Running head: REDEFINING SYNCHRONOUS LEARNING

Pepperdine University

Graduate School of Education and Psychology

REDEFINING SYNCHRONOUS LEARNING FOR THE 21ST CENTURY: A DESCRIPTIVE CASE STUDY TO EXAMINE MULTI-CHANNEL SYNCHRONOUS ONLINE COMMUNICATION AND CRITICAL THINKING

A dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Education in Educational Technology

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This dissertation, written by

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DOCTOR OF EDUCATION

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DEDICATION

To believers everywhere, and to those that inspire and nurture the humanity in each of us.

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VITA

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Employment History

Superintendent Sitka School District, Sitka, Alaska July 2014 to present

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Supervisor Educational Technology, Elementary Educational Technology Department Anchorage School District, Anchorage, Alaska February 2007 to June 2010

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K-12 Instructional Technology Teacher/Director of Special Education Sitka School District, Sitka, Alaska August 1997 to December 2001

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Qualified Mental Retardation Professional/Case Manager Seattle Specialized Group Home #1 Seattle Specialized Group Homes, Seattle, Washington December 1987 to September 1989 and April 1986 to April 1987

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Additional Employment

Technology Plan Reviewer (January 2003 to 2009) Review and certify district Technology Plans for the State of Alaska

Part-time Instructor (January 1994 to present) Schools of Education, University of Alaska Southeast and University of Anchorage, Alaska

Competitive Grant Awards

New Visions grant from the Alaska State Council on the Arts for a total of \$45,000 [2013-2018] to cultivate a systemic arts education program in the Sitka School District.

Successful Transitions for At-Risk (STAR) grant from the State of Alaska [Title I, Part D, Subpart 2] for a total of \$340,242 [2013-2016] to partner with a community agency that will provide therapeutic and vocational training support for students at the alternative high school in the Sitka School District.

Sitka Riches grant from the Alaska Learning Network's (AKLN) Digital Sandbox for a total of \$4,000 [Spring 2012] to support the creation of student generated digital stories that articulate the human side of what makes Sitka rich. Sitka School District teachers developed and shared plans regarding how others could do a similar documentary-type of exploration of community.

Turning Our School Inside Out! grant from the State of Alaska [Title IID Wave VII] for a total of \$99,944 [2010-2011] to foster student and teacher proficiency in technology literacy by integrating the use of digital tools into the curriculum in the Sitka School District.

Achievement = Teachers Engaging All Meaningfully (A-TEAM) grant from the State of Alaska [Title IID Wave VI] for a total of \$148,534 [2009-2010] for the Anchorage School District to partner with the Sitka School District in order to foster student and teacher proficiency in technology literacy through professional development and the use of classroom-based technological tools of engagement.

The Digital Citizen grant from the Alaska Association of School Boards' (AASB) Consortium for Digital Learning (CDL) project for a total of \$250,000 [2008-2009] to implement projects that use high access devices to access web-based academic resources and productivity tools that foster individual access to resources that are differentiated to meet personal learning needs.

Anchorage and Cordova Educators (ACE) grant from the State of Alaska [Title IID Wave V] for a total of \$148,023 [2007-2008] for the Anchorage School District to partner with the Cordova School District to foster student and teacher proficiency in technology literacy through professional development in classroom-based technological tools of engagement.

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Awards and Academic Honors

Alaska Society for Technology in Education President's Award, Award Recipient, 2015 Making IT Happen, Award Recipient, 2010 Academy of Excellence, Award Recipient, 1995 Graduated with a 4.0 Grade Point Average, 1995 Graduated Cum Laude, 1985

Leadership

Alaska State Council on the Arts, Council Member: 2014 to present

A state agency that fosters the development of the arts for all Alaskans through education, partnerships, grants and services.

Alaska Arts Education Consortium, Southeast Representative: 2013 to 2014 An affiliation of school districts and individuals committed to preparing and supporting educators so that they can teach the arts across the curriculum.

Alaska State Council on the Arts, Arts Education Advisory Committee: 2013 to present *A state agency that fosters the development of the arts for all Alaskans through education, partnerships, grants and services.*

Easter Group, Secretary: 2011 to present

A non-profit organization in Sitka that strives to end extreme poverty and empower people, resulting in a rebirth of hope.

Alaska Society for Technology in Education (ASTE): At-Large Representative 2014 to 2015, Past-President 2012 to 2013, President 2011 to 2012, President-Elect 2010 to 2011, Advocacy Chair 2009 to 2011, and Treasurer 2002 to 2006

An educational organization in the state of Alaska that promotes access to technology, connectivity to information resources, and technology integration for all Alaskan learners.

International Society for Technology in Education (ISTE) Public Policy and Advocacy Committee: 2006 to 2014

The premier association for education leaders committed to empowering connected learners in a connected world; home to ISTE Standards for learning, teaching, and leading in the digital age. The Public Policy and Advocacy Committee is ISTE's think tank regarding the organization's actions on advocacy and public policy issues.

ISTE/Consortium for School Networking (CoSN) Joint Policy Advisory Committee: 2006 to 2013

A collaborative effort that set the national policy agenda in the field of educational technology.

EdTech Action Network (ETAN), Alaska Co-Chair: 2005 to 2013 Grassroots advocacy for federal and state educational technology issues.

Leadership (continued)

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- Wegner, M. (February 2014). *Redefining Synchronous Learning for the 21st Century*. Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.
- Ashton, T., & Wegner, M. (February 2014). *Art the world neighborhood: Actualizing digital galleries*. Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.
- Wegner, M., Anderson, S., & Corliss, C. (October 2013). *K-12 Parent engagement panel: Best practices in parent engagement programs*. Panelist for the Symposium on Parent Engagement, online webinar.
- Wegner, M., & Ashton, T. (March 2013). *Art the world neighborhood: Actualizing digital galleries*. Presented at the Alaska Arts Education Consortium Leadership Symposium, Juneau, Alaska.
- Wegner, M., & Zamudio, K. (February 2013). *ISTE conference 101*. Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.
- Tompkins, S., & Wegner, M. (February 2013). *User centric website communication*. Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.
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- Wegner, M. (June 2010). *ABC's of advocacy: Advocate, be heard, create change*. Panel participant at the International Society for Technology in Education Conference, Denver, CO.
- Silverstein, E., Wegner, M., Jones, D., & Fraze, M. (February 2010). *Curriculum technology audit 101*. Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.

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- Ashton, T., & Wegner, M. (February 2010). *Practical uses of connecting in virtual communities.* Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.
- Wegner, M. (October 2008). *Advocacy capacity strategies*. Panel participant at the National School Boards Association's Technology + Learning Conference in Seattle.
- Wegner, M. (June 2008). *ABC's of advocacy: Make your voice heard!* Panel participant at the International Society for Technology in Education Conference, San Antonio, TX.
- Wegner, M. (April 2008). *Successful advocacy strategies*. Panel participant at the Washington Education Technology Policy Summit, Washington, D.C.
- Ohler, J., & Wegner, M. (February 2006). *Digital storytelling and the DOW of literacy: Ventures in digital creativity and assessment*. Presented at the Alaska Society for Technology in Education Pre-Conference, Anchorage, Alaska.
- Leland, K., Clements, K., & Wegner, M. (June 2004). *The four pillars of online learning*. Presented at the International Society for Technology in Education Conference, New Orleans.
- Wegner, M., & Reilly, D. (February 2004). *Collegial community and the isolated learner*. Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.
- Wegner, M. (August 2003). *Community of learners*. Presented at the University of Alaska Southeast's Sitka Professional Development Conference, Juneau, Alaska.
- Murphy, J., & Wegner, M. (2003). *The teacher as a mediating force between students and society*. Paper presented at the Society of Educators and Scholars, Louisville, Kentucky.
- Wegner, M. (September 1997 to April 2002). Over 150 various classes on the topic of technology integration. Presented at the Sitka School District's Spring Technology Institute, Classroom Integration of Technology Institute, Educational Technology Institute, Summer Technology Institutes, and Afterschool Technology Classes, Sitka, Alaska.
- Andrews, P., & Wegner, M. (April 1996). *Multi-media made easy*. Presented at the Alaska Society for Technology in Education Conference, Anchorage, Alaska.
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ABSTRACT

Students in the 21st century seek connection with each other through synchronous online avenues, yet the education community does not embrace the use of synchronous online tools within the formal process of schooling. This creates a disconnect between the way that students learn outside of school and the way that they are schooled. In addition to matching the communication patterns of students, synchronous online tools provide opportunities for participants to communicate using a number of channels (audio, text, and interactive media) within a single communication environment. An important and useful perspective in this regard is to view the multi-channel environment from the point of view of how it facilitates critical thinking. This is especially important since critical thinking has been determined as an essential skill necessary for life in the 21st century.

This descriptive case study sought to answer the following research questions:

- In a synchronous online conversation that is action orientated using a multi-channel interface (audio, text, and interactive media), what sort of talk occurs in each channel, specifically, does each channel facilitate a different function of communication?
- 2. What proportion of a synchronous online conversation using audio, text, and interactive media is occupied by critical thinking?

Communication was analyzed within a multi-channel synchronous online environment, as used by 25 Technology Teacher Leaders (TTLs) from the Anchorage School District in Anchorage, Alaska during a 90-minute facilitated discussion on the topic of using Web 2.0 in education. Participants also completed a self-report demographic questionnaire. Study participants used the communication channels of audio, instant messaging, interactive whiteboard, and participant feedback tools, which included clapping, raising and lowering their

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hand, smiling, displaying a thumbs down, and registering a vote using the polling tool. The functions of communication studied included assertion, build logical reasoning, content questions, endorsement, off-topic/social/logistical, and reflect/think aloud.

This study produced 5 significant findings that provide insight into synchronous online course design: an instant message backchannel exists; a logistics facilitator is needed; synchronous online communication supports social learning constructs; a link exists between synchronous online communication and critical and integrative thinking; and audio best facilitates critical and integrative thinking.

Chapter One: Introduction

Given the educational options that exist today coupled with the increasingly digitally skilled and mobile student population, online learning is positioned to be a growing industry within education. The value of asynchronous online communication to the process of learning is well documented (Anderson, Rourke, Garrison, & Archer, 2001; Blanchette, 2001; Bullen, 1998; Cecez-Kecmanovic & Webb, 2000; Flynn, 2004; Garrison, Cleveland-Innes, & Fung, 2004; Palloff & Pratt, 2005; Rossman, 1999; Rourke & Anderson, 2002; Salmon, 2002; Vonderwell, 2004; Wu & Hiltz, 2004). Technological tools of multi-channeled collaboration have evolved to meet the needs of the 21st century learner, thus making synchronous online communication an accessible educational tool; however, empirical evidence is needed regarding the value of synchronous online communication to the learning process (Bannan-Ritland, 2002). Chapter one provides background information regarding the imperative nature of studying synchronous online communication and the opportunity it provides to practice critical thinking skills.

The trend of adolescent access and use of technology is increasing over the years. Levin and Arafeh (2002) found that 78% of children between the ages of 12 and 17 go online while recent data shows this number up to 93% of teens (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). Closer examination of these studies indicate that the majority of Americans use the Internet as a tool for information and communication, which are both factors associated with the process of learning. Levin and Arafeh (2002) conducted a qualitative study of the attitudes and behaviors of 136 Internet-using middle and high public school students regarding the role of the Internet in the process of doing their schoolwork. This study found that school-age students today live in a narrative environment where they seek connection with each other, and they rely on collaborative tools to support learning outside of school yet most teachers do not understand

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nor do they embrace Internet-based connectivity in the educational process. When the term "narrative" is used throughout this dissertation, it is in reference to Levin and Arafeh's (2002) study of middle and high school student's use of the Internet.

The National School Boards Association (2007) found similar findings to Levin and Arafeh (2002) in their study of about 1,300 9 to 17 year olds who have access to the Internet. In addition to the students surveyed, about 1,000 parents and 250 school leaders who impact Internet policy were also surveyed. The finding show that 96% of students with online access participate in instant messaging or chatting, text messaging, blogging, and visiting online communities. Fifty-nine percent of these students talk about education when using these social networking tools, with 50% of these students talking specifically about schoolwork. However, 52% of school districts surveyed specifically prohibit students from using social networking sites in school, and of the school districts surveyed, 87% of them would require that social networking have a strong educational value and purpose before they would allow its use in schools. This study provides further evidence that students have embedded online social networking into their lifestyle, but most school districts are cautious about using online social networking in school. "School district leaders seem to believe that negative experiences with social networking are more common than students and parents report" (National School Boards Association, 2007, p. 6).

There are many forms of social networking tools, and to examine the use of instant messaging by teenagers, Grinter and Palen (2002) conducted a qualitative study of 16 teenagers regarding their use of instant messaging, which is a synchronous narrative tool widely available today on smart phones, tablets, and computers. Grinter and Palen learned that contact via instant messaging communication mostly occurs between teenagers who are friends in the non-online

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environment, and they use instant messaging to socialize, plan events, and to collaborate on schoolwork. Further findings indicate that peer pressure was a factor regarding a teenager's choice to participate in instant messaging activities, as this communication vehicle increased opportunities to socialize with his/her friends. Of note was the fact that instant messaging fosters the opportunity to be part of a social group without interfering with home and activity commitments. "Teenagers will communicate and build relationships without IM, of course, but the technology is made notable by how easily it supports these objectives within the constraints imposed by age and limited mobility" (Grinter & Palen, 2002, p. 29).

Students of the 21st century are relying on synchronous online conversations outside of school to support their learning process (Grinter & Palen, 2002; Levin & Arafeh, 2002; National School Boards Association, 2007). If a goal of education is to make learning relevant, then it is incumbent upon educators to examine the integration of this narrative resource into the process of school-based learning. Yet the reality is that despite seeing value in the Internet as demonstrated by personal use (Pew Internet & American Life Project, 2007), educators are failing to embrace online collaboration in the learning process, and thus are missing an opportunity to evolve education to meet the changing nature of learning. According to Prensky (2010), educational change "is everywhere else *but* our schools" (p. 1). The need to include at least a moderate amount of technology into education is supported in a quantitative study of 27,846 college students from 103 institutions that was conducted by Borreson Caruso and Salaway (2007).

Synchronous learning in the 21st century is not bound by face-to-face contact; however, more remains to be known about the pedagogical value of synchronous online communication in order to strategically use synchronous online narrative tools in today's schools. Synchronous online tools are being used today by individuals of all ages and especially by school-aged students. Educators will either evolve education to embrace the narrative tools of the 21st century, or schooling and the process of learning will have an even greater disconnect that it currently does (Levin & Arafeh, 2002).

This dissertation analyzes communication within a multi-channeled synchronous online environment, specifically Elluminate, as participants of the Technology Teacher Leader professional development program used it to discuss the use of Web 2.0 tools in education. The purpose of the analysis is two fold. First, to better understand how the different communication channels (audio, text, and interactive media) were used by the study participants, meaning what functions of communication did they facilitate, and two, to better understand the extent to which critical thinking skills were employed throughout the synchronous online discussion.

Critical Thinking Skills in the 21st Century

The world needs critical thinkers. Thinking and knowledge are the cornerstones of society in this New Media or Information Age in which we live. As we prepare for the Imagination Age to come, we need a society strong in their ability to think critically, as well as their ability to innovate, create, and communicate. Two important considerations are the fact that adolescents are increasing becoming more mobile in their use of technology (Lenhart, Ling, Campbell, & Purcell, 2010), and that schools must restructure the process of schooling in order to help students hone what Kay and Greenhill (2012) call the 4Cs – Communication, Creativity, Critical Thinking, and Collaboration, which are the essential skills necessary for life in the 21st century. In order to truly prepare students for success both in today's as well as tomorrow's world, Ohler (2013) calls on teachers to embrace New Media as the uncommon core standards.

"We need to teach creativity and critical thinking together (because they work in tandem in any innovative venture)" (p. 43).

The ability to think critically is foundational to our democratic society. Dewey (1916) believed that the development of thinking skills should be the focus of education, and although most schools identify the development of critical thinking skills as a goal for students, students do not learn these skills in the American educational system (Resnick, 1987). In our current educational climate of prioritizing test success in order to leave no child behind, American society has created a chasm between the intent and reality of education, which, tragically, leaves students with undeveloped skills in the area of critical thinking. This is especially noteworthy considering that critical thinking has been identified by the Partnership for 21st Century Skills (2004) as one of the skills necessary for students to acquire if they are to be successful in today's world. It is the school's responsibility to instill democratic values into students (Mondale & Patton, 2001), and thus it is the American educational system that must fulfill the promise as professed in the mission statements of educational institutions around the country by focusing on helping students to develop and practice critical thinking skills. Given the complexities of issues that need to be addressed in today's world, understanding how to help students develop critical thinking skills promises to be one of the focal points in the evolution of the educational process.

Life in the 21st century is synonymous with being deluged by information from every conceivable avenue. We are largely a literate population that is technologically connected to information, that is both initiated by corporations and government and also by people around the world through webpages, blogs, and podcasts. Regardless of the source, technology plays a role in increasing the exposure to information that in the case of corporations and governments it is controlled by a few individuals (Mander, 1978), and in the case of posting to webpages, blogs,

and podcasts, may or may not be credible (Hawkins, 1999). Technology, then, has the ability to centralize and decentralize information, which leaves the consumer in the position of deciding what is credible regarding the information presented. According to Oseas and Wood (2003), it is important to help students understand that the world is a complex place where multiple perspectives exist and truth is often left up to interpretation. Students must "become curators of information in all its forms; to help them become proficient at arranging, organizing, and synthesizing the vast amount of stimuli that animate their lives; and to add their own original ideas to the mix" (Oseas & Wood, 2003, p. 23).

The need to practice critical thinking skills arises from this unparalleled access to information coupled with technology-based entertainment that has become embedded into American life. Johnson (2005) points out that contrary to popular misconception, the current culture and use of technology-based resources are making the world smarter rather than dumber. How then, do we as an education community learn to harness the power afforded by evolving narrative-based technological tools so as to enhance the process of learning in school?

As educators attempt to improve the process of learning, it is important to note that a component of the educational evolution to synchronous online tools involves a shift in the role of both the teacher and the student. Synchronous online tools support a change from a teacher-centered to a student-centered classroom (Cooney, 1998; Polin, 2000; Schrum, 1998), and Garrison and Anderson (2003) identified that this transformation in roles demands critical thinking on the part of the teacher as well as students. When in the student-centered online environment, both teachers and students have to be willing to change their approach to interaction and involvement with the learning environment (Falvo & Solloway, 2004).

Consequently, critical thinking skill development takes an even more crucial role when considering synchronous online communication than it does in the general area of education.

Synchronous Online Communication Tools Defined

There are many synchronous online communication tools available to educators. A common tool is instant messaging, either text-based or multimedia-based, which can occur in a stand-alone program, such as Skype (voice and/or video telephony over the Internet that also includes instant messaging as well as file sharing) or Google Chat, which has similar features to Skype. Synchronous online communication can also be incorporated into a more robust resource such as Elluminate (a subscription-based, Java-enabled, web-based communication tool where communication is facilitated primarily through audio interaction that is supplemented with text and other interactive features) or TappedIn before it ended service in 2013 (a web-based synchronous and asynchronous text-based communication tool that was free to educators). Video conferencing over the Internet as well as collaborative, virtual workspaces are also used in education today. Additionally, a growing body of research is supporting the role of video gaming to the learning process (Gee, 2003; McGonigal, 2011; Prensky, 2010). Regardless of the tool used to connect individuals, synchronous online communication differs from other forms of online communication because it requires that the participants be online at the same chronological time, and it is this real time interaction that is a factor fostering deep thinking (Weigel, 2002).

Problem Statement and Purpose

This descriptive case study analyzes communication within the multi-channeled synchronous online environment of Elluminate, as used by Technology Teacher Leader (TTL) participants who discussed the use of Web 2.0 tools in education. The purpose of the analysis

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was two fold. First, to better understand how the different communication channels (audio, text, and interactive media) are functionally used within the synchronous online communication tool, and two, to better understand the extent to which critical thinking skills are employed in the use of these channels. This study produced a holistic analysis of the use of Elluminate, a synchronous collaborative space, by TTL participants by examining communication in the various channels and their relationship to one another as they combined to inform a singular communication environment.

Study Considerations

The TTL program targeted increased teacher competence regarding the integration of technology in order to enhance student learning of content, and participants in the TTL program comprise the study population. The TTL program was associated with the Anchorage School District in Anchorage, Alaska. Teachers from all levels of the Kindergarten through 12th grade (K-12) school environment (elementary, middle, and high) were involved in the TTL program; however, the elementary teacher comprised the majority of the TTL participant population. TTL participants must have had at least three years of teaching experience prior to becoming a TTL participant, as the TTL program was designed to foster transformation in the practice of being a teacher in the 21st century. All TTL participants received equivalent technological tools and professional development opportunities, and all participated in synchronous online learning activities themselves through the professional development activities associated with the TTL program. Additionally, all TTL participants implemented and assessed the impact of a technology-enhanced project with their students.

It is important to note that the study sample is not a random sample of teachers, as TTLs had to apply and be accepted in order to be part of the yearlong professional development

program. The review of the literature identified that previous experience using online tools was a factor that positively contributed to evidence of critical thinking (Bullen, 1998), and thus having a study population with equivalent experiences can be beneficial. Additionally, this researcher has facilitated professional development activities and provided support to all of the TTL participants, which makes them a group that this researcher had access to in order to accomplish this study. In order to ensure unbiased involvement by the facilitator during the Elluminate discussions, Dr. Enid Silverstein facilitated the discussions associated with this study.

The TTL program was in operation for 7 years, and 213 teachers were part of the TTL program. The review of the literature identified that professional development activities for teachers should be grounded in the same pedagogy as what is needed for students (Barab, MaKinster, Moore, & Cunningham, 2001), and thus it is valid to study teachers even though the overall intent of this study is to positively impact student learning in the K-12 environment. The Critical and Integrative Thinking Rubric (Washington State University, 2006), discussed in Chapter 3, was the measurement tool used to identify evidence of the linguistic markers found in the communication within the Elluminate sessions.

Research Questions

The objective of this descriptive case study is to understand whether the use of synchronous online narrative tools of the 21st century supports the process of thinking critically, and to better understand the types of communication that occur in a communication event that has the potential for a variety of interaction avenues.

Research Question One: In a synchronous online conversation that is action orientated using a multi-channel interface (audio, text, and interactive media), what sort of talk occurs in each channel, specifically, does each channel facilitate a different function of communication? A need exists to better understand interactivity in the synchronous online learning environment between the learner and the interface (Bannan-Ritland, Harvey, & Milheim, 1998). This need becomes even more pronounced as online learning gains establishment especially in the higher education environment (Parker, Lenhart, & Moore, 2011). Research question one is important because online course design can be enhanced through better understanding of the specific ways that participants in a synchronous online learning event use the various avenues or channels of communication to meet their specific functions of communication.

Research Question Two: What proportion of a synchronous online conversation using audio, text, and interactive media is occupied by critical thinking?

