's quiet in here (except for the fan.) I actually keep the lights off unless I need it. If I try to get my work done in the classroom, everyone else is just talking because they figure that they can just do it when they get home. I like [this room]! I like having this space that's just for us and I like how the door locks. Nobody else can come in on me and I can just kind of work. (I-2)*

Megan knew that DE classes often required 10-15 hours per week, but at the end she felt that she spent more time on this class than all her seven others – combined. One bit of personal learning that Megan found valuable was how to rely more on herself than on "what the teacher" wants. This was a theme throughout her interviews, for example, she advised future students when they have trouble: "Make use of Google when you don't understand something. Use web sites that you know that are reliable for things like that. Or if you know of anyone else who has taken the course, maybe teachers at your school. Sometimes it's good to hear it from another source. Sometimes it can take a long time for your teacher to get back to you."

Self-sufficient Megan commented on group work, "There are a couple of kids whose posts really annoy me. They don't even check their grammar or their spelling. You can't even understand what they are trying to say. That gets irritating." "I really HATE class projects where we all get the same grade on it. That really drives me nuts!"

Other things that annoyed Megan were instructors who didn't respond in a timely manner or who didn't read complete messages: one teacher "completely ignored the bottom part of my message. I would think she'd at least take the time to read all three lines. That irritated me"

It is interesting to note that examples from Xavier's interviews show a strong preference for verbal learning but his overall score indicates "mild." Xavier measured in the medium range as a sensing and reflective learner. He is a poster child for the concept that "everyone is *sensing* sometimes and *intuitive* sometimes." As seen in Table 3, he claimed to be bored with theories, yet prior to the first interview Xavier contemplated the type of questions he might be asked, as well as developing a theory regarding how online teachers would function. Xavier brought most things back to a pragmatic base: taking an online course would help his college applications or how can he communicate with his teacher on a personal level.

Typically, a reflective thinker prefers to work solo and to learn by thinking rather than doing. This often takes more time and is difficult in a fast-paced, in-person class. Therefore, an asynchronous online class has the potential for this 'gift of time' for reflective learners. An interesting leitmotif appeared throughout Xavier's long interviews, that of being 'in control.' Part of the persona that he willfully projected was that of a leader. The following three examples seem to contradict the "solitary learner" image.

> *"I can do this!" No matter what "this" is. Give it to me and I'll give you excellence. And that's kind of arrogant and that's an issue for me. Like I said, you have no idea how many teachers and people have said to me, "You might want to tone it down because you're kind of coming off like a prick." (I-1)*

> *Like I mentioned last time in our interview, I always like to display that air of confidence about things, even if I don't understand or know anything about what I'm endeavoring to do. I guess I never, and this may sound arrogant, but I never really think about the teacher's expectations because I always feel like I'm going to meet them. You know that sounds like, I always meet the expectations, but it's true, when I go into a class, I'm always going to do what's asked of me. I'm always going to study for the tests. So I'm sure if their expectations are high, I'll meet them. If they're low, I'll probably go above and beyond them. (I-2)*

However, he admitted to relying on physical presence to accentuate his influence, and he sounded disoriented in an online environment, unable to use his personality in a familiar way.

> *And I have a GREAT relationship with all my teachers -- some more than others. Some I'd consider, you know, pretty good friends of mine. They wouldn't admit that because it's like –*

> *"you can't have kids as friends." We are pretty close; teachers I've been over to their house for dinner, that sort of thing. It's different in an online class. If I were taking Criminology from [a teacher] here, I would probably know him pretty well. But I don't know him "pretty well" because we don't talk after class, we don't talk before class. We don't say things during class. That sort of thing. It IS different. (I-2)*

Rachel presented quite a puzzle; she was the only student to drop out. She scored the strongest of all ten participants in the areas reflective, verbal and global. She had the second highest score on sensing. These characteristics would seem to indicate successful online abilities. She knew before she started the online class that she had a tendency to procrastinate. Attempted assistance from her family didn't work. Rachel mentioned, "My mother nags me about [my online course] constantly. That was NOT helpful!"

4.5 Group work, advice and metaphors

Reluctance and irritation with group work appeared as a strong theme in the data analysis. Rachel simply and bluntly stated in the first interview that she dreaded, "working in groups. It's always been a problem for me." Megan was just as frustrated with online group work as she was similar in-person tasks.

> *I like to do things early. And the people in my group wanted to do things on [the last day] and that got really annoying. Basically there were two of us in my group that pulled the whole thing together. And the rest of them were just kind of like, "Oh yeah. That sounds good." And "Yeah, I like that idea."*

Xavier outlined how off balance he felt with one online project:

> *The group aspect… we have our own little forum where we can post things and do these [assignments] but I seriously disliked the online aspect of this group project because it's really difficult for me to get on, and post and read thorough everyone's ideas, and then kind of post my own because it was… It's different in a f2f group thing. I'm used to taking the leadership position in a group where I can sit with the students and go around the table, write things down and communicate with them. Whereas in the online class, the communication is erratic and sporadic. (I-2)*

> *I had to wrap my brain around the project and kind of make sure that I understood it before I made any posts. I didn't understand it. I had to go back and read and make sure that I understood what was required of us. By that time, I'd already been assigned something within the group anyway… There was this girl, in particular, who probably did take the time and probably had a decent amount of time or did it home and she knew exactly what we were doing, and exactly what was required of every one. I did not like the online aspect of reading, posting and reacting… It is similar, it is similar to talking to someone but it's different when you go on there and there's been postings and then everyone has you know … something's been resolved and you didn't get to inject your own ideas.*

Even though Megan began the online class already appreciating the value of organizing her own work schedule she felt that she had grown during the semester. "You have to be more independent and just work your way through your problems." Both Megan and Xavier were accustomed to asking face-to-face teachers all manner of questions regarding disciplinary content and assignments. Megan found that she had to be more self-reliant because sometimes her DE teacher didn't respond for 3 or 4 days. "That's half the week!" Megan exclaimed. She views it as a "luxury" to be able to ask questions in person, whenever she wishes. This led to her strongest advice: "DEFINITELY get your work done early." This gives the teacher more time to clarify assignments if needed. Megan also advised only taking a DE course in an area you really like "because otherwise you won't be able to do it."

Each of the end-of-semester interviews concluded with the question: "Please finish this sentence, "Taking an online class is like……"

> *Megan: couldn't answer immediately and was visibly stressed by that. The researcher assured her it was OK and wrapped up the interview.*

> *Rachel: "It's not that different from school, except that you can wear pajamas everyday!"*

Xavier: "Exercise! You need to keep doing it consistently to maintain that level of fitness to be where you want to be."

5 Discussion

One of the pilot project coordinators' final conclusions was to strictly adhere to the requirement that every online student schedule a study hall. Rachel and Megan both had this designated time to work on classwork, but it wasn't enough for Rachel. Her site coordinator felt that she might not have dropped out if he had touched base as often at the end as he did in the beginning. Xavier did not have the requisite study period but satisfactorily completed the course.

An unexpected result of this research showed a major irritant for the online high school students: filtering (unreasonably censored sites) or link rot (sites not updated by instructor). Not only did Megan and Rachel highlight this as a major roadblock, but so did others in the full study. Xavier did not mention this as a problem, but he didn't have a study hall, performing all his work on an unblocked home network. Filtering at some level is a requirement for federal e-rate funds and all schools requiring DE components should address this problem.

The axial coding and data analysis revealed the other DE issues most bothersome to students. For Rachael, it was her own demons of procrastination and lack of self-discipline. She noted, "multitasking isn't so easy." The physical support systems of School A seemed to work for her in the beginning, but a stronger in-person mentor may have provided the extra nudge towards staying on track for completion. Echoing the results of the Crawford study (2006) study, Rachel, the only non-completer, stated that she spent more time playing digital games than either Megan or Xavier, neither of whom mentioned playing numerous games or spending a multitude of hours playing. More significantly, Rachel lacked the self-discipline to stay on task when connected to the Internet; she allowed herself to become distracted. Would "nudging" or "nagging" by Rachel's site coordinator have assisted her in the long run, when parental overview didn't work? Would her locus of control remainder external? At what point will Rachel learn that she is responsible?