In the early part of the 20th century, Dewey established that the goal of education should be to develop thinking skills, and specifically thinking skills that align with Lipman's (2003) definition of critical thinking. Dewey (1997) stated:

The most important factor in the training of good mental habits consists in acquiring the attitude of suspended conclusion, and in mastering the various methods of searching for new materials to corroborate or to refute the first suggestions that occur. (p. 13)

Resnick (1987) furthered the discussion and stressed the need for education to help all students become competent thinkers who employ higher order thinking skills. Despite this call, Resnick (1987) and Kuhn (1991) both noted that education is failing to teach students to think.

The call for education to help students develop thinking skills has not lessened over the years. The Partnership for 21st Century Skills (2004) identified critical thinking as one of the essential skills needed in today's workplace, and Kay and Greenhill (2012) further identified that critical thinking is one of the 4Cs, which are the most essential of all of the skills identified in the

Partnership for 21st Century Skills' Framework. Of note is the fact that the opportunity to think cognitively about a topic is a remedy to counteract a lack of critical thinking (Douglas, 2000).

If the education model of the last 100 years has not been successful in helping students develop higher order thinking skills, then the question begs, can new digital resources help to create opportunities for students to cognitively process a topic, and in turn help them to develop and practice critical thinking skills? Research Question Two is important because it can help share information about the extent to which critical thinking is evident in a synchronous online learning event, which could help to establish synchronous online learning as a vehicle to help practice and use critical thinking skills.

Setting

This descriptive case study examined synchronous online discussions through the use of Elluminate's built-in record feature coupled with a self-report demographic questionnaire. The discussions were analyzed to identify the type of talk facilitated through each of Elluminate's communication channels (audio, instant message, interactive whiteboard, and participant feedback tools). To analyze the critical thinking aspect of this study, the Critical and Integrative Thinking Rubric (Washington State University, 2006) was used to examine the various interactions for evidence of critical thinking. Additionally, each study participant completed a self-report demographic questionnaire that included age, years of teaching experience, and teaching area. An open-ended Comment field was also included in the questionnaire. The self-report demographic data was used to better identify the study population.

Significance of the Study

This study is significant because it provides information regarding educationally valid ways that synchronous online communication can be used to enhance learning. Specifically, it addresses the fact that synchronous online communication can facilitate a person's ability to employ critical thinking, which is a universal goal of education (Resnick, 1987). Additionally, this study provides information for synchronous online instructors in how to effectively pair the channel of interaction (audio, text, and interactive media) with the desired educational goal, and provides insight that will foster best practices in synchronous online lesson plan design. Understanding these two areas, critical thinking and intentional lesson plan design to facilitate functional communication, has the potential to significantly impact synchronous online course delivery.

Narrative students of the 21st century feel a sense of disconnection between formal education and the ways they learn outside of school (Levin & Arafeh, 2002; Prensky, 2010), and including the purposeful use of synchronous online learning activities in education may lessen this disconnection. Additionally, this study has the potential to impact the development of professional development activities at a point in time when the opportunity to teach synchronously in the online environment is no longer a novel concept (Palloff & Pratt, 2003), which can, in turn, impact the overall perceived value of online learning resources.

Chapter two grounds this study in the literature, and identifies seven significant considerations related to the topic of developing critical thinking skills through communication in an online environment.

Chapter Two: Review of Relevant Literature

The overall goal of this study is to better understand how the channels of communication available in a synchronous online environment that include audio, text, and interactive media are used to support various functions of communication and the use of critical and integrative thinking skills. Specifically, the goal is to better understand how the use of a synchronous online tool, Elluminate, facilitates functional use as well as critical thinking offered by participants of the TTL professional development program, which was associated with the Anchorage School District in Anchorage, Alaska. The findings of this study contribute to the growing body of research related to 21st century tools that impact the development of critical thinking skills and online course design. Foundational to this study is consideration that communication enhances a person's ability to think critically (Rougle, 2004), and that technology offers tools to foster the development of learning and critical thinking skills (Bonk & King, 1998; Fauske & Wade, 2003-2004).

The review of the literature in Chapter two will begin with an overview of the elements related to the development of critical thinking skills, and will continue with information related to the use of channels of communication found in the online environment. Additionally, seven findings have been identified in the literature as significant considerations related to the topic of developing critical thinking skills through communication in an online environment. The findings are as follows: critical thinking must become part of the curriculum, learning involves action, real-time interaction supports the social construction of knowledge, online learning changes the teacher and student roles, collaboration facilitates learning, communication makes thinking visible, and assessment must address the quality of the interaction. But first, an

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overview of the elements related to the development of critical thinking and the role that communication plays in this process.

Communication and Critical Thinking

The link between communication and critical thinking is based on the seminal work of Vygotsky (1978) and subsequent work of numerous researchers, which identifies that learning occurs through social interaction (Bransford, Brown, & Cocking, 2000; Brown & Duguid, 2000; Engeström, 1999; Lave & Wenger, 1991; Resnick, 1987; Vygotsky, 1978). Specifically, Gee (1989), in his examination of literacy, linked language and thinking. Communication that is facilitated through an educational context is grounded in the process of argumentation, which permits individuals an opportunity to articulate and assess thought processes in the context of a social framework. Dialogue, a conversation designed to examine sides of an issue, is one way in which people think and reflect together (Isaacs, 1999). According to Isaacs (1999), "dialogue is a living experience of inquiry within and between people" (p. 9). Opportunities to learn from mistakes, refute hypotheses, and learn from interventions are actions facilitated through many forms of communication. Communication that fosters argumentative skills plays a vital role in the process of rational thought, which is the basis of critical thinking (Duffy, Dueber, & Hawley, 1998).

Communication can also be overwhelming, which requires critical thinking in order to navigate what is and what is not important. According to Oseas and Wood (2003), we must become better informed instead of just better at receiving more information:

The world in which we are preparing our students to live and thrive is one where information arrives at warp speed from electronic media. It is virtually impossible to participate as an informed citizen unless we know how to extract and process information from multiple sources. (p. 14)

Consequently, critical thinking skills are necessary for life in the 21st century. Communication is not only a vehicle to facilitate learning but is also a vehicle to demonstrate critical thinking skills.

The 21st Century Narrative Student

The socially situated world of online communication is a world that resonates with students of the 21st century. The importance of online communication to students is demonstrated in a survey conducted by the Pew Research Center that shows 90% of American teenagers aged 12-17 use the Internet, and 80% use an online social networking site like MySpace or Facebook (Pew Internet & American Life Project, 2011). Additionally, studies show that students are using online communication tools to enhance their schoolwork (Levin & Arafeh, 2002; National School Boards Association, 2007). This data further highlights the popularity and desire of individuals to use the Internet to connect socially.

The desire for students seek communication with their peers is not limited to computers. Another Pew Internet & American Life Project shows that the use of cell phones, specifically smart phones, among American youth aged 12-17 is on the increase with 1 in 4 teenagers using their cell phone mostly as the tool to access the Internet, and 74% of teenagers using the cell phone at least occasionally to access the Internet (Madden et al., 2013). Madden et al. report that 78% of American teenagers own a cell phone with 47% of those being a smart phone, which is on the increase. Yet another Pew study shows that the use of cell phones by adolescents is not always seamless. According to a study by Lenhart et al. (2010), 24% of students attend schools that ban cell phones; however, this does not stop 65% of students in these schools from brining their cell phones with them to school everyday. While using a cell phone in a school that bans them, 58% of students with a cell phone report that they have sent a text message during class. American youth seek narrative connection with each other at all times, even despite challenges.

Online social connectivity exists in many venues. The examples mentioned previously highlight the role that narrative communication plays in the life of 21st century students. The fact that students are connecting in a narrative world through digital means is especially significant since opportunities for students to participate in narrative communication in a face-to-face school situation is largely limited to the time dedicated to lunch and passing between classes. If students are seeking a place to connect with others in meaningful communication, it is not surprising that the online environment has become increasingly popular, as it offers opportunity for a more reflective, thought-provoking experience than the environment of the school hallways and lunchrooms, which are typically time restrictive and occur in a noisy environment. The focus and desire of students to exist in a narrative environment is especially noteworthy since students are forming their identity at the age that they are becoming prolific bloggers, and as Habermas (1987) points out, "identity formation takes place through the medium of linguistic communication" (p. 58).

One way to offer students the opportunity to be part of meaningful communication is for educators to embrace collaborative knowledge building activities during synchronous class sessions. Collaborative knowledge building requires action and innovation, and allows students to construct knowledge and build identity within a community (Riel & Sparks, 2009). "The shift from lecturing to collaborative knowledge building changes the nature of the course of learning in fundamental ways. It addresses the split between what is learned from books and what is learned in experiences" (p. 12). Although Riel and Sparks talk about collaborative knowledge building during face-to-face classes in order to support online learning in a hybrid class, this

strategy provides an example of how learning can harness narrative connection in order to enhance learning.

When considering the use of online communication tools inside the school environment, the Telecommunications Act of 1996, commonly referred to as E-Rate, has connected schools and libraries to the Internet (Ed Tech Action Network, 2007) making online learning resources accessible to students. With the general availability of connectivity, American schools have an opportunity to access information and people afforded by the Internet, which offers a socially situated venue to practice argumentation and thus critical thinking skills within the structure of the educational experience. Additionally, access to the Internet offers an opportunity to connect education to the world in ways that interest students and prepares them for real world successes (Haythornthwaite, 2006). Adequate broadband continues to be a significant barrier to interactive and multi-media resources needed in our schools and libraries in this 21st century, and thus E-Rate 2.0 calls for increased broadband and a move from 3 MB or less for approximately half of E-Rate schools to 100 MB or more by 2015 for all schools (Rosenworcel & Edwards, 2013). With universal access and the hope of increased broadband access, the use of the online environment within the context of school becomes an ideal place to reach students in order to help them develop their critical thinking skills through the narrative tools that resonate with students of the 21st century.

Why Synchronous Online Communication?

There are two major arenas into which the world of online communication can be divided – asynchronous and synchronous. Asynchronous communication allows participants to share ideas and thoughts at different points in time, which allows for flexibility in scheduling and fosters the process of reflective thought. Consequently, the asynchronous mode of online
communication has been widely used by the educational world and thus has been the focus of educational research in the area of online learning (Bannan-Ritland, 2002). An example of how asynchronous communication is commonly used in education is the requirement that students post reactions to readings in the class discussion board. Synchronous communication, on the other hand, requires that the participants be online at the same time. Synchronous online communication can be facilitated through text-only interaction (i.e., TappedIn), or it can be facilitated primarily through audio interaction that is supplemented with text (i.e., Elluminate). Synchronous online communication can also exist outside of structured resources such as TappedIn and Elluminate. Two popular alternatives are instant messaging and Skype. Both instant messaging and Skype allow for text and multi-media based communication using free programs that allow users to connect with other known individuals. An example of how synchronous communication is commonly used in education is a small-group discussion about content read in a course text.

Although both asynchronous and synchronous communication can be used to achieve similar educational goals, synchronous communication offers the richest opportunity for interactivity and collaboration amongst students (Schrum, 1998). This focus on student-to-student interaction fosters a student-centered approach rather than an instructor-centered approach to education, which is consistent with best practices in online education (Conrad & Donaldson, 2004; Fauske & Wade, 2003-2004; Rourke & Anderson, 2002). Additionally, synchronous tools offer unique opportunities to restructure the learning environment so as to facilitate learning within a community (Polin, 2000). Tabbi (1997) furthers the discussion regarding the value of synchronous online conversations in facilitating innovative classroom

practices to increase writing skills, but cautions that students must be encouraged to think critically to be effective.

Differences surface between synchronous and asynchronous communication when it comes to grading student participation. Since synchronous communication fosters learning that is grounded in active participation (Weigel, 2002), the focus is on quality interaction between students, whereas asynchronous communication tends to focus on the number of posts rather than the quality of the comment posted (Bannan-Ritland, 2002).

Although asynchronous online communication has been the primary method used to date in online education, it is not always the best tool to use especially when focusing on learning gained through student interaction (Bannan-Ritland, 2002). According to Weigel (2002), the advantages of a synchronous broadband virtual classroom vs. an asynchronous self-paced learning environment is worth the hassle of dealing with meeting at a specific time, as the synchronous virtual classroom fosters interactive lectures and opportunities for students to shape class content. However, synchronous online education does present barriers to learning. Erickson (2004) identifies real-time interaction as foundational to the process of learning, but notes that the lack of time to reflect in the complex process of communicating orally is problematic. Consequently, offering opportunities for students to process and reflect within the synchronous online event becomes an important lesson plan consideration. Despite any challenges, synchronous online communication is the vehicle that is best matched to achieve the goals of this study.

Communication Channels and Social Presence

Online learning environments that are synchronous in nature offer multiple ways for participants to connect. For example, Elluminate, which was the interface used in this study, offers audio, public instant messaging, private instant messaging, an interactive whiteboard, file sharing, video interaction, desktop sharing, polling, as well as a variety of participant feedback tools including clap, thumbs down, raise hand, and question face. The majority of these interaction options or communication channels are available to participants 100% of the time; however, a session moderator can control access to some of the features such as audio and the interactive whiteboard. Asynchronous online learning environments, on the other hand, tends to offer only text and file sharing interaction. Since this study explored communication in a synchronous online environment, it seems prudent to explore the research regarding the impact of using different avenues or channels of connection on participant communication patterns.

Social presence is an area of research that explores online social connectedness and the impact on learning, and is defined as the sense of being with another within the scope of a technologically mediated environment (Biocca, Harms, & Burgoon, 2003); put another way, social presence is the degree to which a person is perceived as being a real person in mediated communication (Sung & Mayer, 2012). Understanding social presence is foundational to effective instruction in an online environment (Garrison, Anderson, & Archer, 2000). The study of social presence is relevant for both asynchronous and synchronous online communication.

Wei, Chen, and Kinshuk (2012) identified that both the user interface and social cues impact social presence. "When learners perceive a high degree of social cues from other people, they will get a better perception of social presence" (p. 540), and better perception of social presence is linked with student satisfaction in online courses (Markaridian Selverian & Hwang, 2003; Sung & Mayer, 2012; Wei et al., 2012). Having multiple ways to communicate can provide for increased social cues and a more robust user interface. Elluminate is an example of what Biocca et al. (2003) describe as a social presence technology. "Social presence technologies offer the user the opportunity to interact with others in a variety of ways to access the social and task information provided by others" (p. 458). Specifically in regards to social presence in synchronous online learning environments, a meta-analysis of research involving online multimedia learning experiences "associate the highest levels of learning with the highest levels of combined spatial and social presence" (Markaridian Selverian & Hwang, 2003, p. 519).

Social presence does not just automatically happen. Reisetter and Boris (2004) questioned why students in their study of asynchronous online courses identified a low value for peer interactions despite an attempt to build a learning community, and they propositioned that they had "not yet found a way to make these exchanges meaningful enough for the leaner" (p. 289). The key, according to Garrison, Anderson, and Archer (2001), is skilled facilitation coupled with social presence. Consequently, improving social presence in both the synchronous and asynchronous environments equates to best practices in online learning.

In an attempt to better understand the role of the learner's sense of presence in an online environment, Sung and Mayer (2012) conducted research that identified five factors of social presence: social respect, social sharing, open mind, social identity, and intimacy. Having a better understanding of these factors when teaching in an online learning environment can positively impact the learner's perceptions or feelings about his/her connectedness to a learning community, which in turn is likely to positively impact learning.

Slagter van Tryon and Bishop (2009) refer to the learner's feeling of social connectedness in an online learning environment as e-mmediacy. "We refer to this state of social cognition as experiencing e-mmediacy – those feelings of social connectedness one has with fellow online class participants (classmates, instructor, teaching assistant) through computer-mediated communication experiences that simulate the episodic perception of immediacy" (p.

293). It is important to note that immediacy is a measure of social presence (Biocca et al., 2003), and that immediacy coupled with intimacy are "good predictors or potential indicators of students' online learning" (Sung & Mayer, 2012, p. 1739). In support of the role of intimacy in social presence, Bruss and Hill (2010) found that "online communication may increase people's personal self-disclosure in general, helping them along in the early stages of relationship building" (p. 5).

Without a sense of social presence, the limitations of online communication can become a barrier to learning. Celik (2013) identified that there is a disparity between individual attitudes towards the group dynamic and actual interaction in the online environment. "The need to contribute to the discussion forum as a class requirement may have outweighed their disinclination to engage with their more experienced peers; however, this reluctance was evident in the underlying dynamic of the class, and it ultimately affected the motivation of some of the students to participate substantially in the discussion" (p. 680). Employing Sung and Mayer's (2012) five factors of online social presence can help students feel more connected to each other in online classes.

Additional research regarding the channels of communication provides interesting insights related to this study. Riordan and Kreuz (2010) looked at why people chose to express positive and negative emotions in asynchronous email, synchronous instant message, or face-toface environments. In general, study participants chose the face-to-face channel because of the increased access to nonverbal clues and the less permanent nature of the communication; however, study participants also chose the two computer mediated channels over face-to-face in specific situations. Specifically, asynchronous email was selected to share bad news with a recipient because of the natural shielding factor inherent in this channel, and synchronous instant messaging was selected for the ability to share positive news quickly. In essence, Riordan and Kreuz's study supports the research on social presence and the desire for online learners to be a real person with their learning colleagues, and it also provides potential insight regarding the dominant use of the instant message channel for communication associated with the findings of this study.

Learning also has an element of social presence in that it must become real to the learner. "In order to learn, we need to attend to and process elements of new information, establish key connections between them, integrate them with available knowledge base, and build new or modified knowledge structures" (Kalyuga, 2007, p. 390). In order for new information to be processed efficiently, the brain must have adequate cognitive processing ability. Research on Cognitive Load Theory helps to inform online course design. Specifically, Cognitive Load Theory studies the impact on learning when you lessen the cognitive load in various channels of communication, which can in turn foster engagement in the learning activities (Wouters, Paas, & van Merrienboer, 2009). For example, Wouters et al. describe the impact on learning when instructional activities recognize cognitive load. "When verbal material is presented in spoken rather than in written format, cognitive demands on the visual channel are reduced which enables the learner to process the visual material and construct an adequate pictorial representation" (p. 2). Cognitive Load Theory, then, can provide insights into the findings associated with this study in terms of the channels of communication used by participants and the evidence of critical and integrative thinking found in the online discussion comments.

Darabi and Jin (2013) examined online discussions for evidence of higher order cognitive processing, which was originally introduced in Bloom's Taxonomy and later updated by Krathwohl (2002). Darabi and Jin's premise was that poorly designed online discussion

strategies lead to cognitive overload. They used Cognitive Load Theory-based strategies to reduce the learner's cognitive load in the hopes of facilitating higher order cognitive processing, which would in the end enhance the quality of the online discussion. Darabi and Jin studied online discussions in the asynchronous arena, and found that participants who had access to the Cognitive Load Theory-based strategies of using an example post and limiting posts on a page did reported lower mental effort combined with higher quality discussion than participants who did not use these strategies (Darabi & Jin, 2013). It is of note that synchronous online discussions naturally provide both examples and concise information on a discussion point. The real-time sharing from co-learners provides not only one but many discussion examples with the added benefit of immediate feedback from the instructor/facilitator about the structure and/or impact the comments have on the current discussion. Additionally, the time limits associated with synchronous online discussions necessitate movement from a particular discussion topic onto the next, which in turn focuses the learner's attention on the specific topic at hand.

The Duality of Consumption and Creation of Knowledge

Communication requires participants to be both consumers and creators of knowledge. The fact that student's are enamored with the use of Web 2.0 tools, such as wikis, blogs, and podcasts (Henning, 2004; Lenhart & Madden, 2005; Nardi, Schiano, Gumbrecht, & Swartz, 2004), indicates that the ability to create knowledge in the narrative environment of the web is a desired way to learn and share information. While the majority of Web 2.0 tools are asynchronous, the most used online communication tool for students today is instant messaging, which is often done with other creators of information (Rainie, 2006). Instant messaging is synchronous in nature, which distinguishes it from other Web 2.0 tools. An important caution related to synchronous chat or instant messaging is that some online environments support *thin* *chat* (nothing exists before or after the chat experience) instead of the *fat chat* (features extend learning beyond text chatting, such as an interactive whiteboard) that can help facilitate learner-focused online classrooms (Polin, 2000).

When students use the Internet for asynchronous activity, they can choose to be an active participant, creator, or a passive participant, consumer. Synchronous activity, on the other hand, demands creation and participation. One obvious limitation to synchronous activity is a lack of time to reflect; however, the model of synchronous communication is talking. An advantage to "talking" online rather than in person is that some space to reflect can be created, especially since synchronous online communication does not require, or in most cases allow, the participant to read real-time body language.

It was an interest in the dual role of creating and consuming knowledge in today's narrative environment that prompted this study and informed the study design of using synchronous online communication. Now that an overview of the elements related to critical thinking, communication channels, and synchronous online learning has been established, the significant findings associated with this literature review follow.

Critical Thinking Must Become Part of the Curriculum

Dewey's (1997) book, *How We Think*, which was originally published in 1909, offers a definition of thinking as, "active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds which support it and the further conclusions to which it tends" (p. 9). Dewey used the term reflective thinking in his writing; however, what he wrote about describes a process of thinking and topic of research commonly referred to today as critical thinking. One noted researcher in the area of critical thinking, Fisher (2001), extends Dewey's description of thinking by defining critical thinking as "a kind of evaluative thinking—

which involves both criticism and creative thinking and which is particularly concerned with the quality of reasoning or argument which is presented in support of a belief or a course of action" (p. 13). Although research offers many definitions of critical thinking, Alwehaibi (2012) points out that they commonly include thinking that comprises "a number of skills and mental processes" (p. 194). For the purposes of this study, critical thinking is defined by Lipman (2003) as "skillful, responsible thinking that facilitates good judgment because it (1) relies upon criteria, (2) is self-correcting, and (3) is sensitive to context" (p. 39).

Critical thinking is foundational to learning and is widely held as the goal of education (Dewey, 1938; Douglas, 2000; Kuhn, 1991; Lipman, 2003; Resnick, 1987) yet many of these same authors note that critical thinking skills are rarely mastered by students in the educational process:

Schools always hoped to teach students to think critically, to reason, to solve problems, to interpret, to refine ideas and to apply them in creative ways . . . Nevertheless, we seem to agree that students do not adequately learn these higher order abilities. (Resnick, 1987,

p. 2)

Fisher (2001) noted that teachers believe they are indirectly teaching these critical thinking skills; however, this is not effective for most students to actual master the skills.

With the hope of increasing the number of K-12 teachers who actively facilitate student development of critical thinking and problem-solving skills, the California Commission on Teacher Credentialing conducted a study to better understand the extent to which teacher preparation programs prepared teacher candidates to teach critical thinking and problem-solving skills. The results are consistent with the literature on this topic, in that although critical thinking is a hallmark of education, explicit instruction or practice in learning how to think critically is

not commonly found in the instructional process. Specifically, Paul, Elder, and Bartell (1997) found that although 89% of the teachers interviewed claimed critical thinking was a primary objective in their instruction, only 19% could define critical thinking, and only 9% were in actually teaching with a focus on critical thinking. To further clarify the misunderstanding of critical thinking, Paul et al. found that many teachers equate critical thinking with active and cooperative learning strategies, Bloom's Taxonomy, and the understanding of learning styles.

Since educational institutions are failing in their ability to graduate students with critical thinking skills, the question then turns to how best to promote the development of these skills. A common belief found in the literature is that "critical thinking must be an explicit part of the curriculum" (van Gelder, 2005, p. 43) yet questions exist as to how to implement this in practice. Lipman (2003) calls educators to be part of a thinking-orientated process and argues that critical thinking skills should be prevalent throughout the educational process:

There is the question of the role of critical thinking in education. I have already suggested that all courses, whether in primary, secondary, or tertiary education, need to be taught in such a way as to encourage critical thinking in those subjects. Indeed, this opinion is so common . . . as to be fairly uncontroversial. (p. 229)

Critical thinking is not about acquiring information, but rather it involves self-correction and good judgment that results in action. According to Johnson (2005), activities that support the use of thinking skills helps to gain competence in the skill as well as helps with thinking in general.

To examine whether online learning is a vehicle that can help to build critical thinking in students, Bullen (1998) conducted a quantitative and qualitative case study of student interaction in an asynchronous university course. The quantitative data examined not only the number of posts, frequency of interaction, and references made to other posts, but also assessed the degree

to which students appeared to be using critical thinking skills and also uncritical thinking skills. The qualitative data examined perceptions about critical thinking from both the students and the instructor, which was gathered through semi-structured interviews. To assess critical thinking, comments were rated on a scale of one to three with one being low evidence and three being high evidence of critical thinking. A rating of one also corresponded with frequent use of uncritical thinking and a rating of three corresponded with minimal use of uncritical thinking. Results of this study showed that critical thinking was evident in the student comments, but that it was inconsistent throughout the duration of the course and that no student used critical thinking skills at the highest level on a consistent basis. The students overall mean critical thinking score was 1.83, with 3 being the highest score possible.

This study offers considerations for future research design. First, this study used qualitative measures to examine critical thinking. Secondly, one of the findings associated with this study identified that previous experience in using distance learning was a factor that positively impacted evidence of critical thinking, and thus having a population that has a common experience regarding online learning could contribute to equalizing the potential of participants to demonstrate critical thinking skills. Lastly, an implication for further research identified a need to study effectiveness in promoting critical thinking in an online instructional method other than an asynchronous online course. An examination of critical thinking found in collegial discussions in an online synchronous environment would meet this call to further study.

Argumentative reasoning skills are not found in the average person. To examine the extent to which people use critical thinking skills throughout their lives, Kuhn (1991) conducted research on argumentative skills in a cross-section of average people across the life span. She found that the majority of people studied were epistomogically naïve meaning that when

examining how people think, they lacked general abilities of argumentative reasoning. Specifically, most people were certain that their causal explanations of complex phenomena were correct; they had no awareness that there could be another explanation other than what they reasoned.

We have no evidence that the cognitive skills of argument . . . are to be taken for granted, that is, assumed to be in place in average people simply by virtue of their membership in a society that was founded on the values of rational discourse. (Kuhn, 1991, p. 4)
By argument, Kuhn (1991) is not referring to rhetorical argument (an assertion with justification), but rather she is referring to dialogic argument (defending an assertion with justification against an opposing assertion). This ability to argue a point of view between two people requires not only that a person identifies that there is more than one point of view on a topic, but they must also be able to reason sufficiently enough to defend their argument, which includes weighing the pros and cons associated with the issue.

Thinking skills, specifically critical thinking skills, plays a vital role in the skills of argumentation, and these skills are not found in a cross-section of average people across the life span. The results of the California Commission on Teacher Credentialing study (Paul et al., 1997) are consistent with Kuhn (1991), in that although critical thinking is a hallmark of instruction, explicit instruction or practice in learning how to think critically is not commonly found in the instructional process.

Use is vital to increasing critical thinking skills. The acquisition of critical thinking skills is no different from sports agility or the ability to perform mathematical computations or even the ability to play chess in that frequency of use plays a crucial role in the development of the skill set. Addressing the need to use critical thinking skills with students in order to more

fully develop them, vanGelder (2005) identified lessons learned from the literature on this topic. Building on Kuhn's (1991) research and examining other authors on the topic of the development of critical thinking skills, vanGelder (2005) points out that the naïve view is to believe the first thing one hears; once heard, people find it difficult to even believe that another viewpoint exists. To examine critical thinking as applied to reading, Douglas (2000) identified that unless people are encouraged to think cognitively about a topic, they will reject an idea that they believe to be true, even if that belief is unsubstantiated. Compounding the issue of unexamined beliefs is the concept of belief preservation. Belief preservation is a bias where people will find evidence to support pre-conceived beliefs instead of seeking alternative viewpoints (van Gelder, 2005). As identified by Douglas (2000) the opportunity to think cognitively about a topic is a remedy to counteract the realities of naïve thought and belief preservation.

Another remedy to address the lack of critical thinking skills found in the general population or in the educational process itself is to consider Ericsson and Charness' (1994) research on expert performance. Expert performance refers to outstanding performance of such a nature that it is even superior to other high achievers of that skill. The prevalent thought is that expert performance is directly linked with giftedness or an innate ability to perform the identified skill; however, the reality is that expert performance results from a combination of innate ability, motivation, and effort along with the development of the skill set (Ericsson & Charness, 1994).

Understanding how expert performers acquire their skills impacts the educational process in general and specifically the development of critical thinking skills. Ericsson and Charness (1994) identify "that the central mechanisms mediating the superior performance of experts are acquired" (p. 737). It is, therefore, primarily use coupled with the mastery of relevant knowledge and prerequisite skills that enable expert performers to perform expertly. Consequently, limiting access to knowledge and opportunity to use a skill may be the biggest factors that impede the development of the identified skill (Ericsson & Charness, 1994). In their examination of 12 research studies related to the necessity of using a skill in order to master it, Newell and Rosenbloom (1981) support the fact that experience using any skill is critical for improvement in that skill.

In summary, if progress is to be made towards the goal of graduating students who can think critically, it is incumbent upon schools to mandate critical thinking skill development as an explicit part of the process of education (Kuhn, 1991; Resnick, 1987; van Gelder, 2005). Consistent with the ability to perform expertly in any other domain, the development of critical thinking skills requires the opportunity to practice the identified skill throughout the course of a lifetime (Ericsson & Charness, 1994; Newell & Rosenbloom, 1981; van Gelder, 2005). Additionally, the opportunity to cognitively process any given topic is necessary to mediate naïve beliefs (Douglas, 2000). One way to help students gain critical thinking skills, then, is to provide them with opportunities to discuss differing points of views and then defend their argument. Synchronous online communication is one vehicle available that can foster discussion designed to cognitively process content so as to mediate naïve beliefs.

Learning Involves Action

The ability to transform one's thinking is a direct result of action. Brown (2000) contends that creating knowledge revolves around action; that learning is situated in action. In their seminal work that brought us the concept of Communities of Practice, Lave and Wenger (1991) studied how knowledge is transferred between people performing a specific practice (e.g., midwifery in Yucatan); practice in this sense refers to a group of people who have a common interest in a field of work or a subject. The result of Lave and Wenger's research showed that engaging in the activities of the practice is a condition for learning. Lave (1993) reasons that engaging in a learning activity requires that the learner extend what they know beyond the immediate situation. Transforming one's thinking on a topic is thus a natural result of examining the topic through action.

Understanding the role of action to the learning process has impacted what we know about how learning occurs. Bransford et al. (2000) states that active learning facilities the transfer of knowledge from one context to another. "It is important to view transfer as a dynamic process that requires learners to actively choose and evaluate strategies, consider resources, and receive feedback" (p. 66). Thus learning occurs in a social context when students are actively involved in the process of examining, reflecting, and re-thinking what they know to be true and then generalizing or extending that knowledge to other situations. To extend learning, students must have the opportunity to rehearse information in working memory so as to organize and integrate it with existing knowledge (Clark & Mayer, 2005). Dialogue, which is a specific form of communication, is based on the concept of taking action. "Dialogue not only raises the level of shared thinking, it impacts how people act, and, in particular, how they act all together" (Isaacs, 1999, p. 22).

Real-Time Interaction Supports the Social Construction of Knowledge

Erickson (2004), a noted author on the topic of discourse as it relates to learning, found that, "timing appears to be what holds the whole social ecology of interaction together in its performance" (p. 7). When considering online social interaction, synchronous interaction (vs. asynchronous) is the option that addresses the timing issue and fosters an environment where social interaction can occur: When we say that cognition and action are 'situated' and 'tactical' we mean, among other things, that they are situated in real time and done tactically in real time – not in an ideal 'time out' condition for reflection and deliberation but in an actual ongoing development of sequences of interaction moment by moment, within which real-time process of development one is never completely sure of where the interaction is going next and during which the time clock never stops. (Erickson, 2004, p. 9)

Although asynchronous online communication fosters reflective thought, it lacks the realtime, dynamic interaction necessary to examine the impact of communication on thinking. Erickson (2004), contends that it is the real-time nature of interaction that supports the social construction of knowledge:

The social ecology of mutual adaptation within the interactional environment is a process that not only takes place within the real-time conduct of the interaction but underlies or enables it. In the absence of mutual adaptation (i.e., in the absence of a social ecology) the participants in interaction would be continually interfering with one another's actions rather than complementing and reciprocating them. It is this articulation and mutual adaptation that constitutes the 'inter' of interaction in conversation (rather than conversation being simply the sum total of separate actions by discrete individuals). (p. 5)

Regardless of the many values of reaching students in the narrative world of synchronous online communication, it is not ideal in all aspects. During face-to-face communication, nonverbal clues assist participants in the process of assigning information as significant and in the timing their interaction. Erickson (2004) notes that without these non-verbal clues, participants would be overwhelmed by data, which would interfere with a person's ability to cognitively process the content being discussed. Synchronous as well as asynchronous online

communication lacks access to non-verbal clues. This inherent lack of non-verbal clues in online communication has the potential to impact participant contribution and subsequent learning. To study whether synchronous online communication could facilitate learning, Cooney (1998) conducted a case study using both quantitative and qualitative measures to study 10th grade English students who used a synchronous online communication tool called Aspects. Aspects offered participants the opportunity to interact with each other in a collaborative textual mode, a collaborative graphical or concept mapping mode, and to chat with each other. An analysis of student interaction was conducted based on both synchronous online discussions held in Aspects and face-to-face classroom-based discussions. The topic of both sets of discussions revolved around specific literary works, and the discussions lasted over a period of weeks. The quantitative data consisted of rating interaction in both the synchronous online discussion as well as the face-to-face classroom-based discussion. Qualitatively, observations were noted during the face-to-face discussion, and notes were made summarizing the online discussion. The results of this study indicate that student interaction changed between the face-to-face and synchronous online environment. Specifically, when in the synchronous online environment, students dominated the communication whereas the teacher did so in the face-to-face environment. Additionally, in the synchronous online environment the students communicated and collaborated needing minimal direct teacher intervention. Although the teacher shaped the learning experience, it was the students who shaped the learning itself when communicating synchronously online:

The students decided what they would discuss, how long, and to what depth they would interact about certain issues. They analyzed, without substantial help from the teacher, all of the main characters of the play, following them through each act of the play. Additionally, they chose speeches from within the play that were difficult for them to understand, wrote explanations of these speeches, and reacted to (and received reactions from) other students to better help them understand their 'difficult speech.' In the times in which [the teacher] did 'talk' in the classroom, it was rarely about the content or analysis of the play; rather, it was to adjust or remove part of the scaffolding in the structure of the class. (Cooney, 1998, p. 276-277)

Cooney's research shows that deep learning can occur without the non-verbal clues inherent in face-to-face communication. An important factor associated with this study is that the synchronous online tool used in this study, Aspect, provided for fat chat (e.g., a collaborative writing tool), and as Polin (2000) noted, fat chat can help facilitate learner-focused online classrooms. The use of a synchronous online tool that provides for fat chat features appears to be a critical factor when examining the impact of synchronous online communication to the learning process.

Another finding associated with Cooney's research addresses whether the students found the online experience or the printed transcript to be more helpful to the process of writing their final written essay. In Cooney's study, "the majority of students found accessibility to peer and personal work more helpful *online*, during the interaction, rather than *later*, in the printed copies" (Cooney, 1998, p. 281). Consequently, using the synchronous online communication tool to develop ideas and process content allowed the students to use the technology to shape the way they learned, which is an important design consideration.

Online Learning Changes the Teacher and Student Roles

The opportunity for rich discussion facilitated through online communication tools fosters an opportunity to shift from a teacher-centered classroom to a student-centered one. As

noted by Brookfield and Preskill (2005), active discussion doesn't automatically transform a classroom from teacher-centered to student-centered, but it is a tool that can help foster deeper thinking. Student-centered and deep thinking are worthy goals for education today. Schrum (1998) identifies pedagogical issues when teaching a synchronous online course, specifically, she notes the opportunity for reconceptualization of the teacher's role and subsequently of the student's role. Barab, MaKinster, Moore, and Cunningham (2001) acknowledge that moving to a learner-centered approach in education is consistent with research on how learning occurs. The unique resources available in the online environment assist the teacher in making the shift from provider of direct instruction to facilitator of learning (Shea, 2006). Additionally, the role assumed by an online learner, whether in the synchronous or asynchronous environment, includes both independence and interdependence, and this matches life outside of the classroom (Garrison et al., 2004).

The shift from a consumer of knowledge to a creator responsible for learning is fundamental to the process of thinking. Inherent in the shift of teacher-student roles is the opportunity for students to use critical thinking skills, which is consistent with established beliefs regarding the process of developing thinking skills. Dewey (1997) referred to the formation of habits that form the basis of thinking as the *Training of Mind*. If learning is to occur, students must be given an opportunity to learn how to think, which comes from opportunities and exercises designed to foster thinking. "No matter how much an individual knows as a matter of hearsay and information, if he has not attitudes and habits of [discriminating tested beliefs from mere assertions, guesses, and opinions], he is not intellectually educated" (Dewey, 1997, p. 28). Strategies such as those proposed by Dewey can be facilitated in the synchronous online learning environment. Shift in role necessitates a shift in identity. In their research, Garrison et al. (2004) discovered that student adjustment to a new identity is an inevitable process associated with a collaborative online educational experience. Although Garrison et al. were specifically studying students in an asynchronous environment, the concept of identity is generalizable to synchronous environments when examining the shift in student roles presented by online learning. "Inevitably, the student must assume greater responsibility to match the increased control that comes with online learning" (Garrison et al., 2004, p. 63). When students see themselves as part of a community of thinkers, their identity changes (Brown & Duguid, 2000). Garrison et al. (2004) found that the shift in responsibility inherent in online learning environments requires that the instructor's presence transforms from imparter of knowledge to manager/monitor of the student's social and cognitive presence. As this transformation occurs, students must assume greater responsibility for their learning, and with this greater responsibility comes increased control of the educational experience (Garrison et al., 2004).

Foundational to any examination of identity is the seminal work by Lave and Wenger (1991) regarding the identity associated with members of a Community of Practice. Lave and Wenger offer that individuals construct identities through the process of learning and their role in the practice of the community. Specifically, that these identities are dynamic and are impacted by social membership. Brown & Duguid (2000) take the role of identity in the learning process a step further by linking a person's self-awareness about the development of identity to his/her ability to assimilate knowledge. "What people learn about, then, is always refracted through who they are and what they are learning to be" (Brown & Duguid, 2000, p. 138).

A key to the development of identity is the legitimized participation by members of a community (Lave & Wenger, 1991). To further identify where individuals are legitimized when

it comes to the online world, Takayoshi, Huot, & Huot (1999) examined the places adolescent girls go on the web and found that adolescent boys and girls have distinctly different purposes for using the World Wide Web. Despite the clearly masculine emphasis of the Internet, a growing population of girls are using the Web to create spaces of their own and connect with content designed to build self-esteem (Takayoshi et al., 1999). The key to legitimized participation seems to be the congruency between the online course structure and best practices in education. The fundamentals of synchronous online learning that are supported as best practices in education include but are not limited to the shift in the role of the instructor, the building of a learning community, and the process of collaboratively generating ideas (Bonk & King, 1998; Fauske & Wade, 2003-2004; Garrison et al., 2004).

The opportunity to interact with others helps to build identities, as well as helps to facilitate a learner-centered approach to learning. Despite the fact that a learner-centered approach is a pedagogical model grounded in best practices, it is not realized in the teaching practices found in traditional public schools (Barab et al., 2001). Barab et al. (2001) identify that the key in having teachers move to a learner-centered approach to learning in their classrooms is to offer professional development that is consistent with this pedagogy; to change the culture of teaching from isolation to one of collaboration. For both students and teachers, synchronous online learning fosters interaction, which can facilitate a shift to a learner-centered approach to education, which, in turn, can impact an individual's identity in the learning process.

Individual identity formation impacts learning of peers. In a synchronous online learning environment, reflecting on an individual's identity can take many forms. For example, Tabbi (1997) contends that synchronous online conversations can facilitate writing if students are encouraged to think critically about the ways in which technology impacts their process of reading and writing. In this example, student identity can be that of *researcher* as s/he examines the mediating impact of technology on his/her writing. The dynamic and rich nature of student identity formation impacts not only an individuals' learning but also that of the entire learning community. Bullen's (1998) research on the development of critical thinking skills in an asynchronous educational environment identified that students themselves desired synchronous communication over asynchronous communication.

Critical thinking is not about gaining information but rather results from dialog within a community (Lipman, 2003). Lave and Wenger (1991) introduced us to the concept that communities are made up of peers, near peers, and experts. In order to facilitate communication between peers, near peers, and experts, Brown and Duguid (1996) call for interactive tools to foster online community building; communication tools should not be broadcast in nature or ones that focus solely on one-to-one or one-to-many one-way communication, but rather they should be interactive, which is at the heart of synchronous online learning and is consistent with the research on how students of the 21st century are using online narrative tools (Levin & Arafeh, 2002; National School Boards Association, 2007).

Social learning is not limited to group work. A common misperception regarding social learning necessitates that a distinction is made between learning within a community and group work. Although group work does require social interaction with peers and near peers, learning within the social network of a community does not require working on a project with a group of peers or near peers. Group work can be used effectively in online education, and evidence exists that supports the use of group work in online learning. For example, Rourke and Anderson (2002) studied the effectiveness of peer teams to facilitate communication in an online asynchronous educational environment. Results of this study showed that peer teams of student-

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led discussions fostered an atmosphere of open thinking amongst students, whereas solo peer facilitation of student-led discussions was not as effective. "Working in teams to lead discussion was an enjoyable experience for the students, and it contributed to their learning" (Rourke & Anderson, 2002, p. 15). The work of Conrad and Donaldson (2004) identifies that activities led by student teams of three to five people are an effective way to engage the online learner.

Even though strong examples exist in the literature regarding the effective use of group work in online learning environments, not all online students consider group work to be a positive experience. Specifically, Hughes and Daykin (2002) found that group work in an online environment can contribute to anxiety within students. Consequently, group work can be effective in online education; however, it is not the only way nor should it be the only way to connect peers, near peers, and experts within the social fabric of a community.

Any meaningful connection between peers, near peers, and experts will rely on relevant and timely communication. Communication also facilitates the process by which identities change throughout the interactional process. "Knowledge is not necessarily something that individuals possess or that evolves inside the head but rather something that individuals do together such that their social processes become intrinsic to their mental operations" (Bearison & Dorval, 2002, p. 1). Knowledge, then, is formed through collaboration and communication, which is linked to the process of thinking.

Collaboration Facilitates Learning

The construction of knowledge through collaboration can take many forms. Palloff and Pratt (2005) provide specific activities that foster collaboration in an online learning environment, which include but are not limited to discussions, case studies, simulations, and role playing. Garrison and Anderson (2003) lists collaboration as fundamental to the education and

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learning process. According to Bohm (2004), "the collective thought is more powerful than the individual thought the individual thought is mostly the result of collective thought and of interaction with other people" (p. 14). Since thinking and collaboration are so closely intertwined, the power of learning within a social network clearly has the potential to increase knowledge acquisition. "When we fully recognize the social nature of classroom learning, it does not seem so surprising that students should collaborate in coming up with an answer to a question or a solution to a problem" (Lemke, 1993, p. 79). The impact of collaboration on the learner also extends beyond the virtual classroom walls. According to Laurillard (1998), "interaction between the learner and the world is a vital part of the learning process" (p. 230).

Learning within a community is not impervious to problems. One common problem associated with online learning is the stripping away of personality that is inherent in solely textbased communication. The negative effects of this stripping away can present itself in many forms, but a common occurrence is the act of flaming. Flaming describes the behavior of verbally assaulting a member of the community for expressing a specific point of view. Millard (1997) conducted a case study on the issue of asynchronous flaming in a discussion board. As Millard points out, the written word has been used to insult others ever since the development of the Gutenberg press; the Internet merely amplifies this action. Professional journals routinely publish back and forth insults on specific schools of thought. The immediacy of the Internet, however, encourages emotional rule as opposed to measured thoughtfulness. Synchronicity in online communication provides a remedy for this situation. Not only does the nature of the interaction change to spontaneous snippets of thought instead of diatribes of passion common with asynchronous flaming, but also the sense of community is bolstered through the greetings and feelings associated with being in a class. Regardless of the design, online communication fosters reflective and precise thinking, and can facilitate critical thinking (Garrison & Anderson, 2003).

By nature, learning in a synchronous online environment is a collaborative experience that requires students to be an active member in the learning community. "Online learningcommunity models allow participants to actively engage one another in ideas and perspectives they hold to be educationally worthwhile, exciting, and provocative" (Shea, 2006, p. 37). Student identity is impacted as they assume greater responsible for the learning and thus have greater control of the learning process. Consequently, synchronous online learning can foster a student's ability to skillfully and responsibly employ good judgment, which is consistent with Lipman's (1988) definition of critical thinking.

Communication Makes Thinking Visible

It is the synergetic process of the social interaction that brings individual actions to life. Robertson and Rane-Szostak (1996) found in their research that dialog encourages active student participation and critical thinking. Kuhn (1991) further elaborates on the role of social interaction to the development of thinking skills. "Social dialog offers us a way to externalize the internal thinking strategies we would like to foster within the individual" (p. 293). In essence, communication makes thinking visible, and communication is only possible through social interaction. Bohm (2004) furthers the conversation about real-time interaction by addressing the way that dialogue changes the way that thought processes occur. According to Bohm, dialogue changes the process of thinking versus just engaging in thinking. "You cannot defend something without first *thinking the defense*" (Bohm, 2004, p. 12). Consequently, the use of educationally focused communication supports the process of learning. Additionally, synchronicity provides an opportunity to reflect *in* the online environment on books or other events that happen *outside of* the online environment, which can assist students as they apply the concepts learned to the whole of their lives.