Megan' computerized test anxiety may be alleviated by practice and habitual use in the future. However her greatest frustrations were the online teacher's delays and incompleteness of response. Her sense of operating in a vacuum would not have been removed regardless of how many learning styles were addressed in the course material. The online teacher failed to bridge the "transactional distance" (Moore, 1993). Both Megan and Xavier had earned a reputation for top quality work in their high schools. Megan relished the independent nature of online work but needed to fight against the urge to be affirmed by the DE instructor. The life skill of independent learning, combined with a concomitant gain in self-efficacy almost shines past content knowledge in this class

On the other hand, Xavier expressed in numerous ways how off balance he felt, not in control in his online environment. When pressed by the researcher to explain the difficulties, he returned to his carefully honed in-person skills. He was accustomed to his physical commanding presence giving him an advantage. The researcher postulates that when f2f class leaders feel out of their element, perhaps there is more room for students who take more time to formulate responses or are skilled in the written word as opposed to the aural. The researcher concludes that there are many advantages to relating learning styles to DE. However, problems or issues that percolated to the top of the thematic list (group work and irritants of online learning) may indicate precise spots where new learning will occur.

5.1 Limitations & implications for research and practice

A fundamental limitation of qualitative studies is that they do not purport to generalize to larger populations. The research community has recently begun to realize the value of qualitative research as they seek to understand a key phenomenon (Creswell, 2006). The richer picture of these three program structures and the involved participants may inform schools as they embark on online learning. Limitations of this study include the small geographical area, homogeneity of the state's population, the fact that only one online institution is represented, and the narrow focus on students and not the course design. These are areas for potential future study. It is also possible, but unlikely, that interview responses may have been different if the researcher had been unknown to the students and adult coordinators. These findings could be correlated with a teacher's perspective, such the study by Murphy and Rodríquez-Manzanares (2008) who interviewed Canadian

secondary distance education teachers on their views of student motivation

Subsequent research may follow the three schools to gauge the level of commitment, success and growth of this pilot program in locally controlled schools. Additional research might ask: How well do these bottom-up initiatives fare without mandates from the state government?
Schools approaching DE programs and instructors who teach in them should be more fully aware of link rot and unnecessarily filtered websites.

It might seem obvious that students' emotional needs should also be more fully considered, especially as they relate to transactional distance (Moore, 1993). If Megan's teacher responded to her queries in a more complete and timely manner would Megan have become a more independent learner? If Rachel's school had continued with regularly adult check-ins would she have completed her course? Or would the words and methods of encouragement fallen in the same realm as her ignored mother? If the online instructor had suggested that Xavier's group do their work via synchronous video chats, he might have found this modality closer to his established auditory "dominance" and been more comfortable and ultimately more "in charge." However, would that result have left the same vacuum that might allow students with longer process time (also reflective learners) but with greater skills in the written word to become "leaders?"

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APPENDIX A: Semi-structured adult interview questions (beginning of the semester)

Follow-up probe questions were asked for clarification.

- What are your school's goals in this project?
- How will you determine success?
- What do you anticipate as being primary problem(s)?
- What is the student support structure for your school?
- Is there anything else you think I should know about this process?

APPENDIX B: Semi-structured student interview questions (beginning of the semester)

Follow-up probe questions were asked for clarification.

- How would you characterize your academic self-discipline?
- Tell me about your time management strategies.
- What do you believe will be the most difficult facet of online learning?
- How much time do you think you will need to spend on this class work?

APPENDIX C: Semi-structured student interview questions (end of the semester)

Follow-up probe questions were asked for clarification.

- What components of this course are you enjoying / not enjoying?
- What are the most important things you are learning?
- What elements are you struggling with the most?
- Have you asked questions about this course? To whom? What was the result?
- What grade do you anticipate getting in this course?
- What is your opinion of the impact of this DE class
- How might the program be improved?

APPENDIX D: All Study Students

NAME (pseudonym)	Gr	COURSE	ACT/REF	SNS/INT	VIS/VRB	SEQ/GLO
Anne	12	genes and diseases	9a	5b	7a	3a
Becky	10	oceanography	3a	9b	6a	6b
Bella	11	Intro economics	7a	3b	2a	1a
Hannah	12	Vietnam & U.N.	4b	7b	5a	7b

Julie	12	Pre-vet medicine	3a	11a	5b	5a
Margaret	11	Modern religions	3b	3a	1b	5a
Megan	10	Advanced Placement - Psychology	1b	1b	9a	3a
Nella	8	meteorology	5a	7b	5a	5a
Rachel	11	Forensic Science	9b	7a	9b	9a
Xavier	12	Honors Criminology	5b	5a	3b	1a