The concept of communication being a tool to mediate learning is born out of the constructs of social learning theory, which is primarily based on the work of Vygotsky. Gallimore and Tharp (1990) examined Vygotsky's writing and compiled his thoughts on the role of thinking and activity so they could be applied to schools today. According to Vygotsky as interpreted by Gallimore and Tharp (1990), communication develops "in the context of social use in joint activity" (p. 193). *Activity* refers to the theory based on Vygotsky's work, which examines human interactions through the contexts of culture and time, commonly referred to as Cultural Historical Activity Theory (CHAT). Mediating tools are central to the learning process when examining situations through the lens of CHAT. Tools and signs connect the individual mind with the culture and society, and allow individuals to exert control over their environment so as to impact their behavior (Engeström, 1999). It is an individual's ability to fluidly use tools to move between externalization and internalization that is at the heart of social learning constructs.

The concept of activity as a critical component of the learning process is not only associated with CHAT. As discussed previously, it is foundational to the concept of learning within a community and is aligned with best practices in education. According to Wertsch (1991), a noted authority in the area of collective memory and identity, "mental functioning in the individual originates in social, communicative processes" (p. 13).

Communication is especially powerful as a learning tool because it modifies the understanding of all people who are part of the process (Dewey, 1916). Communication, then, is transformational for the teacher as well as the student. The research conducted by Anderson et al.

(2001) shows that teachers must become learners themselves and be willing to be changed through the process of learning. In order for teachers to be equal partners in the learning process, they must be full participants in the learning community and not hold the dual role of being the expert in the center while at the same time living on the periphery and insisting on controlling the actions and learning of the students.

Communication plays a vital role in transforming education to be student-centered and responsive to conditions necessary for the development of critical thinking skills. Perhaps Dewey (1916), being the visionary that he was, summed it up best:

An undesirable society, in other words, is one which internally and externally sets up barriers to free intercourse and communication of experience. A society which makes provision for participation in its good of all its members on equal terms and which secures flexible readjustment of its institutions through interaction of the different forms of associated life is in so far democratic. Such a society must have a type of education which gives individuals a personal interest in social relationships and control, and the habits of mind which secure social changes without introducing disorder. (p. 99)

Social relationships and communication are inseparably linked in both face-to-face and online synchronous communication. Together, social relationships and communication provide a mediating tool that fosters thinking. "Since none of us are in this world alone, everything we do, say, and even think is a product not only of our individual processes and construction, but also of our interaction with other people" (Wegner & Vallacher, 1977, p. 10). Students of the 21st century naturally tap into the power of social relationships combined with communication to evolve their thinking process (Grinter & Palen, 2002; Levin & Arafeh, 2002; National School Boards Association, 2007), and it is necessary for educators to experience this pedagogy in

professional development opportunities (Barab et al., 2001) in order for there to be consistency between school-based learning and non-school-based learning.

Assessment Must Address the Quality of the Interaction

In an educational environment where feedback and accountability are important factors to consider, the meaningful assessment of critical thinking and student learning are of primary importance. A contributing factor to this discussion is the fact that we know that communication, as well as other factors, are needed if students are to construct knowledge and confirm understandings (Garrison & Anderson, 2003). Additionally, we know that student engagement and activity design are more important to the online learning process than the actual technologies used (Roblyer & Wiencke, 2004).

According to Bannan-Ritland's (2002) review of the literature related to online learning and interactivity, there is a need to focus on the quality of learner-self interaction such as cognitive processes and metacognition rather than merely counting the quantity of communication. The work of Swan, Shen, and Hiltz (2006) reinforces the need to assess collaboration in the online environment, and they propose that only when collaboration is assessed will it be perceived as valuable. Dewey (1916) extends the notion of community in the assessment process by suggesting the examination include the level of shared interest and the fullness of freedom of interacting with other groups. Fauske and Wade (2003-2004) encourage the examination of the quality of interaction by looking for evidence of critical thinking and the use of language that reflects understanding of content.

The need to meaningfully assess student interaction has been established in the literature; however, the call to actually implement assessment measures to examine the quality of the collaboration remains in large part unanswered. According to Swan et al., (2006), this reality is

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due to the fact that "assessment of collaboration requires a radical rethinking of assessment methodologies" (p. 46). Learners seek quality feedback rather than a generic *nice job* (Rossman, 1999). There is more than one way to assess dialog, but to honor the nature of communication it is imperative that the assessment address the quality of the interaction vs. the quantity of the communication.

Reflection

Given the information overload associated with life today combined with the startling information about naïve thought, there exists an urgent situation that makes it incumbent upon educators to systematically foster the development of critical thinking skills. The development of critical thinking skills will allow students to fully process information as opposed to merely being the recipient of possibly biased viewpoints found both in school and in their lives. Consequently, it is not an option to ignore the development of critical thinking skills in education today, as a need exists to regularly use critical thinking skills (Douglas, 2000). To meet this call to action necessitates that critical thinking becomes part of the curriculum (van Gelder, 2005).

A foundational belief regarding learning, is that learning occurs in a social context when students are actively involved in the process of examining, reflecting, and re-thinking what they know to be true (Brown, 2000; Lave & Wenger, 1991), which supports the concept that learning involves action. We also know that it is real-time interaction that supports the social construction of knowledge (Cooney, 1998; Erickson, 2004), which is why synchronous online communication is critical when studying learning and the process of developing critical thinking skills via online resources.

Social learning constructs, especially when considering online learning, changes the nature of the teacher and student roles (Brookfield & Preskill, 2005), and this shift towards a

learner-centered pedagogy is consistent with best practices in education (Barab et al., 2001). Of note are the facts that a shift in role necessitates a shift in identity on both the part of the student as well as the teacher (Garrison et al., 2004), and that in order to facilitate the implementation of social learning constructs in schools today, teachers must participate in professional development activities that model this pedagogy (Barab et al., 2001).

When considering the process of thinking critically, a focus on social learning constructs is fundamental as critical thinking is not about gaining information, but rather results from dialog within a community (Lipman, 2003). It is collaboration, therefore, that facilitates not only critical thinking but also learning (Garrison & Anderson, 2003; Laurillard, 1998; Lemke, 1993).

Communication makes thinking visible (Bohm, 2004; Dewey, 1916; Kuhn, 1991), and communication is only possible through some kind of interaction. Communication in a synchronous online learning environment is a viable tool to promote thinking skills for students of the 21st century (Levin & Arafeh, 2002; National School Boards Association, 2007). When it comes to assessment, any assessment of growth in the area of critical thinking must address the quality of the interaction versus the quantity of text (Bannan-Ritland, 2002). In summary, learning opportunities that are offered synchronously online can harness the power of learning through dialog (Roblyer & Wiencke, 2004; Salmon, 2002; Schrum, 1998; Wu & Hiltz, 2004), which can positively impact a person's ability to think critically (Duffy et al., 1998; Gee, 1989).

Chapter three discusses the methodology associated with this study, which incorporates the significant findings and lessons learned from the literature review.

Chapter Three: Methodology

The objective of this descriptive case study was to examine communication in a synchronous online discussion that offered multiple channels or ways to communicate (audio, text, and interactive media). Further, this study examined whether the use of multi-channeled synchronous online communication supports the process of thinking critically. Chapter three describes the details associated with this study, which includes a statement of the research purpose and questions, theoretical framework that informed the design of this study, description of the research procedures, as well as the case being studied. The role of the researcher and a conclusion are also included in this chapter.

There are many definitions of critical thinking in the literature; however, the precise and inclusive nature of Lipman's (1988) definition seems most relevant to an educational setting. "Critical thinking is skillful, responsible thinking that facilitates good judgment because it (1) relies upon criteria, (2) is self-correcting, and (3) is sensitive to context" (p. 39).

Although no study was found in the literature that was similarly situated to the study associated with this dissertation, some key points were found in the literature review that helped to inform the development of the methodology.

- Qualitative measures in the form of a case study are used when examining critical thinking that is mediated through an online environment (Bullen, 1998; Cooney, 1998).
- Previous experience in using the distance learning method used in the study can positively impact evidence of critical thinking found in the participant work (Bullen, 1998).

- There is a need to study critical thinking in an online instructional environment other than an asynchronous online course (Bullen, 1998).
- 4) Any synchronous online tool that is used to study learning must include fat chat features, meaning that the synchronous online tool provides features that contribute to the process of learning versus a chat space where nothing exists before the participants enter and nothing enduring remains after the experience (Cooney, 1998; Polin, 2000).
- 5) In order to have consistency between school-based learning and non-school-based learning, educators must examine through personal professional development the role that synchronous online communication can have on the process of learning (Barab et al., 2001).

Significance of the Study

This study is significant because it provides information regarding educationally valid ways that synchronous online communication can be used to enhance learning. Specifically, it addresses the fact that synchronous online communication can facilitate a person's ability to employ critical thinking, which is a universal goal of education (Resnick, 1987). Additionally, this study provides information for synchronous online instructors in how to effectively pair the channel of interaction (audio, text, and interactive media) with the desired educational goal, and provides insight that will foster best practices in synchronous online lesson plan design. Understanding these two areas, critical thinking and intentional lesson plan design to facilitate functional communication, has the potential to significantly impact synchronous online course delivery. Narrative students of the 21st century feel a sense of disconnection between formal education and the ways they learn outside of school (Levin & Arafeh, 2002), and including the purposeful use of synchronous online learning activities in education may lessen this disconnection. Additionally, this study has the potential to impact the development of professional development activities to support effective teaching in a synchronous online environment, which can, in turn, impact the overall perceived value of online learning resources.

Overview of the Technology Teacher Leader Program

The Technology Teacher Leader (TTL) program was a professional development resource for teachers of the Anchorage School District in Anchorage, Alaska. The TTL program was funded through a combination of the federal Title IID Enhancing Education Through Technology (EETT) program, the federal Title IIA Improving Teacher Quality, and school district operating funds. The TTL program operated for seven years, and each year there were anywhere from 12 to 42 teachers who participated in the TTL program in what was called the TTL project year. It was during the TTL project year that the bulk of the professional development activities occurred although continued support and professional development was offered to all TTL participants even after their TTL project year had concluded. In the end, 213 teachers were part of the TTL program, and evidence exists that the TTL program helped teachers use technology in the classroom in ways that positively impacted student learning (TTL Final Report is Appendix A).

The goal of the TTL program was for participants to gain knowledge and acquire skills and resources in order to increase student learning through the meaningful integration of digital tools into classroom activities. Teams of two to four teachers per school applied to be part of the TTL program, and due to financial limitations only about half of the schools that applied were selected each year. The TTL application consisted of narrative text that described a technologyenhanced project that supported a school-based goal of increasing student learning. The TTL program provided intensive professional development spanning a calendar year with all activities tied directly to the teacher's work with students and/or the implementation of the school-based project. Due to the transformational nature of the TTL program, only teachers that had at least three years of teaching experience were admitted into the program. Each TTL received the professional development tools of a laptop, digital camera, and document camera projector. Additionally, each school-based team of TTL participants selected up to \$10,000 in hardware and software necessary to implement the school-based project that formed the narrative text of the TTL application.

The TTL program was designed to develop a Community of Practice (CoP) as defined by Lave and Wenger (1991), and all professional development activities were grounded in the practice of being a classroom teacher. Professional development activities occurred in the faceto-face, asynchronous, and synchronous environments. Interaction was an integral part of all professional development activities regardless of the venue.

As part of the TTL program, participants earned five graduate credits during the project year, and were expected to read and discuss books, write and revise a philosophy statement regarding the role that the integration of technology plays in the learning process, develop a Unit of Instruction and an introductory "commercial" for the unit, etc. (TTL Syllabi and TTL Application is Appendix B). TTL instructors provided the professional development and were primarily the staff of the Educational Technology Department of the Anchorage School District who had undergone training regarding the process of helping adult learners transform their classroom learning activities so as to meaningfully and wisely integrate technology. To gain a better understanding of the use of synchronous online communication tools associated with the TTL program, TTL participants read and discussed books in a synchronous online learning environment throughout the course of the project year. The books were provided to each of the TTL participants, and the book titles changed throughout the years although all books were on the topic of using technology to enhance student learning of content. Book discussions were held in small groups of four to six TTL participants and were led by a TTL peer or occasionally by a TTL instructor. Both TappedIn as well as Elluminate were used to host the book discussions. TTL participants were also introduced to the synchronous online communication tools of instant messaging and Skype, and were encouraged to use these resources independently of the structured TTL program activities.

Problem Statement and Purpose

This descriptive case study proposed to analyze communication within a multi-channeled synchronous online environment, specifically Elluminate, as Technology Teacher Leader (TTL) participants used it during a discussion regarding the use of Web 2.0 tools in education. The purpose of the analysis was two fold. First, to better understand how the different communication channels (audio, text, and interactive media) were used within the synchronous online communication tool, meaning what kinds of information exchange did each channel facilitate, and two, to better understand the ways in which critical thinking skills were employed in the use of these channels. This study produced a holistic analysis of the use of Elluminate by TTL participants by examining communication in the various channels and their relationship to critical and integrative thinking as they combined to inform a singular communication environment. A self-report demographic questionnaire was also analyzed as part of this study.

Research Question and Setting

The objective of this descriptive case study was to understand whether the use of synchronous online narrative tools of the 21st century supported the process of thinking critically, and to better understand the types of communication that occurred in a communication event that had the potential for a variety of interaction avenues.

TTL participants were invited to participate in this study until a total population of 25 was achieved. To allow for smaller groups when communicating, 5 synchronous online conversations that followed the same lesson plan were conducted, and the 25 TTL participants who agreed to be part of this study selected a session time that best matched their availability. Each session was approximately 90 minutes in length. The synchronous online discussions were held in the multi-channel (audio, text, and interactive media) synchronous online communication tool of Elluminate. TTL participants were familiar with other synchronous online communication tools (e.g., instant messaging, Skype, and TappedIn); however, Elluminate was selected as the tool to be used in this study since Elluminate offers multiple avenues of communication (audio, text, and interactive media), and it was used to foster other TTL discussions not associated with this study making it the standard synchronous online communication tool used within the program.

The lesson plan followed during each session included using whole and small group discussions, adding thoughts to the interactive whiteboard, and polling or voting. The topic of the discussion was related to the use of Web 2.0 tools in education, and the lesson plan had four main sections – *Setting the Stage, Defining Web 2.0, STEM Examples, and 5 Elements.*

The *Setting the Stage* section shared the goal of the session with participants and reviewed the agenda, as well as gave participants a chance to practice using the various communication avenues available in Elluminate. The *Defining Web 2.0* section had participants
read an article previously shared with them (Riedel, 2009) and then they visited a website associated with the article (Lovely, 2009) to explore Gail Lovely's top 10 Web 2.0 tools for young learners. Participants were then asked to write on Elluminate's interactive whiteboard three things that all of the websites had in common. Common thoughts were moved around and grouped on the whiteboard, and then participants collaboratively identified a common definition of Web 2.0 that would be used for the purposes of the session. The STEM Examples section had participants review two lesson plans that were shared with them prior to the session. The lesson plans were created collaboratively with staff from the Educational Technology and the Curriculum and Instructional Support departments in the Anchorage School District. Participants were asked to consider how the lesson plans used technology to enhance the learning of content, and then share insights with other participants. The 5 Elements section of the lesson plan allowed participants to join 2-4 other participants in a breakout room to discuss and identify 5 elements that a Web 2.0 tool does or accomplishes (e.g., connects non-proximal groups). After a period of time where participants discussed and settled on their five elements, everyone returned to the main room and each group added their ideas to Elluminate's interactive whiteboard. Common ideas between the various small groups were moved around and combined on the whiteboard, and then an identifier was assigned to popular thoughts. Participants then individually voted on their top reason for using Web 2.0 tools to enhance learning of content. After the vote findings were shared, the participants had a discussion about the outcome (Lesson Plan is Appendix C).

Although "distance education in its current incarnation has been accorded the status of second best" (Weigel, 2002, p. 45), the examination associated with this study is positioned to help to establish synchronous online learning as a viable educational tool worthy of first best

status. This is especially significant when considering the synchronous learning habits and tools available to the 21st century learner.

Research Question One: In a synchronous online conversation that is action orientated using a multi-channel interface (audio, text, and interactive media), what sort of talk occurs in each channel, specifically, does each channel facilitate a different function of communication?

Research Question Two: What proportion of a synchronous online conversation using audio, text, and interactive media is occupied by critical thinking?

The unit of study is one TTL participant who was employed by the Anchorage School District at the time of the study. A total of 25 TTL participants comprised the study population. TTL study participants engaged in a 90-minute synchronous online discussion in Elluminate, and completed a self-report demographic questionnaire.

This descriptive case study examined the synchronous online discussions through the use of Elluminate's built-in record feature coupled with a self-report demographic questionnaire. According to Merriam (1998), descriptive case studies "are useful in presenting basic information about areas of education where little research has been conducted" (p. 38), which applies to this study. The discussions were analyzed to identify the type of talk facilitated through each of Elluminate's communication channels (audio, instant messaging, interactive whiteboard, and participant feedback tools). Examining documents or artifacts associated with the study setting is a valid data collection strategy to use in a case study (Merriam, 1998). An advantage of using the artifact associated with actual synchronous online discussions is that data of this nature allows the researcher to access the study participant's actual language and words (Creswell, 2003). Elluminate's built-in record feature allowed all interaction to be recorded as it occurred. The recorded discussion became an electronic artifact that was played like a movie for

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analysis. All participant interaction (audio, instant message, participant feedback tools, and whiteboard) was recorded with integrity. To analyze the critical thinking aspect of this study, the Critical and Integrative Thinking Rubric (Washington State University, 2006) measurement tool was used to examine the various interactions for evidence of critical and integrative thinking. Additionally, each study participant completed a self-report demographic questionnaire that included age, years of teaching experience, and teaching area. An open-ended Comment field was also included in the questionnaire to provide an avenue for study participants to share anything they would like regarding the synchronous online discussion on the topic of Web 2.0 use in education. Table 1 identifies specific information related to the design of this study.

Table 1 Study Design

Multi-channel	Number of	Length of	Data Collection Methods		
Synchronous	Study	Discussion			
Online Tool	Participants				
Elluminate	N = 25 (Note:	90 minutes	Elluminate's	Self-Report Demographic	
(Communication	Discussions		built-in	Questionnaire (Questions	
channels	were held in		record	asked were: age, years of	
included: audio,	small groups		feature	teaching experience,	
instant message,	ranging from			teaching area, and	
participant	3 to 7 study			comment option for	
feedback tools,	participants)			participants to share	
and whiteboard)				anything they would like	
				regarding the synchronous	
				online discussion on the	
				topic of Web 2.0 use in	
				education)	

The research questions associated with this study were designed to examine the types of communication and whether critical thinking was employed within the various communication channels of a synchronous online communication tool. Critical thinking is foundational to this study, as there exists a need to know whether communicating synchronously online contributes to the process of thinking critically.

Study Considerations

As mentioned previously, the purpose of the TTL program was to increase teacher competence regarding the integration of technology into classroom activities in order to increase student learning, and participants of the TTL program comprised the study population. Teachers from all levels of the Kindergarten through12th grade (K-12) school environment (elementary, middle, and high) were involved in the TTL program; however, the elementary teacher comprised the majority of the overall TTL population. All TTL participants received equivalent technological tools and professional development opportunities, and have participated in synchronous online learning activities themselves through the professional development activities associated with the TTL program. Additionally, all TTL participants have implemented and assessed the impact of a technology-enhanced project with their students.

It is important to note that the population of study participants is not a random sample of teachers, as TTLs had to apply and be selected in order to be part of the TTL professional development program. The advantage of eliminating variables such as access to technology was a factor in the selection of the TTL participants as the study population. The review of the literature identified that previous experience using the online tool included in the study was a factor that positively contributed to evidence of critical thinking (Bullen, 1998), and thus having a study population with equivalent experiences helped to lessen the impact of an obvious barrier to this study. Additionally, this researcher had facilitated professional development activities and provided support to all of TTL participants, which makes them a group that this researcher had access to in order to accomplish this study.

The review of the literature identified that professional development activities for teachers should be grounded in the same pedagogy as what is needed for students (Barab et al.,

2001). Although this study focused on the use of synchronous online communication with teachers, the overall intent was to study teachers so as to positively impact student learning in the K-12 environment.

Seven findings were identified from the review of the literature (critical thinking must become part of the curriculum, learning involves action, real-time interaction supports the social construction of knowledge, online learning changes the teacher and student roles, collaboration facilitates learning, communication makes thinking visible, and assessment must address the quality of the interaction). Out of this broad perspective, two research questions were formulated to serve as a focus for this study. The next step was to select the most appropriate methodology to explore the type of communication facilitated by the various channels (audio, text, and interactive media) in a multi-channeled synchronous online communication environment while also exploring how critical thinking skills were employed within each of the channels.

Methodology

A case study methodology was selected for data collection due to the researcher's desire to understand the function of the participant interaction, and to examine the interaction for evidence of critical thinking. As discussed by Merriam (1998), case studies are appropriate when researchers are interested in insight and interpretation, which is consistent with the purposes of this study.

The case studied was a synchronous online action-orientated conversation between TTL participants that used a multi-channel (audio, text, and interactive media) interface. Specifically, this researcher sought information regarding the type of talk that occurred in each channel, and whether the channels facilitated different functions of communication. Additionally, this researcher was interested in understanding whether there was any evidence of critical thinking

that emerged within the interaction conducted through the various channels of communication. Case study methodology is appropriate for this study due to the purpose of investigating the extent to which the channel of interaction can be paired with the desired educational goal, and the extent to which critical thinking skills can be fostered through multi-channeled synchronous online communication event.

Why a case study? A variety of other methods were examined but discarded. Specifically, a phenomenological study was not selected due to the nature of phenomenology being focused on the core or essence of a phenomena or experience (Morse & Richards, 2002) as opposed to an examination of evidence, as was the focus of this study. Although the focus of this research did fit into the broad category of phenomenology, this study had boundaries that delineated what would and would not be studied (Merriam, 1998) and therefore was most consistent with the case study methodology.

Bannan-Ritland (2002) conducted a literature review of computer-mediated communication, eLearning, and interactivity studies. This review showed that the majority of research in these areas revolves around asynchronous communication, and consequently there is a need for empirical evidence regarding the use of synchronous communication in online educational environments. Additionally, there was a need for research to focus on the actual value of interaction vs. counting participation. "Additional studies involving synchronous communication would enrich the literature Research incorporating intrapersonal aspects of interactivity or learner-self types of interaction, such as metacognitive or cognitive process, would also improve the literature base" (Bannan-Ritland, 2002, p. 173). Thus, this case study, as designed, has the potential to contribute to the larger research base in a significant and necessary fashion.

Evidence exists in the literature to support a case study methodology when assessing thinking and/or interaction skills in online education. Bullen (1998) used a case study methodology to examine critical thinking in student discussion questions posed in a postsecondary course that used online asynchronous methods to communicate. A case study methodology was used by Rourke and Anderson (2002) when they studied the effectiveness of using peers to facilitate discourse in a post-secondary online asynchronous course. The appropriateness of case study methodology is not limited to the asynchronous environment when studying the assessment of thinking and interaction skills. For example, Cooney (1998) used a case study methodology to examine the interactions of high school English students using a synchronous online communication tool compared to student interactions in a face-to-face environment.

Case study to investigate phenomenon. As discussed previously, the most appropriate method to examine the impact of synchronous online communication on interaction and critical thinking skills found in data involves case study methodology. Although a case study is not a phenomenological study, it is designed to study phenomenon. "By concentrating on a single phenomenon or entity (the case), the researcher aims to uncover the interaction of significant facts characteristic of the phenomenon" (Merriam, 1998, p. 29). Consequently, the framework of using the case chosen to study, which is the examination of the process of interacting and thinking critically during multi-channel (audio, text, and interactive media) synchronous online communication, correlates with this researcher's intention as well as the situation being studied.

Research Procedures

This study involved three data sets that were collected during a multi-channel (audio, text, and interactive media) synchronous online discussion and through completion of a self-

report demographic questionnaire. The three data sets include: an examination of the types of

communication TTL study participants used in each of the channels (audio, text, and interactive

media), an examination of how critical and integrative thinking was employed by TTL study

participants, and a self-report demographic questionnaire that included age, years of teaching

experience, teaching area, and comments study participants wanted to share about the discussion

itself. (Data Sets are included Table 2).

Table 2 Data Sets

Data Set 1: An examination of the types of communication TTL study participants used in				
each of the channels (audio, text, and interactive media) during a multi-channel synchronous				
online discus	ssion.			
Qualitative	Elluminate, a fat chat, multi-channel synchronous online communication tool,			
_	was used to host the synchronous online discussions associated with this study.			
	Each Elluminate session was recorded using the built-in record feature. Data			
	gathered through the use of this method was analyzed through a qualitative			
	process to identify whether any trends emerged regarding the use of the various			
	channels (audio, text, and interactive media).			
Data Set 2: A	An examination of how critical and integrative thinking skills were employed by			
TTL study p	articipants during a multi-channel (audio, text, and interactive media) synchronous			
online discus	ssion.			
Qualitative	The Critical and Integrative Thinking Rubric designed by Washington State			
	University's Critical Thinking Project (2006) was used to examine the			
	communication conducted by TTL study participants during a multi-channel			
	(audio, text, and interactive media) synchronous online discussion. The			
	Elluminate session was recorded using the built-in record feature. The Critical			
	and Integrative Thinking Rubric uses linguistic analysis to identify the presence			
	of critical and integrative thinking occurring in the text being studied.			
Data Set 3: Self-report data regarding age, years of teaching experience, teaching area, and				
thoughts study participants wanted to share about the discussion itself.				
Qualitative	All TTL study participants completed a self-report questionnaire that included			
	data regarding age, years of teaching experience, teaching area, and an open-			
	ended, narrative question (share anything you would like regarding the			
	synchronous online discussion on the topic of Web 2.0 use in your classroom).			
	This data was analyzed to better understand the study population.			

Description of the study participants. The participants for this study included 25

teachers who were part of the TTL program, which was associated with the Anchorage School

District in Anchorage, Alaska. The teachers ranged in age from 37 to 59, and had from 7 to 25 years of teaching experience. At the time of the study, 10 of the teachers worked with adults or in specialized situations (e.g., educational technology department, elementary counseling), and the remaining study participants where classroom teachers with students at the primary elementary (N = 3), intermediate elementary (N = 7), middle school (N = 3), and high school (N = 2) levels.

Description of the case studied. A pilot and five study sessions were held using Elluminate, which is a synchronous online fat chat tool that allowed participants to communicate though a variety of channels (e.g., audio, text, interactive whiteboard, polling, file sharing, participant feedback tools). Each of the sessions followed a standardized lesson plan, and Dr. Enid Silverstein who was known to the study participants facilitated each session. Martina Henke, who was also known to the study participants provided primarily technical support and assisted Dr. Silverstein in the implementation of the lesson plan. At the time of the study sessions, Dr. Silverstein was just about to or had recently retired as the Executive Director of Curriculum and Instructional Support in the Anchorage School District, and Mrs. Henke was the Language Arts Coordinator for the District.

Three non-TTLs participated in the pilot session, and a total of 25 TTLs participated in the various study session day and time options available to them. Specifically, 5 TTL's participated in the first study session opportunity, 4 in the second opportunity, 6 in the third opportunity, 7 in the fourth opportunity, and 3 in the fifth and final opportunity. The pilot and 5 study sessions were held in June and September of 2011. The study sessions were held outside of the TTL's contracted work time, and each session was designed to take 90 minutes.

The purpose of the pilot session was twofold. First to give the session facilitator an opportunity to practice and refine the lesson plan, and secondly to give this researcher and the

person checking for inter-rater reliability, Dr. Cathy Anderegg, an opportunity to ensure that this researcher was coding correctly for both of the research questions.

Each study session included the following: a welcome; overview and statement of the goal for the session; opportunity to practice using the various communication channels; an activity to develop a common definition of a Web 2.0 tool, which included reading an article and reviewing a website to identify 3 things that the 10 identified Web 2.0 tools had in common; an examination of 2 Science, Technology, Engineering, and Math (STEM) lesson plans to discuss how technology was used to enhance the learning of content and how Web 2.0 could have been used to extend the learning opportunities; and a small group discussion that identified 5 elements that a Web 2.0 tool accomplishes (e.g., lets students be creative beyond taking notes or answering questions), which was later voted on by the larger group of all study participants in each session to identify the biggest bang for the buck regarding the use of Web 2.0 tools to enhance learning. Each session ended with a statement of appreciation, and a request to complete the self-report demographic survey. This researcher was not part of any of the study sessions, although this researcher did work closely with Dr. Silverstein in the development the lesson plan that was followed during the study sessions, and did coordinate with study participants to make necessary arrangements for each one to participate in the study. Elluminate recorded everything that happened in the main room, and the session could be played back in a similar manner to watching a video. The recorded file was transcribed and then coded for both of the research questions.

Two different kinds of assessments were applied in the coding process. A rubric was created for each of the research questions that included operational definitions and examples to showcase how the element looked in the data itself. Similarly to the pilot data, Dr. Anderegg checked this researcher's coding for both of the research questions to ensure inter-rater reliability.

Instruments. Three instruments were used in association with this study. The main instrument was the recorded interaction during the synchronous online discussion held in Elluminate. The second instrument was the Critical and Integrative Thinking rubric, which was designed by Washington State University's Critical Thinking Project (2006) to operationalize successful critical thinking. The Critical and Integrative Thinking Rubric was designed to "integrate assessment with instruction in order to increase coherence and promote higher order thinking" (Washington State University, 2006). The third instrument used in association with this study was a self-report demographic questionnaire that identified the study participant's age, years of teaching experience, teaching area, and also gave them an opportunity to share anything they would like regarding the synchronous online discussion on the topic of Web 2.0 use in education.

Recorded interaction. Elluminate, the vehicle used for the multi-channel (audio, text, and interactive media) synchronous online discussion, provided a built-in resource to record the entirety of the interaction that occurred during each of the study sessions. The recorded Elluminate interaction automatically became a movie that was played and replayed to examine the various aspects of the interaction. All public text chat, audio, use of the interactive whiteboard and participant feedback tools, as well as polling activities were automatically included in the record of the synchronous online discussion. All aspects of the interaction were transcribed into one document to assist in the analysis.

Critical and Integrative Thinking rubric. The Critical and Integrative Thinking Rubric (Washington State University, 2006) was designed to provide feedback regarding critical

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thinking in academic activities so as to foster the increase in critical thinking skills. The Critical and Integrative Thinking Rubric was used to identify evidence of critical and integrative thinking in the transcribed data of the discussions held by TTL participants. The Critical and Integrative Thinking Rubric can be used in many ways, and the use in this study was consistent with the design of the instrument. Permission to use the Critical and Integrative Thinking Rubric was granted by the Washington State University's Critical Thinking Project Director. (Critical and Integrative Thinking Rubric is Appendix D).

Self-report demographic questionnaire. Specific questions were asked of study participants in order to better understand the study population. The self-report demographic questionnaire included the study participant's age, years of teaching experience, teaching area, and offered them an opportunity to share anything they wanted regarding the synchronous online discussion on the topic of Web 2.0 in education. (Self-Report Demographic Questionnaire is Appendix E). The self-report demographic questionnaire was available through a webpage interface hosted by Survey Monkey (http://www.surveymonkey.com/).

Validity of instrumentation.

Recorded interaction. The recorded interaction facilitated by the built-in record feature within Elluminate was a factual representation of each study participant's contribution to the synchronous online communication as it actually occurred. The final product was not edited in any manner, and all aspects of interaction were transcribed prior to analysis.

Critical and Integrative Thinking rubric. The Critical and Integrative Thinking Rubric evolved from a previous project at Washington State University where seven dimensions of critical thinking were identified. The seven dimensions were based on research and had been refined through implementation. The goal of the original project was to develop a rubric that

would "provide a process for improving and a means for measuring students' higher order thinking skills" (Kelly-Riley, Brown, Condon, & Law, 2001, p. 7). The impact of the original critical thinking project at Washington State University provided evidence that the use of the rubric did have an impact on a student's ability to think critically, as evidenced in writing assessment data, which indicated that the seven dimensions identified in the rubric were valid elements of critical thinking.

The original rubric evolved through use, but the same seven dimensions of critical thinking were still the elements assessed in the version of the Critical and Integrative Thinking Rubric that is associated with this study. The tool was proven to have inter-rater reliability of 80%, and the tool has proven to be effective in increasing critical thinking skills. Students who use the critical thinking rubric "increase three and a half times as much in a course that overtly integrates the rubric into instructional expectations, compared with performances in a course that does not" (Kelly-Riley et al., 2001, p. 9). This evidence indicates that the Washington State University's Critical Thinking Project has developed a product, the Critical and Integrative Thinking Rubric, that is not only a valid assessment of a person's use of critical thinking skills, but also can prove to be a tangible tool to transform the practice of integrating critical thinking skills, skill development into the process of education.

Self-report demographic questionnaire. The use of a self-report demographic questionnaire is a viable instrument to use when considering a qualitative study (Creswell, 2003). Since the self-report demographic questionnaire used is unique to this study, it had not been previously tested regarding validity measures; however, the self-report demographic questionnaire results were only used to describe the study sample.

Procedures. The data collection methods outlined previously occurred in the following order:

Discussion lesson plan created. The discussion facilitator, Dr. Silverstein, along with this researcher created a lesson plan for the study sessions on the topic of Web 2.0 tools in education. Accompanying PowerPoint slides were created and used in Elluminate during the pilot and study sessions. The lesson plan included whole group, small group, interactive whiteboard, and polling activities. After the pilot session, Dr. Silverstein and Mrs. Henke slightly modified the lesson plan and subsequently the PowerPoint slides in order to accommodate facilitator and pilot participant feedback (see Appendix C.)

Identification of study participants. Forty-six of the 213 TTL participants were invited to participate in the study. In order to facilitate easy access to email addresses, only TTLs employed by the Anchorage School District at the time of the study were considered for inclusion in the study. The Assessment Department of the Anchorage School District had given this researcher permission to contact TTLs by their District email (see Appendix F). To limit the list further, the selection criteria for TTLs invited to participate in the study included TTLs who had previously expressed interest in the topic of Web 2.0 tools, and TTLs who previously expressed interest in continuing discussions amongst TTLs even though the program had ended.

An initial mass email was sent to all of the selected 46 TTL participants at their Anchorage School District email address. The initial email included a description of the study's purpose and process, as well as the Informed Consent agreement (see Appendix G). At the time of the initial email, this researcher planned on having just two discussions with 15 TTLs in each discussion group; however, schedule restraints on the part of the TTLs interested in being part of this study necessitated additional session date and time options. The email also identified Dr. Enid Silverstein as the discussion facilitator. In order to maintain anonymity of the study participants, the initial email was sent using the Blind Carbon Copy feature of email.

Although a number of TTLs responded to the initial email that they would be interested in being part of the study, the suggested dates were not good options for virtually all interested participants. Consequently, a number of other individual emails were sent to the 46 individuals selected to be part of the study (see Appendix H) in order to identify date and time options that worked for the potential study participants. The shift from a mass email to individual emails was done to ensure that the emails did not end up in potential study participant's email spam filters, and to help in the organization of the email communication between this researcher and each of the study participants. All potential study participants were included throughout the successive iteration of emails except for those who indicated that they would not be available during the timeframe or were not interested in participating in the study. In the end, three study sessions were held in June 2011 and two in September 2011, and the 25 study participants came from the initial 46 selected for consideration.

TTL participants who agreed to participate in the study and would be available at one of the date and time options returned their Informed Consent either via email, fax, or by traditional mail. The Informed Consent stated that the participant could withdraw from the study without harm at any time, and that the agreement to participate in the study included the expectation that participants would complete both aspects of this study (participating in a synchronous online discussion, and completing a demographic survey).

A confirmation email was sent to each study participant prior to the study session where he/she would participate. The email included an article about Gail Lovely's Top 10 Web 2.0 Tools for Young Learners and two STEM lesson plans created in the Anchorage School District, all of which would be used during the study session (see Appendix I). In order to ensure anonymity, each study participant was assigned a unique number, which they used in place of their name during the synchronous online conversation and completion of the self-report demographic questionnaire. The confirmation email reminded each study participant of his/her unique number.

Elluminate training session. This researcher offered to hold individual optional training sessions for pilot and TTL study participants regarding the use of Elluminate; however, no one expressed any interest in being part of a training session. Consequently, the lesson plan was modified to include some training/refreshing in the use of the tools within Elluminate during the actual pilot and study sessions.

Pilot activities. Three non-TTL participants were part of a pilot discussion that followed the same protocol as outlined for the study. Dr. Silverstein facilitated the pilot session with technical support provided by Mrs. Henke. The pilot participants gave their Informed Consent and were assigned a unique number to use during the synchronous online discussion and completion of the self-report demographic questionnaire. In addition to the opportunity to provide practice implementing the lesson plan, the data from the pilot served as an opportunity to provide training in the rubrics and ensure inter-rater reliability for the coding process.

Self-report demographic questionnaire. This researcher created an online survey containing the self-report demographic questions. The web-based tool called Survey Monkey was used to create the survey for pilot and study participants to use. Data from the self-report demographic questionnaire was exported from Survey Monkey and then analyzed on this researcher's computer.

Data collection. At each of the identified time options, TTL study participants along with the discussion facilitator and person providing technical assistance logged into Elluminate. Each TTL was provided a laptop through the TTL program, and thus each study participant had independent access to a computer that could be connected to the Internet. The Elluminate resource automatically recorded each of the pilot and study sessions in a manner that allowed for playback and analysis.

In order to protect the anonymity of the study participants during the discussions and in the transcript data, each participant was directed to log into Elluminate using their assigned unique number. Each discussion followed a lesson plan that was consistent for all date and time options. Once the Elluminate discussion ended, study participants were encouraged to immediately go to the online survey tool and complete the self-report demographic questionnaire. Participants were told that each participant who completed both the 90-minute Elluminate discussion and the online self-report demographic questionnaire would be entered into a drawing for the chance to win one of two, fifty-dollar (\$50.00) Amazon gift cards. All pilot and study participants participated in both the synchronous online discussion and completed the self-report demographic questionnaire. Once all of the study sessions were concluded, the drawing was conducted and the two winners contacted. This researcher then transcribed the interactions during the synchronous online discussions including information from all communication channels (audio, instant messaging, interactive whiteboard, and participant feedback tools) used by the pilot and study participants. Each session was transcribed individually, and then all data was combined in order to facilitate the data analysis process.

Table 3 describes the relationship between the research questions associated with this study and the evidence that was gathered to facilitate answering the questions.

Research Question	Nature of Evidence	Instruments	Source
One: In a synchronous	Transcripts of the	Elluminate's	Elluminate
online conversation that is	discussions held in	Record feature	
action orientated using a	Elluminate were analyzed		
multi-channel interface	to see if any trends		
(audio, text, and interactive	emerged between the		
media), what sort of talk	nature and frequency of		
occurs in each channel,	how the various channels		
specifically, does each	(audio, text, and interactive		
channel facilitate a	media) were used within		
different function of	the multi-channeled		
communication?	synchronous online		
	environment.		
Two: What proportion of a	The Critical and	Critical and	Washington
synchronous online	Integrative Thinking	Integrative	State
conversation using audio,	Rubric was used to	Thinking	University's
text, and interactive media	examine the interactions	Rubric	Critical
is occupied by critical	for evidence of critical		Thinking
thinking?	thinking.		Project (2006)

Table 3Summary of the Relationship Between Research Question and Evidence Gathered

Identification of themes. A review of the literature was conducted to search for themes that could be used to examine the different functions of communication pertinent to research question one. These themes were documented, and analyzed in light of relevance to what might be found in the data associated with this study. Additional themes surfaced through the analysis of the transcription, and then the themes were vetted further to see which ones were most closely aligned with the topic and nature of the study sessions.

The following six themes emerged from the data: assertion; build logical reasoning; endorsement; off-topic/social/logistical; content questions; and reflect/think aloud. These six themes were the functions of communication that became the lens through which the data was parsed and analyzed. All data was able to be coded within these six themes except as follows: Dr. Silverstein's and/or Mrs. Henke's directions, context, and general comments designed to support the facilitation process (e.g., positive feedback); data related to the practice of using the various channels to communicate; communication that occurred in the breakout rooms amongst small groups of participants; and non-functional communication data that was included in the transcription to provide a realistic picture of the study session event (e.g., releasing microphone control, entering or leaving a room or the session, documenting what showed on the whiteboard, entering audio set-up). Table 4 provides an operational definition for each of the six themes or functions of communication, and an example from the data for each function. Table 4 served as the coding rubric for research question one.

Table 4Rubric for Research Question One

Function of	Definition and Example
Communication	
Assertion	Making a statement of belief or experiences
	Audio: 14 stated that he didn't know if it was a definition, but he
	definitely felt that kids want a bigger audience, as compared to a
	classroom. That YouTube video or Vimeo get lots of hits that students
	like, and they don't build things just for him as the teacher. He went on to
	say that when students build things for a bigger audience they are more
	engaged in the process than when it is just for the teacher or for the
	classroom. (9/15 @ 0:34:52)
Build Logical	Identifying a series of steps or propositions that may be linked to models
Reasoning	Rechtlying a series of steps of propositions that may be mixed to models
Reasoning	Audio: 12 stated that it is important to see that these were not
	Addio. 12 stated that it is important to see that these were not
	conadorative projects, and that there has been a shift in our awareness
	and access to collaboration on the web. She thought that both of these
	projects were projects designed to teach technology and build content
	knowledge, but not really apply technology in the deeper sense. One of
	the things that has really stuck with her the quote that "technology is not
	the project, but it is how the project gets done". (6/21 AM @ 1:26:06) 12
	continued and stated that both of these are good starting-level - learn how
	to use technology lessons - but they lack the more intense application of
	using technology to learn the content. (6/21 AM @ 1:26:39) 12 stated
	that while Enid was speaking she had a final thought that both of these
	lessons appear to be done by individual students, so it would be nice to
	see the extension - even with the lessons as they are - to some type of
	sharing of the data in the end or

(continued)

Function of	Definition and Example
Communication	
Build Logical	analysis in the end. It is kind of left hanging in both of these, as to what
Reasoning	the purpose of the assignment is, so the Web 2.0 could easily be included
(continued)	as part of this lesson without changing too much of the original design. (6/21 AM @ 1:29:19)
Endorsement	Agreeing with a statement made by someone else often providing an
	example from personal experience
	Audio: 21 wanted to reiterate what has already been said. When she
	taught 4th grade she used these lessons, but she can see how the use of
	the Web 2.0 tools really kicked it up a notch just like Enid had said. (9/12
	@ 1:17:40)
Off-topic/ Social/	Sharing a comment that is not directly related to the current discussion
Logistical	
	IM 37: Hello from 37 (6/21 PM @ 0:26:17)
Content Question	Making a request for information that is related to the content
	Audio: 12 asked if Team 1 had a scribe - Room 1 (6/21 AM @ 1:48:59)
	12 asked if there were any volunteers (6/21 AM @ 1:49:12)
	Audio: 22 asked if they can go back in the room and get them to copy
	(6/21 AM @ 1:49:21)
Reflect/Think	Sharing thoughts that are introspective in nature or indicate a
Aloud	spontaneous comment arising from the conversation
	IM 14: Instead of using ExcelGoogle Docs Spreadsheet and then use
	the graph function. (9/15 @ 0:43:21) I wonder if you could use photo
	booth to take pictures of your teeth (9/15 @ 0:43:59)

Of significance to the study are the channels of communication. The channels did not need to emerge from a coding process, as Elluminate identified them by nature of inclusion in this synchronous online tool. The channels of communication used by participants when communicating via one of the identified functions of communication (e.g., assertion) included the following: audio; instant message; interactive whiteboard; polling; and the participant feedback tools of clap, smile, and thumb down.

As pertains to research question two that examined the critical thinking component, Washington State University's Critical and Integrative Thinking Rubric uses linguistic markers to indicate of the level of critical thinking evident in the text being studied. Four of the seven areas or elements identified in the Critical and Integrative Thinking Rubric were highlighted as being potentially present in the relatively short narrative examples associated with this study's data; a statement of less than or equivalent to a paragraph vs. a multi-page paper. The four elements that were selected for inclusion in this analysis were as follows: identifies and considers the influence of context and assumptions; develops, presents, and communicates own perspective, hypothesis or position; presents, assesses, and analyzes appropriate supporting data/evidence; and integrates issue using other perspectives and positions. The three elements not selected for inclusion in the study were as follows: identifies, summarizes (and appropriately reformulates) the problem, question, or issue; identifies and assesses conclusions, implications, and consequences; and communicates effectively.

The Critical and Integrative Thinking Rubric provides progress indicators regarding each element (emerging, developing, or mastering) with sub-level ratings of 1 or 2 for emerging, 3 or 4 for developing, and 5 or 6 for mastering. Since the research question associated with this study did not address the level to which critical and integrative thinking was present in the conversation but rather focused on the proportion of the synchronous online conversation that was occupied by critical thinking, the progress indicators (e.g., emerging) and sub-level ratings (e.g., 1 or 2) were not included in the rubric used to assess the critical and integrative thinking Rubric itself, a score of 4, which falls within the developing progress indicator, represents competency. Consequently, the operational definitions for the rubric elements associated with analyzing research question two of this study includes information from the developing level of Washington State University's Critical and Integrative Thinking Rubric. Table 5 provides an operational definition for each of the analyzed elements from the Critical and Integrative Thinking Rubric, and an example from

the data for each element. Table 5 served as the coding rubric for research question two, and is

based on Washington State University's Critical and Integrative Thinking Rubric.

Table 5

Rubric for Research Question Two

2. Identifies and considers the influence of context* and assumptions. (*other people's cultural, as well as academic perspectives)
Provides some recognition of context and consideration of assumptions and their implications.
Audio: 26 went on to state that he had a couple of thoughts when he was reading each of the lesson plans. He was thinking about around 4th grade, and that we are really tied into the step by step of the software; that the idea of graphing really became caught up in the formalities of how to you use and create a spreadsheet. Then he was thinking about how good it would be to use something like the link he would post. (9/15/11 @ 0:55:46)
3. Develops, presents, and communicates OWN perspective, hypothesis or position. Position includes some original thinking that acknowledges, refutes, synthesizes or extends other assertions.

Audio: 22 continued that since this is using technology, she thought that if Google Docs were used students could be comparing the collection of data especially when using the brightness meter, and so on. This would give them a chance to check in to make sure they were measuring correctly, or ask why is that data so different from what they have collected. This would help to create some questioning and also help to encourage checking validity, if that makes sense. As she was looking at the Teeth one, she was thinking that Glogster would have been so much fun to integrate, as it is a Web 2.0 tool where you could add some things that might engage students like with some audio. Perhaps the teeth could talk about what their job is and those types of things. The lessons encouraged the use of technology, but she didn't see the use of Web 2.0 applications in either of them. (6/21/11 @ 1:23:49)

4. Presents, assesses, and analyzes appropriate supporting data/evidence. Discerns fact from opinion and may recognize bias in evidence.

Audio: 21 shared that over the years she has noticed that students are not as engaged in the learning process as they used to be, and that technology seems to engage them. Participant 21 seeks to facilitate what they are engaged in through technology so she can incorporate standards they need to be proficient in. (9/12/11 @ 1:38:49)

5. Integrates issue using OTHER (disciplinary) perspectives and positions.

Acknowledges and integrates different ways of knowing. Some evidence of reflection and/or self-assessment.

Audio: 26 continued and stated that he was trying to get his mind to think how a kid today would benefit by using a program where he is kinda stuck in the box that is in front of him. He was thinking that some of this stuff could be done a different way. (9/15/11 @ 0:56:56)

Protection of human subjects. Each study participant was assigned a unique number and all data collected through this study only referenced the assigned number. All data associated with this study will be securely stored for three years as required by the human subjects review process. Once the period of three years has elapsed, this researcher will completely destroy all data in a manner that ensures the continued anonymity of the study participants. Participation in this study is voluntary and involved no physical risk. This researcher has successfully completed training regarding the protection of human subjects (see Appendix J) and received Pepperdine University's Institutional Review Board approval to conduct this study (see Appendix K).

The recorded Elluminate interaction data and the responses shared in the online Survey Monkey tool are distinctly different than the other data collection measures used in this study in that this researcher cannot assure the confidentiality and destruction of this data. Both of these resources may maintain a record of the interaction in their files. However, in both of these cases the participants are identified only by a unique number associated with this study, and thus even if the service provider does keep a copy of the interaction, there is no potential of harm to any of the participants.

Inter-rater reliability. This researcher provided the initial analysis of the data associated with this study, and another individual who holds a doctorate in the field of education, Dr. Anderegg, also reviewed all data and analysis associated with this study, so as to confirm or question the findings of this researcher.

To ensure consistent use of the previously validated instrument, the Critical and Integrative Thinking rubric, Dr. Anderegg and I discussed the modified rubric to ensure that we had a common understanding regarding the intent, terminology, and the process of using the rubric. Then, each of us used the rubric on the discussion held by the three pilot participants. Our goal was to achieve at least an 80% level of inter-rater reliability, which we achieved in our review of the pilot and study data, as this is the level achieved when the Critical and Integrative Thinking Rubric was used in the Critical Thinking Project activities associated with Washington State University.

For the study data, inter-rater reliability was at 99% (595 out of 601 items) regarding the functions of communication used to answer research question one. The coding of the critical thinking using the modified Critical and Integrative Thinking Rubric showed 87% (199 out of 228 items) consistency between reviewers, with 66% of the differences being that the validator would have added evidence of critical and integrative thinking to the coded comments, and 34% of the time the validator would have removed a rating.

Role of the Researcher

This researcher had been intimately involved in the visioning, development, and implementation of the TTL program since it's inception in 2003. During the time of this study, this researcher was no longer employed with the Anchorage School District nor was the researcher directly or indirectly involved in the TTL program; however, a personal relationship did exist with each TTL participant and this researcher. This study was designed to harness the power afforded by these relationships while ensuring that the integrity of the data remained in tack. Specifically, this study was designed to understand the types of interaction that occurred in multi-channel (audio, text, and interactive media) synchronous online communication event and of critical and integrative thinking that occurred in that event, and did not attempt in any way to better understand the TTL program itself.

The analysis of both of the research questions associated with this study is shared in Chapter four. Additionally, the essential role of audio and unexpected findings is presented.

Chapter Four: Findings

This study had two separate but connected purposes. First, to better understand how study participants used the different communication channels (audio, text, and interactive media) available to them in a multi-channel synchronous online environment, and secondly, to better understand the ways in which critical and integrative thinking skills were employed in the use of these communication channels. In summary, this study examined communication in the various channels of communication and their relationship to one another as they combined to inform a singular communication event. Chapter four examines the two research questions in depth showing the distribution of the data that looked at both the channels and the functions of communication, examines the essential role of audio when considering critical and integrative thinking, and shares some unexpected findings.

Overview of Participants

The nature of this group of participants can be described by what they had in common. They were all part of the Technology Teacher Leader (TTL) program, which meant that they participated in a yearlong professional development program that revolved around using technology to enhance the learning and teaching process, they had an explicit expressed desire to learn about the role technology plays in the learning process, they wrote and implemented units of instruction that used technology to enhance student learning of content, they worked with colleagues at their school to implement and evaluate a technology-based project that helped the school meet an identified goal (e.g., increase reading scores), and they experienced similar expectations and events in the professional development process.

In total there were 7 distinct groups of TTL's in the Anchorage School District with one group occurring each of 7 subsequent years. The TTL program created a supported community

of K-12 teachers who became leaders in the area of technology integration at their school and eventually many moved into leadership positions at the district level. The TTL program had a saying, *Once a TTL ~ Always a TTL*. Consequently, even though the 25 study participants came from any of the 7 TTL program years, there existed a sense of community amongst all of the 213 TTL's that participated in the program throughout the years.

Study participants were asked to complete a self-report demographic questionnaire after the conclusion of their synchronous online discussion. The questionnaire gave participants an opportunity to share any comments they would like regarding the discussion, which focused around the use of Web 2.0 tools with students. The following comments from the survey accurately portrays the desire to learn from and with each other that helps to define the nature of the TTL program and participants:

This was a good discussion, in spite of our small group. It was really nice to be inspired again by talking about the tools and how they, in turn, can inspire my students. I was intrigued by the top 10 lists and now have a few more things to explore during this summer break. I hope to be able to seamlessly incorporate some more of these tools into my classes next year (study participant 37). Teachers do not get enough time to share experiences and successes. The more creative ways we can develop to share, the better teachers we all become (study participant 9).

Research Question One

Research question one addressed two variables, the channels and functions of communication. When considering the channels of communication used by participants in this study (audio, instant message, interactive whiteboard, and participant feedback tools that included clap, smile, thumb down, and polling feature), the channel of instant message was used most frequently at 48% (N=289) of the time, with audio and whiteboard used the next most frequently at 26% (N=154) and 17% (N=101) respectively. An example of the participant interaction that occurred in the instant message channel during the *Defining Web 2.0* section of the lesson plan is as follows¹:

33: I like the use of language idea. good one

33: A definition of web 2.0 tools?

37: An easy way to collaborate, inspire and share ideas?

33: nice

Facilitator: nice one 37

37: Thanks

33: A tol that does not reside in one place that allows users to share, create, and collaborate

33: tool

9: Increase participation in sharing ideas and concepts over distances and places.

4: easily used across grade level

9: multi-cultural

33: Me too!

4: I was pleasantly surprised that there were so many I was not aware of.

4: I too was excited about the graph app.

33: Graph app is cool!

Figure 1 shows the overall percentage of coded comments for all of the communication channels used by participants in this study, and Table 6 shows this same base data by count.



Figure 1. Overall percentage of coded comments distributed by communication channels.

Table 6

Count of Coded	<i>Comments</i>	Distributed	by Com	nunication	Channels
			~		

	Audio	Instant	Interactive	Participant	Totals
		Message	Whiteboard	Feedback	
Assertion	67	69	86	0	222
Build Logical	20	1	0	0	21
Reasoning					
Content	5	17	1	0	23
Question					
Endorsement	11	39	6	13	69
Off-Topic/	45	153	8	44	250
Social/					
Logistical					
Reflect/Think	6	10	0	0	16
Aloud					
Totals	154	289	101	57	601

When considering the functions of communication examined in this study (assertion,

build logical reasoning, content question, endorsement, off-topic/social/logistical, and

reflect/think aloud), the function of off-topic/social/logistical occurred the most frequently at 42% (N=250) of the time, with the next most frequent functions being assertion and endorsement, which occurred 37% (N=222) and 11% (N=69) of the time respectfully. An example of the participant interaction that was coded as the function of off-topic/social/logistical during the *STEM Examples* section of the lesson plan is as follows:

- 2 took control of the mic but did not say anything at first, and then he could be heard wondering what is going on. Then he asked if they could hear him now. (Audio channel)
- 46 and Martina smiled (Participant Feedback Tool)
- 2 continued and indicated that he did not see anyone giving him acknowledgement that he could be heard, and that was disappointing. (Audio channel)
- 27 clapped (Participant Feedback Tool)
- 2 continued and saw that 27 said they could hear him (Audio channel)
- 27: yup (Instant Message channel)
- Technical Assistant: now we do (Instant Message channel)
- 2 continued and read "now we do", which was excellent (Audio channel)
- 27: :) (Instant Message channel)
- 46 smiled (Participant Feedback Tools)

Note: 2 makes assertions in the Audio channel that shared in the Audio section below

2 stated that he hoped everyone heard him that time. (Audio channel)

Technical Assistant smiled (Participant Feedback Tool)

Figure 2 shows the overall percentage of coded comments for all of the functions of

communication examined in this study.





Since the largest percentage of coded talk occurred in the combined function of offtopic/social/logistical, an examination of the sub-topics shows that nearly half or 45% (N=112) of the time this function is used for logistical purposes, with social being the next highest use at 34% (N=86) of the time, and off-topic comments at 21% (N=52) of the time. Figure 3 shows the overall percentage of coded comments distributed by each of the three sub-topics.

In order to answer research question one, the data must be examined in light of each of the channels of communication used by the study participants. Since the overall number of the coded comments occurring in the participant feedback tools used by study participants (clap, polling, smile, and thumb down) ranged between 0% and 4% of the total coded comments, for the purposes of analysis all participant feedback tools used were grouped into one channel. Findings regarding the channels of audio, instant message, participant feedback tools, and

REDEFINING SYNCHRONOUS LEARNING

whiteboard will be discussed separately in order to answer the question about the type of talk that occurs in each channel, and to examine if each channel facilitates a different function of communication.





Communication channel of audio. Study participants used the communication channel of audio a total of 154 times to make a comment that was coded as one of the functions of communication identified in this research. Of the total comments in the audio channel, 44% (N=67) of them were coded as an assertion, with off-topic/social/logistical and build a logical reasoning as the next most common use of the audio channel at 29% (N=45) and 13% (N=20) respectively. An example of the participant interaction in the audio channel that was coded as the function of assertion during the *STEM Examples* section of the lesson plan is as follows:

2 stated that he teaches middle school. He made himself a note to start with that said to make sure to know what they are assessing and what they are trying to teach before teachers get overly fancy, and that often teachers get overly fancy with a lesson. He stated that he liked the Comic Life lesson, and that it was a great way for students to use their own body to show understanding of what they know. He thought it would be a great idea to take that lesson and add it to a Moodle site, and then use voki to teach the critical pieces of the lesson. He thought it would be good to have students assess the same way, but using the voki. He has done that before, and it does work, and that the kids really like it, but again he wanted to caution the participants to be careful about how much fancy they want in a project. He stated that he has seen teachers use Glogster, for example, for big projects in social studies without the writing piece beforehand. He thought there was a huge piece that could be lost if students don't do the legwork before they go to that application phase. He has seen some teachers completely lose track of what they are trying to teach or assess.

Figure 4 shows the distribution by communication function for the audio channel. Of note is the fact that although the function of build logical reasoning only occurred in 3% of the total comments coded as part of this study, 95% of those comments coded as build logical reasoning appeared in the channel of audio.

Communication channel of instant message. Study participants used the communication channel of instant message a total of 289 times to make a comment that was coded as one of the functions of communication identified in this research. Of the total comments in the instant message channel, 53% (N=153) of them were coded as off-topic/social/logistical with assertion and endorsement as the next most common use of the instant

message channel at 24% (N=69) and 14% (N=39) respectively. An example of the participant

interaction in the instant message channel that was coded as the function of off-

topic/social/logistical during the 5 *Elements* section of the lesson plan is as follows:

26: hmm. My 5 elements is grayed out

14: mine too

26: there it oges

Technical Assistant: how about now

14: open now

26: yup

Figure 5 shows the distribution by communication function for the instant message channel.



Figure 4. Percentage of coded comments occurring in the communication channel of audio distributed by functions of communication.



Figure 5. Percentage of coded comments occurring in the communication channel of instant message distributed by functions of communication.

In order to explore the comments in the combined function of off-topic/social/logistical, a sub-topic analysis shows that nearly half or 49% (N=75) of the 153 off-topic/social/logistical comments shared in the instant message channel were logistical in nature and 33% (N=51) were social in nature. Figure 6 shows the distribution by communication sub-function for the off-topic/social/logistical comments coded in the instant message channel.

Communication channels grouped as participant feedback tools. Study participants used the communication channels included in the participant feedback tools (clap, polling, smile, and thumbs down) a total of 57 times to make a comment that was coded as one of the functions of communication identified in this research. Of the total comments in the participant feedback channels, 77% (N=44) of them were coded as off-topic/social/logistical with endorsement as the only other function at 33% (N=13). In order to explore the comments in the combined function

of off-topic/social/logistical, a sub-topic analysis shows that 57% (N=25) of the 44 offtopic/social/logistical comments were social in nature and 43% (N=19) were logistical in nature. In the sub-topic analysis, none of the total of 44 off-topic/social/logistical comments was coded as off-topic. An example of the participant interaction in the channels included as a participant feedback tool coded as the function of off-topic/social/logistical during the *Setting the Stage* section of the lesson plan is as follows:

26 smiled

19 smiled

14 clapped

18 clapped



Figure 6. Percentage of coded comments occurring in the communication channel of instant message with an off-Topic/social/logistical function of communication distributed by sub-function of communication.

Communication channel of whiteboard. Study participants used the communication channel of whiteboard a total of 101 times to make a comment that was coded as one of the functions of communication identified in this research. Of the total comments in the whiteboard channel, 85% (N=86) of them were coded as an assertion with off-topic/social/logistical and endorsement as the next most common use of the instant message channel at 8% (N=8) and 6% (N=6) respectively. An example of the participant interaction in the whiteboard channel that was coded as the function of assertion during the *Defining Web 2.0* section of the lesson plan is as follows:

free and Interactive

Collaborative and Customization

Three things 1. all info stored online. 2. intended for collaborative projects. 3. accessible with only a browser

video or text or images (combination of media)

cloud, sorta idiot proof, and student generated artifacts

student friendly

share/publish, multi-media, information sharing, and have to sign-in for some

ease of use

Simple to use

Lets students be creative beyond taking notes or answering questions

Allows students to save or download their work for sharing with others

Collaboration, Accessibility, work asynchronously, Authentic task with real results, and accountability!

Accessible from any web connection
Can be used collaboratively or individually

Accountability - Digital Citizenship

forum to teach digital citizenship

As noted in this example, the design of the lesson plan facilitated the use of the whiteboard to make assertions. In this specific example, participants were asked to list on the interactive whiteboard three commonalities they saw in the examples of the Web 2.0 tools shared in the article and/or website.

Although the lesson plan design did have an impact on the data, the fact that the whiteboard was used for this activity was because it was the only tool available that fostered the ability to visually see and manipulate the participant feedback so that overarching themes could more easily surface. Therefore, the goal of the learning activity and the channel of communication are interrelated, and the lesson plan should be designed to best facilitate the desired discussion and/or learning. Figure 7 shows the distribution of coded comments by communication function for the whiteboard channel.

In summary and in answer to research question one, *In a synchronous online conversation that is topic-orientated (Web 2.0) using a multi-channel interface (audio, text, and interactive media), what sort of talk occurs in each channel, specifically, does each channel facilitate a different function of communication?* the data shows that audio facilitates assertions (44% of audio coded comments) and is critical if you want to build logical reasoning comments in participants (95% of build logical reasoning coded comments). Instant messaging facilitates off-topic/social/logistical comments (53% of instant message coded comments) with the majority (49%) of those being logistical in nature. Participant feedback tools facilitate offtopic/social/logistical comments (77% of participant feedback tools coded comments) with the majority (57%) of those being social in nature. Lastly, the whiteboard facilitates assertions (85% of whiteboard coded comments). Although each channel of communication does not facilitate a different function of communication, how the study participants chose to express the functions of assertions, build logical reasoning, and off-topic/social/logistical comments did show strong preferences within the various communication channel options.



Figure 7. Percentage of coded comments occurring in the communication channel of whiteboard Distributed by Functions of Communication.

Research Question Two

Overall, critical and integrative thinking was evident in 29% of the comments coded as a function of communication examined in this study with 33% of the those comments showing evidence of 2 or more types of critical and integrative thinking. Consequently, the number used to discuss critical and integrative thinking (N=631) does not equal the number of coded comments (N=601).

Specifically, there were 154 coded comments in the communication channel of audio with 128 counts of critical and integrative thinking evident in those comments. The communication channel of instant message showed 289 coded comments with 42 counts of critical and integrative thinking evident in those comments. Of the 57 coded comments in the channels that make up the participant feedback tools (clap, smile, polling, and thumbs down) there was no critical and integrative thinking evident. Out of the 101 coded comments in the whiteboard communication channel there were 2 counts of critical and integrative thinking evident in those comments. In total, the study participants displayed critical and integrative thinking 172 times in the comments coded as a function of communication, and there were 462 times that no critical and integrative thinking was evident in those comments. An example of the participant interaction in the audio channel that was coded as displaying evidence of critical and integrative thinking during the *STEM Examples* section of the lesson plan is as follows:

23 stated that what she liked about both of the lessons is that they used authentic tasks. For the Bones one she liked how it used real teeth instead of the kids using some kind of print out, which would be harder for them especially if they were just learning to relate to drawings rather than seeing real teeth when being able to demonstrate what the different kinds of teeth are. She also really liked how Circuits and Pathways was a really authentic task, and something that scientists would really do, and something that is a life skill students will need to use. This is a 4th grade Science kit, and the concept is also part of the 6th grade Math concepts where students learn how to use spreadsheets and use words like "cells, rows, and columns" and things like that. She stated that she thinks this is a nice, authentic task that helps kids learn skills they will need later on. Figure 8 shows by communication channel where study participants displayed critical and

integrative thinking.



Figure 8. Percentage of critical and integrative thinking evident distributed by communication channels.

When examining this data in light of the individual functions of communication, a little more than half (56% or N=96) of the critical and integrative thinking occurred while study participants were making assertions. Additionally, even though the function of build logical reasoning accounted for only 3% of the total comments that were coded as displaying a function of communication, this function accounted for 21% (N=37) of the coded comments that showed evidence of critical and integrative thinking. An example of the participant interaction in the audio channel that was coded as displaying both evidence of critical and integrative thinking and serving as build logical reasoning function of communication occurred during the *5 Elements* section of the lesson plan and is as follows:

36 commented that he chose voice because it has always been necessary as a workplace or workforce skill. The more that students are able to communicate and use their voice; it naturally eliminates an inequality and provides a better chance for them to succeed after school meaning when they are too old for school. It is also necessary to build positive relationships; using a voice positively and effectively. Any chance that students have to use that voice, develop that voice, and get a clear sense of themselves and who they are speaking to, should be celebrated.

Figure 9 shows by functions of communication where study participants displayed critical and integrative thinking.



Figure 9. Percentage of critical and integrative thinking evident distributed by functions of communication.

Examination of the types of critical and integrative thinking. Based on the Critical

and Integrative Thinking Rubric (Washington State University, 2006), this study examined 4

types of critical and integrative thinking: identifies and considers the influence of context and assumptions; develops, presents, and communicates own perspective, hypothesis or position; presents, assesses, and analyzes appropriate supporting data/evidence; and integrates issue using other perspectives and positions. When examining the 172 comments that displayed evidence of critical and integrative thinking, 41% (N=70) of the comments were rated as communicating one's own perspective. The other three critical and integrative thinking categories were fairly evenly distributed with recognizing context and assumptions at 22% (N=38), integrating other perspectives at 20% (N=35), and presenting supporting data/evidence at 17% (N=29). Examples of participant interaction that was coded as displaying evidence of critical and integrative thinking that communicated one's own perspective occurred during the *Defining Web 2.0* section of the lesson plan and are as follows:

36: A flexible, user-friendly technology that can be used to help develop a positive classroom climate by helping students find and share their own voices.

14: Web 2.0...a way to share ideas interactively through media

46: Maybe global collabortive communication to create.

9: Increase participation in sharing ideas and concepts over distances and places. Other examples occurred during the *Biggest Bang for the Buck* section of the lesson plan and are as follows:

36: I selected voice ... because for me "voice" means "communication," which is one of the most vital workforce skills.

Participant 17 picked collaboration because the more you get students working around content, sharing ideas, collaborating, brainstorming, and justifying their positions, the

more confident they are with the material. It also springboards their thinking and gets

them excited and looking at things in new ways.

Figure 10 shows the overall percentage of critical and integrative thinking present in the participant's communication.



Figure 10. Percentage of critical and integrative thinking evident distributed by type of critical and integrative thinking.

The essential role of audio. Analysis of the data associated with this study shows that participants who displayed the function of build logical reasoning also displayed evidence of critical and integrative thinking 100% of the time (N=37). Conversely, when participants made off-topic/social/logistical comments (N=260), in all but one occurrence (99.6% of the time) they displayed no evidence of critical and integrative thinking.

When examining the various channels of communication and the percentage of time that each channel was used to display evidence of critical and integrative thinking (N=172), audio

again shows that it was the most effective in facilitating critical and integrative thinking with 83% (N=128) of the 154 coded comments in the audio channel showing some type of critical thinking. The next most frequent channel used to display critical and integrative thinking was instant message with 15% (N=42) of the 289 coded comments in the instant message channel that showed evidence of critical and integrative thinking. An example of the participant interaction that was coded as displaying evidence of critical and integrative thinking in the audio channel of communication occurred during the *STEM Examples* section of the lesson plan and is as follows:

33 continued and stated that she thought that #4 mentioned the graphing app and how cool that was, and it is almost like when you have a tool that can instantly do that for you, then the focus shifts to the actual conversation about the graphing and the conversation about what is happening with the data rather than how do you actually create the graphs. She thought that was an interesting way that a Web 2.0 tool might shift that lesson a little bit.

And the 5 *Elements* section of the lesson plan and is as follows:

22 stated that Digital Citizenship is right in there with Accountability because part of Digital Citizenship is having students be accountable for what they are saying or doing or where they are getting their information, which is all part of Digital Citizenship. So many times teachers see students just doing something because they see it on the web or they see it on Facebook or whatever social network they might be part of without any thought as to the use of their material. Does that make sense?

Figure 11 shows the percentage within each channel of communication that included evidence of critical and integrative thinking.



Figure 11. Percentage within each communication channel that had evidence of critical and integrative thinking.

In answer to research question two, *what proportion of a synchronous online conversation using audio, text, and interactive media is occupied by critical thinking*, 29% of the coded comments showed evidence of critical and integrative thinking, with 33% of those displaying more than one type of critical and integrative thinking. The communication channel of audio yielded the most evidence of critical and integrative thinking, and assertions that communicated one's own perspective were also prevalent.

Unexpected Findings

In addition to answering the two research questions, the data indicate two unexpected findings, which are summarized along with examples from the data:

Finding one: Logistical and social comments dominate the conversation. Participants made more off-topic/social/logistical comments than any other, with logistical and social being

the dominant functions of communication displayed. Figures 2 and 3 shared previously show that off-topic/social/logistical was the most frequently used function of communication at 42% of the overall percentage of coded comments. Of the 250 off-topic/social/logistical comments, logistical and social were the largest sub-topics at 45% (N=112) and 34% (N=86) respectively. Examples from the data that exemplify this finding include the following:

- IM 9: Ok, I do not hear anyone. Someone give feedback (Function: Offtopic/Social/Logistical - Logistical)
- IM 23: Thanks everyone, I enjoyed the conversation (Function: Offtopic/Social/Logistical - Social)
- Audio: 17 started by apologizing that she thought she was talking but she wasn't (Function: Off-topic/Social/Logistical Logistical)

Finding two: Instant messaging and audio are key communication channels. A

closer examination of the data associated with this study shows that the channel of instant messaging was the predominant vehicle used to communicate in 4 of the 6 identified functions of communication (content question, endorsement, off-topic/social/logistical, and reflect/think aloud) when the study participants used the instant message channel 74%, 57%, 61%, and 63% of the time respectively. Regarding the remaining functions of communication (assertion and build logical reasoning), instant messaging was used 31% and 5% of the time respectively. In 5 of the 6 functions of communication (build logical reasoning, content question, endorsement, off-topic/social/logistical, and reflect/think aloud), the channels of instant messaging or audio were used either the highest or second highest percentage of the time. In the case of assertion, however, in the context of this study the whiteboard was used most often to display this function,

as the whiteboard was used 39% of the time when participants made an assertion, instant messaging was used 31% of the time, and audio 30% of the time.

Table 6 shared previously shows the distribution of the count of coded comments in each of the functions of communications associated with this study. Not only was instant messaging or audio used as the primary or secondary way to communicate throughout the study, but Table 6 also identifies that both the instant messaging and audio channels were the only ones where study participants displayed all six of the identified functions of communication examined as part of this study.

Additionally, instant messaging and audio were the only two communication channels where critical and integrative thinking was displayed for each of the functions of communication except for off-topic/social/logistical where the channel of audio had the only example of critical and integrative thinking occurring in this function of communication in the whole of the study. Table 7 shows the distribution of the count of the critical and integrative thinking evident in the functions and channels of communication examined in this study.

Table 7

	Assertion	Build	Content	Endorsement	Off-Topic/	Reflect/
		Logical	Questions		Social/	Think
		Reasoning			Logistical	Aloud
Audio	77	36	1	7	1	6
Instant	19	1	6	7	0	9
Message						
Participant	0	0	0	0	0	0
Feedback						
Tools						
Whiteboard	0	0	2	0	0	0
Totals	96	37	9	14	1	15

Count of Critical and Integrative Thinking Evident in Each Communication Channel Distributed by Function of Communication Examples from the data that exemplify this finding include the following:

- IM 23: I think the digital citizenship piece should be first. (Function: Reflect/Think Aloud Critical Thinking: Communicates Own Perspective)
- IM 40: I like voice, cause too many kids do not feel heard. (Function: Endorsement Critical Thinking: Integrates Other Perspectives)
- Audio: 27 continued and stated that in the Numbers lesson they were needing to explain things. She thought that a lot of the different tools they could use to explain things in different ways. Maybe use Glogster to create an infographic that explains their numbers. If they have a graph for the lesson that they created, and then they create an infographic so they would be visualizing that same kind of data, and can represent it in another way that is either literal or figurative. Something like that might be interesting to not always necessarily replace the less collaborative not-somuch online tools that are in these lesson plans, but supplement them with other things to maybe help those kids teach their classmates a little bit more about what they are doing. Although, she really enjoyed the one about labeling the teeth with Comic Life. She felt the need to open Comic Life and photograph her teeth while they were reading the lessons, but she did not do that and she wouldn't share it if she did. (Function: Build Logical Reasoning Critical Thinking: Communicates Own Perspective and Integrates Other Perspectives)

The importance of these findings is discussed in Chapter five. Additionally, limitations, implications for future research, and potential online course design considerations are presented.

Chapter Five: Discussion

This objective of this descriptive case study was to examine the types of communication facilitated by each channel (audio, text, and interactive media) in a multi-channeled synchronous online communication environment, and to examine whether the use of multi-channeled synchronous online communication supports the process of thinking critically. Education is evolving in the use of online classes and resources. As gleaned from the literature review, asynchronous online communication has been widely used by the educational world and has been well researched in the field; however, it is the much less researched synchronous online communication is foundational to developing thinking skills, and critical thinking skills are not found in a cross-section of average Americans across the life span even though the goal of graduating students K-20 who can think critically is a universal mission of education. Chapter five identifies five findings that emerged from the data associated with this study.

Research Question One

The data associated with research question one supports three significant findings: *an instant message backchannel exists, a logistics facilitator is needed, and synchronous online communication supports social learning constructs.*

An instant message backchannel exists. Instant messaging surfaced as a primary communication channel used by study participants (48% of the coded comments). In essence, instant messaging became a backchannel of communication that allowed participants to share meaningful comments at all times regardless of who was talking or what the activity was at hand. The study results are consistent with Rainie (2006) who found that the most used online communication tool for students was instant messaging, which is often done with other creators

of information. Data from the Pew Research Center's Pew Internet & American Life Project shows this trend continuing over time in that 62% of American adolescents use instant messaging (Lenhart et al., 2010). The study is also consistent with Kearns and Frey (2010) who found that online students created a backchannel of communication outside of the structured online class interaction.

In addition to instant messaging being the leading way in which students in general and study participants in specific communicated, for all six of the identified functions of communication the channel of instant messaging was used as a primary or secondary vehicle to communicate. Additionally, coded comments included a variety of types of critical and integrative thinking. One reason for the richness in the use of instant messaging could be linked to evidence that online text-based communication enables participants to connect to themselves with less social constraints (Dolev-Cohen & Barak, 2013). Regardless of the reason, study participants used instant messaging to stay in regular communication with each other during the discussions, and this backchannel of communication did hold meaningful contributions to the discussions and learning.

A logistics facilitator is needed. Looking at the whole of the study discussions, participants shared off-topic/social/logistical comments 42% of the time they shared a comment coded as a function of communication with 45% of those comments being logistical in nature and 34% being social in nature. Looking at just the instant message channel, 53% of the coded comments were off-topic/social/logistical with 49% of those comments being logistical in nature and 33% social. In the channels grouped as participant feedback tools, 77% of the coded comments were off-topic/social/logistical with 57% of those being social and 43% being logistical. In all instances, off-topic comments were shared the least. In retrospect the title of this function should have been flipped and called logistical/social/off-topic instead of off-topic/social/logistical.

Given the volume of logistical comments shared by participants, this study clarifies the need to have someone other than the content facilitator/instructor act as a logistical facilitator. In the discussions associated with this study, Ms. Henke filled the logistics facilitator role, as during the planning process Dr. Silverstein stated that she did not feel she had adequate skills in the use of Elluminate to be able to answer logical questions that would likely arise. This reality could provide insight into one reason why synchronous online communication is used less in the world of education than asynchronous despite the compelling argument regarding the connection between real-time communications and learning; it could be that the concerns expressed by Dr. Silverstein are not unique. The person facilitating the content discussion may not feel competent to handle logistical concerns, which are significant when looking at the data associated with this study. Additionally, it would be difficult for both the instructor and the participants to have the content discussion interrupted frequently in order to deal with the logistical issues that arose. Having a logistics facilitator helped to maintain the flow of the discussions associated with this study.

The need for a logistics facilitator is punctuated by the fact that in the case of this study 100% of the participants were already competent users and integrators of technology, whereas only 39% of teachers frequently or moderately use technology as an instructional tool in the general teaching population (Grunwald and Associates, 2010). A closer examination of the logistical coded comments shows that only 4% of the logistical comments actually required technical expertise. The remaining 96% of the comments were related to asking questions or giving feedback of a logistical nature, and the participants themselves answered many of the

comments. Consequently, a logistics facilitator would not need to be someone with specific technical expertise, but rather someone who is looking for and able to help provide logistical feedback and support.

Synchronous online communication supports social learning constructs. As shared in the previous finding, a significant number of coded comments were social in nature. In total, 14% (N=86) of the 601 comments coded as displaying a function of communication had a purpose designated as social. This is not surprising data, as the lesson plan used in each of the study sessions was designed to facilitate discussion between participants, which is supported as best practices in the literature. In the 20th century John Dewey wrote about the process of learning, and according to Dewey (1916), communication is especially powerful as a learning tool because it modifies the understanding of all people who are part of the process. In his book titled, How We Think, (1997), Dewey talked about the need for social stimuli to develop intellectual curiosity. Communication as a tool to mediate learning is born out of the constructs of social learning theory, which is primarily based on the work of Vygotsky. According to Vygotsky as interpreted by Gallimore and Tharp (1990), communication develops "in the context of social use in joint activity" (p. 193). Building on this construct, Bearison and Dorval (2002) state that "knowledge is not necessarily something that individuals possess or that evolves inside the head but rather something that individuals do together such that their social processes become intrinsic to their mental operations" (p. 1). Regarding the role of social interaction to the development of thinking skills, Kuhn (1991) stated that, "social dialog offers us a way to externalize the internal thinking strategies we would like to foster within the individual" (p. 293).

Students of the 21st century naturally tap into the power of social relationships combined with communication to evolve their thinking process (Grinter & Palen, 2002; Levin & Arafeh,

2002; National School Boards Association, 2007), and Crooks, Cheon, Inan, and Flores (2012) found that social comments contribute to the sense of community. Although comments coded as a social function of communication did not show any evidence of critical and integrative thinking, the social aspect did play a part in the lesson plan and discussions associated with this study, which is consistent with the literature regarding best practices in education and the social nature of learning. Synchronous online communication, therefore, provides a vehicle to tap into the social aspects of learning.

Research Question Two

The data associated with research question two supports two significant findings: *a link exists between synchronous online communication and critical and integrative thinking*; and *audio best facilitates critical and integrative thinking*.

A link exists between synchronous online communication and critical and integrative thinking. Four types or elements of critical and integrative thinking were analyzed

as part of this study: *identifies and considers the influence of context and assumptions; develops, presents, and communicates own perspective, hypothesis or position; presents, assesses, and analyzes appropriate supporting data/evidence*; and *integrates issue using other perspectives and positions.* Although there was a fairly balanced use of the four types of critical and integrative thinking, *communicates own perspective, hypothesis or position* was displayed the most often at 41% of the time that critical and integrative thinking was evident in a comment coded as a function of communication. Overall, 29% of comments coded as a function of communication displayed evidence of critical and integrative thinking, and 33% of those comments displayed more than one type of critical and integrative thinking. The results of this study are consistent with Garrison and Anderson's (2003) findings that online communication fosters reflective and precise thinking, and can facilitate critical thinking.

Exploring the impact of purposeful dialog on thinking skills, Bohm (2004) stated that dialogue changes the process of thinking versus just engaging in thinking. "You cannot defend something without first *thinking the defense*" (p. 12). In the data associated with this study specifically in the evidence of critical and integrative thinking, participants were not just responding to each other, but rather they processed together in order to deepen their knowledge on the topic being discussed.

According to Douglas (2000), the opportunity to cognitively process any given topic is necessary to mediate naïve beliefs, which dominate the American society across the age spectrum. Synchronous online communication is one vehicle available that can foster discussion designed to cognitively process content so as to mediate naïve beliefs. As evidenced in the data associated with this study, participants cognitively processed the content, and in the end gained knowledge in the use of Web 2.0 use in education. The synchronous or real-time nature of the online discussion facilitated the social construction of knowledge, which is aligned with Erickson's (2004) work on social learning theory.

Audio best facilitates critical and integrative thinking. The data associated with this study includes many examples regarding the role that the channel of audio played in process of thinking critically. For example, the backchannel of instant messaging was available 100% of the time and used extensively by participants; however, when considering all 631 occurrences of critical and integrative thinking evident in this study, only 18% of the critical and integrative thinking comments occurred in the instant messaging channel, which is contrasted by the channel of audio, where 79% of the critical and integrative thinking comments occurred. When

considering just the 601 coded comments, which excludes the multiple occurrences of critical and integrative thinking within a coded comment, 83% of comments coded in the audio channel showed evidence of critical and integrative thinking whereas only 15% of the comments coded in the instant message channel showed similar evidence. Additionally, the function of build logical reasoning basically only occurred in the audio channel (95% or 20 or the 21 times this function was displayed by participants), and build logical reasoning was the only function to have a 100% of comments coded as this function of communication display elements of critical and integrative thinking.

On the basis of these findings and building on the previous discussion about social learning theory, the audio channel was found to best facilitate the process of critical and integrative thinking, which is consistent with the literature about discussion. As noted by Brookfield and Preskill (2005), active discussion is a tool that can help foster deeper thinking. It is of note that the opportunity to use the audio channel to facilitate active online discussions is uniquely available in synchronous online communication.

Limitations

Like all studies, this one had limitations. First, participants were all involved in the TTL program, which required a competitive application process. As such, it is unlikely that TTLs are representative of the general population of teachers. Additionally, membership in the TTL learning community may have been a motivating factor that facilitated interaction, as well as created a safe culture to risk sharing thought processes.

Secondly, another limitation is related to technology itself. There are many barriers to achieving meaningful communication in a synchronous online activity; many of which revolve around technological challenges, time coordination, and training issues. Although this researcher certainly realizes the critical nature of overcoming these barriers, this study did not address barriers to synchronous online education, but instead focused on the actual impact once communication was established. Similarly, although there are numerous synchronous online communication tools available to educators each with specific features, this study neither addressed nor focused on the feature set of any particular synchronous online communication tool except for the fact that the tool selected for this study, Elluminate, was a fat chat, multichannel (audio, text, and interactive media) synchronous online communication tool. Additionally, although Elluminate does have a visual component, the visual channel was not included as a factor in this study due to potential bandwidth limitations for study participants many of who joined the conversation from their home.

Lastly, this study did not attempt to assess the impact of the lesson plan design on the study results. There are obvious examples in the data where the lesson plan did impact the results (e.g., 85% of the coded comments in the whiteboard channel were assertions, and in two parts of the lesson plan participants were asked to add their thoughts to the whiteboard so that ideas could be grouped to form the basis for further discussion); however, this study did not attempt to expound on the potential impact of the lesson plan to the findings in any way. Additionally, it is unknown whether the critical and integrative thinking results associated with this study would have been the same without a lesson plan designed to provide opportunities for active learning where participants were expected to collaborate, reflect, and share.

Recommendations for Further Research

The discussion associated with this study highlighted two questions for this researcher. First, the need for a logistics facilitator was documented as part of this study. This study happened to have a logistics facilitator, and a question arose as to if this was common practice in the world of synchronous online discussions. Perhaps further research in this area could help to make the strategic use of synchronous online communication more palatable to a wider audience of content facilitators/instructors.

Secondly, this study documented that 29% of the coded comments contained evidence of critical and integrative thinking; however, there is no measure of the norm in this area. Is 29% a normal or an unusually high or low percentage of evidence of critical and integrative thinking for a 90-minute discussion - face-to-face, asynchronous, or synchronous? Since critical thinking is a foundational skill in the 21st century, it seems prudent to study ways for K-20 students to practice and refine their skills and art in thinking critically, and to better understand meaningful evaluative targets in this area.

Implications for Professional Practice

The five findings associated with this study (*an instant message backchannel exists, a logistics facilitator is needed, synchronous online communication supports social learning constructs, a link exists between synchronous online communication and critical and integrative thinking, and audio best facilitates critical and integrative thinking*) provide insight into online course design. The use of synchronous online learning is warranted, as at least a supplement in all learning environments – face-to-face, hybrid (combination of face-to-face and online learning), as well as those that are focused on asynchronous online communication – in order to facilitate deep learning in content and offer opportunities to use and practice critical and integrative thinking skills.

This study examined the individual channels and functions of communication, as well as the distinct types of critical and integrative thinking found in the data. Additionally, this study examined how each of these factors interacted with and impacted each other. The result of this complex examination of the data provides insights into effective learning spaces in the synchronous online environment. Specifically, if instructors desire to have students practice and exhibit critical thinking skills, then they will need to provide opportunities for students to make assertions in the audio (44% of the coded audio communication were assertions) and whiteboard (85% of the coded whiteboard communication assertions) channels, and specifically to talk out loud (79% of the critical and integrative thinking happened in the audio channel). According to the data associated with this study, when instructors make space for participants to express their own thoughts verbally, they are more likely to exhibit critical and integrative thinking skills.

Student-centered learning is at the heart of synchronous online communication. According to Cooney (1998), students in the synchronous online environment communicate and collaborate and need minimal direct teacher intervention; although the teacher shapes the learning experience, the students shape the learning itself. Although Cooney's research was with K-12 students, it has implications for professional development for teachers. Specifically, Barab et al (2001), stated that the key to having teachers move to a learner-centered approach in their classrooms is to offer professional development consistent with this pedagogy, which will help to change the culture of teaching from isolation to one of collaboration. Although synchronous online communication offers its own challenges primarily in the area of scheduling and logistical demands, there is academic value to integrating real-time communication/ conversation/discourse into learning opportunities for students of all ages.

REFERENCES

- Alwehaibi, H. U. (2012). Novel program to promote critical thinking among higher education students: Empirical study from Saudi Arabia. *Asian Social Science*, 8(11), 193-204. doi:10.5539/ass.v8n11p193
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1-17. Retrieved from http://olc.onlinelearningconsortium.org/publications/olj_main
- Bannan-Ritland, B. (2002). Computer-mediated communication, elearning, and interactivity. *Quarterly Review of Distance Education*, 3(2), 161-179.
- Bannan-Ritland, B., Harvey, D. M., & Milheim, W. D. (1998). A general framework for the development of web-based instruction. *Educational Media International*, 35(2), 77-81. doi:10.1080/0952398980350204
- Barab, S. A., MaKinster, J. G., Moore, J. A., & Cunningham, D. J. (2001). Designing and building an on-line community: The struggle to support sociability in the inquiry learning forum. *Educational Technology Research & Development*, 49(4), 71-96. doi:10.1007/BF02504948
- Bearison, D. J., & Dorval, B. (2002). *Collaborative cognition: Children negotiating ways of knowing*. Westport, CT: Ablex Publishing.
- Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators & Virtual Environments*, 12(5), 456-480. doi:10.1162/105474603322761270
- Blanchette, J. (2001). Questions in the online learning environment. *Journal of Distance Education, 16*(2). Retreived from http://www.ijede.ca/index.php/jde/index
- Bohm, D. (2004). On dialogue. New York, NY: Routledge.
- Bonk, C. J., & King, K. S. (1998). Computer conferencing and collaborative writing tools: Starting a dialogue about student dialogue. In C. J. Bonk & K. S. King (Eds.), *Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse* (pp. 3-23). Mahwah, NJ: Lawrence Erlbaum Associates.
- Borreson Caruso, J., & Salaway, G. (2007). Key findings: The ECAR Study of undergraduate students and information technology, 2007 (pp. 1-15): EDUCAUSE. Retreived from http://www.educause.edu/
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.
- Brookfield, S. D., & Preskill, S. (2005). *Discussion as a way of teaching: Tools and techniques for democratic classrooms* (2nd ed.). San Francisco, CA: Jossey-Bass.

- Brown, J. S. (2000). Growing up digital: How the web changes work, education, and the ways people learn. *Change*, *32*(2), 10-20. doi:10.1080/00091380009601719
- Brown, J. S., & Duguid, P. (2000). *The social life of information*. Boston, MA: Harvard Business School Press.
- Bruss, O. E., & Hill, J. M. (2010). Tell me more: Online versus face-to-face communication and self-disclosure. *Psi Chi Journal of Undergraduate Research*, *15*(1), 3-7.
- Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education*, 13(2), 1-32. Retreived from http://www.ijede.ca /index.php/jde/index
- Cecez-Kecmanovic, D., & Webb, C. (2000). Towards a communicative model of collaborative web-mediated learning. *Australian Journal of Educational Technology*, *16*(1), 73-85. Retrieved from http://ascilite.org.au/ajet/submission/index.php/AJET/index
- Celik, S. (2013). Unspoken social dynamics in an online discussion group: The disconnect between attitudes and overt behavior of English language teaching graduate students. *Education Technology Research & Development, 61*, 665-683. doi:10.1007/s11423-013-9288-3
- Clark, R. C., & Mayer, R. E. (2005). *e-Learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Francisco, CA: Pfeiffer.
- Conrad, R.-M., & Donaldson, J. A. (2004). *Engaging the online learning: Activities and resources for creative instruction* (Vol. 1). San Francisco, CA: Jossey-Bass.
- Cooney, D. H. (1998). Sharing aspects within Aspects: Real-time collaboration in the high school English classroom. In C. J. Bonk & K. S. King (Eds.), Electronic Collaborators: Learner-Centered Technologies for Literacy, Apprenticeship, and Discourse. Nahway, NJ: Lawrence Erlbaum Associates.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousands Oaks, CA: Sage Publications.
- Crooks, S. M., Cheon, J., Inan, F., & Flores, R. (2012). Modality and cueing in multimedia learning: Examining cognitive and perceptual explanations for the modality effect. *Computers in Human Behavior*, 28, 1063-1071. doi:10.1016/j.chb.2012.01.010
- Darabi, A., & Jin, L. (2013). Improving the quality of online discussion: The effects of strategies designed based on cognitive load theory principles. *Distance Education*, *34*(1), 21-36. doi:10.1080/01587919.2013.770429
- Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York, NY: The Free Press.

Dewey, J. (1938). Experience and education. New York, NY: Simon & Schuster.

- Dewey, J. (1997). How we think. Mineola, NY: Dover Publications.
- Dolev-Cohen, M., & Barak, A. (2013). Adolescents' use of instant messaging as a means of emotional relief. *Computers in Human Behavior*, 29, 58-63. doi:10.1016/j.chb.2012.07.016
- Douglas, N. L. (2000). Enemies of critical thinking: Lessons from social psychology research. *Reading Psychology, 21*, 129-144. doi:10.1080/02702710050084455
- Duffy, T. M., Dueber, B., & Hawley, C. L. (1998). Critical thinking in a distributed environment: A pedagogical base for design of conferencing systems. In C. J. Bonk & K. S. King (Eds.), *Electronic Collaborators: Learner-Centered Technologies for Literacy, Apprenticeship, and Discourse.* Nahway, NJ: Lawrence Erlbaum Associates.
- Ed Tech Action Network. (2007). Issue and Action Centers. Retrieved from http://edtechactionnetwork.org/issue_center.html
- Engeström, Y. (1999). Activity theory and individual and social transformation. In Y. Engestrom, R. Miettinen & R.-L. Punamäki (Eds.), *Perspectives on activity theory* (pp. 19-38). Cambridge, UK: Cambridge University Press.
- Erickson, F. (2004). *Talk and social theory: Ecologies of speaking and listening in everyday life*. Cambridge, UK: Polity Press.
- Ericsson, K. A., & Charness, N. (1994). Expert performance: Its structure and acquisition. *American Psychologist, 49*(8), 725-747. doi:10.1037/0003-066x.49.8.725
- Falvo, D. A., & Solloway, S. (2004). Constructing community in a gradute course about teaching with technology. *TechTrends*, 48(5), 56-60, 62-64, 85. doi:10.1007/BF02763532
- Fauske, J., & Wade, S. E. (2003-2004). Research to practice online: Conditions that foster democracy, community, and critical thinking in computer-mediated discussions. *Journal* of Research on Technology in Education, 36(2), 137-153. doi:10.1080/15391523.2003.10782409
- Fisher, A. (2001). *Critical thinking: An introduction*. Cambridge, UK: Cambridge University Press.
- Flynn, T. M. (2004). Cognitive engagement in online discourse: A phenomenological study of knowledge construction in asynchronous dialogic communities of practice. (Dissertation), Pepperdine University, Los Angeles.
- Gallimore, R., & Tharp, R. (1990). Teaching mind in society: Teaching, schooling, and literate discourse. In L. C. Moll (Ed.), *Vygotsky and education: Instructional implications and applications of sociohistorical psychology*. Cambridge, UK: Cambridge University Press.

- Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st century: A framework for research and practice*. New York, NY: Routledge Falmer.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87-105. doi:10.1016/S1096-7516(00)00016-6
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23. doi:10.1080/08923640109527071
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. (2004). Student role adjustment in online communities of inquiry: Model and instrument validation. *Journal of Asynchronous Learning Networks*, 8(2), 61-63. Retrieved from http://olc.onlinelearningconsortium.org /publications/olj_main
- Gee, J. P. (1989). What is literacy? Journal of Education, 171(1), 18-25.
- Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York, NY: Palgrave Macmillan.
- Grinter, R. E., & Palen, L. (2002). *Instant messaging in teen life*. Paper presented at the Association for Computing Machinery (ACM), New Orleans, LA.
- Grunwald and Associates. (2010). Educators, technology and 21st century skills: Dispelling five myths (pp. 1-36): Walden University, Richard W. Riley College of Education.
- Habermas, J. (1987). *The theory of communicative action: Lifeworld and system A critique of functionalist reason* (T. McCarthy, Trans. Vol. Two). Boston, MA: Beacon Press.
- Hawkins, D. T. (1999). What is credible information? *Online*, 23(5), 86-89. Retrieved from http://www.onlineinc.com/ONLINE/
- Haythornthwaite, C. (2006). Facilitating collaboration in online learning. *Journal of Asynchronous Learning Networks, 10*(1), 7-24. Retreived from http://olc .onlinelearningconsortium.org/publications/olj_main
- Henning, J. (2004). Perseus blog survey. Retrieved from http://perseus.com/blogsurvey /thebloggingiceberg.html
- Hughes, M., & Daykin, N. (2002). Towards constructivism: Investigating students' perceptions and learning as a result of using an online environment. *Innovations in Education and Teaching International, 39*(3), 217-224. doi:10.1080/13558000210150036
- Isaacs, W. (1999). Dialogue and the art of thinking together: A pioneering approach to communicating in business and in life. New York, NY: Doubleday.

- Johnson, S. (2005). Everything bad is good for you: How today's popular culture is actually making us smarter. New York, NY: Penguin Group.
- Kalyuga, S. (2007). Enhancing instructional efficiency of interactive e-learning environments: A cognitive load perspective. *Educational Psychology Review*, 19, 387-399. doi:10.1007/s10648-007-9051-6
- Kay, K., & Greenhill, V. (2012). *The leader's guide to 21st century education: 7 steps for schools and districts*. Boston, MA: Pearson Education.
- Kearns, L. R., & Frey, B. A. (2010). Web 2.0 technologies and back channel communication in an online learning community. *TechTrends*, 54(4), 41-51. doi:10.1007/s11528-010-0419y
- Kelly-Riley, D., Brown, G., Condon, B., & Law, R. (2001). Washington State University Critical Thinking Project: Washington State University. Retreived from http://wsuctproject .wsu.edu/
- Krathwohl, D. R. (2002). A revision of Bloom's Taxonomy: An overview. *Theory Into Practice*, *41*(4), 212-218. doi:10.1207/s15430421tip4104_2
- Kuhn, D. (1991). The skills of argument. New York, NY: Cambridge University Press.
- Laurillard, D. (1998). Multimedia and the learner's experience of narrative. *Computers & Education, 31*, 229-242. doi:10.1016/S0360-1315(98)00041-4
- Lave, J. (1993). The practice of learning. In S. Chaiklin & J. Lave (Eds.), Understanding practice: Perspectives on activity and context (pp. 3-32). Cambridge, UK: Cambridge University Press.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Lemke, J. L. (1993). *Talking science: Language, learning, and values*. Norwood, NJ: Ablex Publishing Corporation.
- Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010). Teens and mobile phones. Retreived from Pew Internet & American Life Project website: http://www.pewinternet.org/
- Lenhart, A., & Madden, M. (2005). Teen content creators and consumers. Retreived from Pew Internet & American Life Project website: http://www.pewinternet.org/
- Levin, D., & Arafeh, S. (2002). The digital disconnect: The widening gap between Internetsavvy students and their schools. Retreived from Pew Internet & American Life Project website: http://www.pewinternet.org/
- Lipman, M. (1988). Critical thinking What can it be? *Educational Leadership*, 46(1), 38-43. Retreived from http://www.ascd.org/

- Lipman, M. (2003). *Thinking in education* (2nd ed.). Cambridge, UK: Cambridge University Press.
- Lovely, G. (2009). TopTen for Young Learners. Retrieved from http://glovely09.wikifoundry .com/page/TopTen+for+Young+Learners
- Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2013). Teens and technology 2013. Retrieved from Pew Internet & American Life Project website: http://www.pewinternet.org/
- Mander, J. (1978). *Four arguments for the elimination of television*. New York, NY: Harper Perennial.
- Markaridian Selverian, M., & Hwang, H. S. (2003). In search of presence: A systematic evaluation of evolving VLEs. *Presence: Teleoperators & Virtual Environments*, 12(5), 512-522. doi:10.1162/105474603322761306
- McGonigal, J. (2011, January 22). Be a gamer, save the world. *Wall Street Journal*, p. C3. Retreived from http://www.wsj.com/
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass.
- Millard, W. B. (1997). I flamed freud: A case study in teletextual incendiarism. In D. Porter (Ed.), *Internet Culture* (pp. 145-159). New York, NY: Routledge.
- Mondale, S., & Patton, S. B. (Eds.). (2001). *School: The story of American public education*. Boston, MA: Beacon Press.
- Morse, J. M., & Richards, L. (2002). *Read me first for a user's guide to qualitative methods*. Thousand Oaks, CA: Sage Publications.
- Nardi, B. A., Schiano, D. J., Gumbrecht, M., & Swartz, L. (2004). Why we blog. *Communications of the ACM*, 47(12), 41-46. doi:10.1145/1035134.1035163
- National School Boards Association. (2007). Creating and connecting: Research and guidelines on online social and educational networking. Retreived from https://www.nsba.org
- Newell, A., & Rosenbloom, P. S. (1981). Mechanisms of skill acquisition and the law of practice. In J. R. Anderson (Ed.), *Cognitive Skills and Their Acquisition*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Ohler, J. (2013). The uncommon core: Essential creativity skills and the grammar of new media are missing from the Common Core English Language Arts Standards. *Educational Leadership*, 70(5), 42-46. Retreived from http://www.ascd.org/

- Oseas, A., & Wood, J. M. (2003). Multiple literacies: New skills for a new millennium. In D. T. Gordon (Ed.), *Better Teaching and Learning in the Digital Classroom*. Cambride, MA: Harvard Education Press.
- Palloff, R. M., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco, CA: Jossey-Bass.
- Palloff, R. M., & Pratt, K. (2005). *Collaborating online: Learning together in community* (Vol. 2). San Francisco, CA: Jossey-Bass.
- Parker, K., Lenhart, A., & Moore, K. (2011). The digital revolution and higher education: College presidents, public differ on value of online learning. Retreived from Pew Internet & American Life Project website: http://www.pewinternet.org/
- Partnership for 21st Century Skills. (2004). Framework. Retrieved from http://www .21stcenturyskills.org/
- Paul, R. W., Elder, L., & Bartell, T. (1997). California teacher preparation for instruction in critical thinking: Research findings and policy recommendations, California Commission on Teacher Credentialing. Sacramento, CA: Foundation for Critical Thinking.
- Pew Internet & American Life Project. (2007). Internet Activities. Retreived from http://www .pewinternet.org/topics/internet-activities/
- Pew Internet & American Life Project. (2011). Trend data (teens). Retrieved from http://www .pewinternet.org/Static-Pages/Trend-Data-%28Teens%29/Online-Activites-Total.aspx
- Polin, L. (2000, April 17). Affordances of a VR world as a place for learning: Discourse patterns and contextualization cue framing learning experiences for adults in a real-time, textbased virtual reality setting. Paper presented at the American Educational Research Association (AERA) Symposium, New Orleans, LA.
- Prensky, M. R. (2010). *Teaching digital natives: Partnerning for real learning*. Thousand Oaks, CA: Corwin.
- Rainie, L. (2006, July 28). *Life online: The growth and impact of the internet (and related technologies)*. Paper presented at the CTCNet Conference, Washington, DC.
- Reisetter, M., & Boris, G. (2004). What works: Student perceptions of effective elements in online learning. *Quarterly Review of Distance Education*, 5(4), 277-291.
- Resnick, L. B. (1987). *Education and learning to think*. Washington, DC: The National Academies Press.
- Riedel, C. (2009). Top 10 Web 2.0 tools for young learners. *T.H.E. Journal*. Retrieved from http://www.thejournal.com/articles/23898

- Riel, M., & Sparks, P. (2009). Collaborative knowledge building: Blending in-class and online learning formats. *Distance Learning*, 6(3), 7-13. Retreived from http://www.infoagepub .com
- Riordan, M. A., & Kreuz, R. J. (2010). Emotion encoding and interpretation in computermediated communication: Reasons for use. *Computers in Human Behavior*, 26, 1667-1673. doi:10.1016/j.chb.2010.06.015
- Robertson, J. F., & Rane-Szostak, D. (1996). Using dialogues to develop critical thinking skills: A practical approach. *Journal of Adolescent & Adult Literacy*, 39(7), 552-556.
- Roblyer, M. D., & Wiencke, W. R. (2004). Exploring the interaction equation: Validating a rubric to assess and encourage interaction in distance courses. *Journal of Asynchronous Learning Networks*, 8(4), 25-30. Retreived from http://olc.onlinelearningconsortium.org /publications/olj_main
- Rosenworcel, J., & Edwards, M. (2013). Giving our kids a chance to compete in the global economy means high-speed broadband capacity. Retrieved from http://www .huffingtonpost.com/jessica-rosenworcel/giving-our-kids-a-chance_b_3645434 .html?utm hp ref=tw
- Rossman, M. H. (1999). Successful online teaching using an asynchronous learner discussion forum. *Journal of Asynchronous Learning Networks*, *3*(2), 91-97. Retreived from http://olc.onlinelearningconsortium.org/publications/olj_main
- Rougle, E. K. (2004). *First-graders as emerging literary thinkers: Teacher change and the social construction of meaning.* (Dissertation), University at Albany, State University of New York, Albany, NY.
- Rourke, L., & Anderson, T. (2002). Using peer teams to lead online discussions. *Journal of Interactive Media in Education, 1*, 1-21. doi:10.5334/2002-1
- Salmon, G. (2002). E-tivities: The key to active online learning. London, UK: Kogan Page.
- Schrum, L. (1998). On-line education: A study of emerging pedagogy. *New Directions for Adult* and Continuing Education, 78, 53-61. doi:10.1002/ace.7806
- Shea, P. (2006). A study of students' sense of learning community in online environments. *Journal of Asynchronous Learning Networks*, 10(1), 35-44. Retreived from http://olc .onlinelearningconsortium.org/publications/olj main
- Slagter van Tryon, P. J., & Bishop, M. J. (2009). Theoretical foundations for enhancing social connectedness in online learning environments. *Distance Education*, 30(3), 291-315. doi:10.1080/01587910903236312
- Sung, S., & Mayer, R. E. (2012). Five facets of social presence in online distance education. *Computers in Human Behavior, 28*, 1738-1747. doi:10.1016/j.chb.2012.04.014

- Swan, K., Shen, J., & Hiltz, S. R. (2006). Assessment and collaboration in online learning. *Journal of Asynchronous Learning Networks*, 10(1), 45-62. Retreived from http://olc .onlinelearningconsortium.org/publications/olj_main
- Tabbi, J. (1997). Reading, writing, hypertext: Democratic politics in the virtual classroom. In D. Porter (Ed.), *Internet Culture* (pp. 233-252). New York, NY: Routledge.
- Takayoshi, P., Huot, E., & Huot, M. (1999). No boys allowed: The world wide web as a clubhouse for girls. *Computers and Composition*, *16*(1), 89-106. doi:10.1016/S8755-4615(99)80007-3
- van Gelder, T. (2005). Teaching critical thinking: Some lessons from cognitive science. *College Teaching*, *53*(1), 41-46. doi:10.3200/CTCH.53.1.41-48
- Vonderwell, S. (2004). Assessing online learning and teaching: Adapting the Minute Paper. *TechTrends*, 48(4), 29-31. doi:10.1007/BF02763442
- Vygotsky, L. S. (1978). *Mind in Society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Washington State University. (2006). Critical and Integrative Thinking Rubric. Retrieved from http://wsuctproject.wsu.edu/ph.htm
- Wegner, D. M., & Vallacher, R., R. (1977). *Implicit psychology: An introduction to social cognition*. New York, NY: Oxford University Press.
- Wei, C.-W., Chen, N.-S., & Kinshuk. (2012). A model for social presence in online classrooms. Education Technology Research & Development, 60, 529-545. doi:10.1007/s11423-012-9234-9
- Weigel, V. B. (2002). *Deep learning for a digital age: Technology's untapped potential to enrich higher education*. San Francisco, CA: Jossey-Bass.
- Wertsch, J. V. (1991). Voices of the mind: A sociocultural approach to mediated action. Cambridge, MA: Harvard University Press.
- Wouters, P., Paas, F., & van Merrienboer, J. J. G. (2009). Obervational learning from animated models: Effects of modality and reflection on transfer. *Contemporary Educational Psychology*, 34(1), 1-8. doi:10.1016/j.cedpsych.2008.03.001
- Wu, D., & Hiltz, S. R. (2004). Predicting learning from asynchronous online discussions. Journal of Asynchronous Learning Networks, 8(2), 139-152. Retreived from http://olc.onlinelearningconsortium.org/publications/olj_main

FOOTNOTE

¹All recorded data were obtained through personal communication from June 21, 2011 to September 15, 2011.

APPENDIX A

TTL Final Report



Overview of the TTL Program Professional Development and Tools

The concept for the Technology Teacher Leader (ITL) program sprung from a need to cultivate a cadre of mentors and models who examined the role of technology in the teaching and learning process. The Educational Technology (EdTech) Department of the Anchorage School District (ASD) provided professional development coupled with resources to teachers throughout the district who applied for and were accepted into the TTL program. Through a comprehensive staff development model, TTLs developed skills that powerfully impacted their own classrooms as well as shared awareness with other teachers within their school regarding the role technology can play in increasing student learning. The TTL program had two components or pillars. The first pillar involved intensive professional development held primarily during the Anchorage School District Summer Academy (ASDSA) and the second pillar involved support for a project implemented throughout the school year by school-based teams of two to four teachers.

The majority of the funding for the TTL program came from the federal Enhancing

REDEFINING SYNCHRONOUS LEARNING

TTL Overview (continued)

Education Through Technology (E2T2) formula funds, and as the years progressed funding also came from other No Child Left Behind (NCLB) Title programs and ASD district operating funds.

A team of teachers from a school competed for selection into the TTL program. All TTL applications were tied directly to a school's improvement plan or other school-wide goal. To honor the E2T2 funding priority, applicants were selected that targeted increasing the academic achievement of students from all NCLB groups who were performing below proficiency levels in the areas of reading, writing, and math with a particular focus on reducing the achievement gap. Any school could submit a TTL application regardless of student proficiency status; however, E2T2 funding guidelines required the TTL program to prioritize schools that



did not make Adequate Yearly Progress (AYP) and Title I schools.

The TTL application had three components. The Narrative component allowed school-based teams to share their idea for a technology-enhanced project aimed at increasing student learning of content; this component was the heart of the TTL application. The second component, the Budget "Technology to me now is a tool to help me (the teacher) reach my students. It is also a tool for the students to communicate ideas, engage the creative process, and to assist in their learning. Technology isn't just computers and the Internet. It is cameras, projectors, overheads, calculators, CD's, tapes, etc. The trick is to use these tools in an effective way to assist students in their learning."

TTL Teacher

Spreadsheet, outlined specific items that would, if successful, be purchased to help support the implementation of the schoolbased project. The third component required each team member to complete and sign a Background Information form that included his/her principal's signature. One TTL application per school was accepted for consideration.



Martina Henke, 3rd Grade Kincald TTL now Language Arts Curriculum Coordinator Kinchid used technology to differentiate instruction to meet student's unique educational needs.

Highlight TTL School Kincald Elementary

Students in the TTL classroom showed significant differences in reading, writing, and math academic achievement (27.6, 24.0, and 21.7 respectively) compared to all other 5th grade classrooms at Kincaid Elementary.



TL RNAL REPORT



TTL History The Very Beginning

The TTL program started when Denali and Fairview Elementary Schools both completed a school remodel at the start of the 2003-04 school year. As part of the remodel process, teachers were given laptops, and student computers and other technologies were becoming available for use in the classroom. The missing component was professional development, and that is where the EdTech Department (Instructional Technology or iTech at the time) stepped in! In the fall of 2003, six teachers from "I've learned so much with my journey through the TTL program. I've grown in my use of technology in the classroom, and have enjoyed sharing some of my knowledge with colleagues, students and parents."

TTL Teacher

each school applied for and became part of the TTL program. EdTech had a proven idea about what to do regarding instruction in technology integration, and since the schools already had the technology it was easy to implement the ideas even though the school year had already begun. Professional development for the 12 original TTL participants occurred after school, which is not the ideal time to help teachers transform their classrooms; however, the first year did allow integration concepts to develop and align with ASD goals and missions. The TTL program is born!

The Stars Align

The same year that the TTL program began, ASD started to develop a summer academy for teachers called the ASD Summer Academy (ASDSA), which was to be held the first two weeks of the summer break, (at the time ASDSA was called ASDTA and stood for the ASD Teacher Academy). Over the years, the TTL program became a model of the transformative potential of professional development offered during a summer institute setting that is aligned with ASD initiatives.

Another factor influencing the direction of the TTL program was the ASD 6-Ioar Instructional Plan. At the time the TTL program was starting, ASD had just conducted a curriculum audit and a recommendation was to develop a long range instructional map for each department. The newly evolving ASD instructional plan created an opportunity to examine how the TTL program could fit into the whole of what the EdTech Department could offer to ASD in support of true technology integration.

NGLB provided the necessary funding through the E2T2 program, which had a goal of providing professional development and technology resources to help teachers learn how to meaningfully integrate technology into the classroom. The vision of the TTL program was to provide not only the professional development but also the technology resources sorely lacking in schools.

TTL by the Numbers: A Summary of Impact

Total Number of TTL Teachers: 213 Average Number of TTL Teachers per School: 3

Total/Percentage of Elementary Schools: 40 or 66%. Total/Percentage of TTL Middle Schools: 9 or 100% Total/Percentage of TTL High Schools: 6 or 75% TTL Teachers are in 80% of ASD schools

Spin-Off Programs:

- Master Technology Teacher Leader (MTTL) E2T2 Competitive Grant
- Technology Integration Educator (TIE) Train-the-Trainer program
- Technology Infused Learning (TIL) Mentor program



TTL RNAL REPORT

TTL History (continued) TTL Years 2-6

The TTL program was off and running with a combination of a long-range implementation plan (ASD 6-Year Instructional Plan), a vehicle to deliver professional development designed to transform a teacher's practice (ASDSA), and a funding source dedicated to the mission of creating mentors and models of technology integration across the district (NCLB's E2T2 formula funds).

For the next five years, schools submitted a narrative proposal that outlined a school-based project designed to increase student achievement, and each school received \$10,000 to purchase technology necessary to implement their project. In addition, each school-based proposal identified a team of two to four teachers who became the TTL Teachers implementing the school-based project and received the year-long professional development. Each TTL Teacher received a laptop, digital camera, projector and document camera that became professional development tools that traveled with them if they moved within the district. In addition to the professional development at ASDSA, TTL's participated in professional development throughout the next school year to support the implementation of the school-based project.

Due to funding limitations, the annual application process was very competitive, with only about half of the schools



desiring to be part of the TTL program actually being selected. Applications were reviewed by the Executive Director of Curriculum and Instructional Support, the Grants Coordinator, and a Supervisor of the EdTech Department. The average number of TTL teachers every year was 38 with an average of 13 schools served.

TTL Year 7

After the selection of the TTL6 schools, it became clear that there needed to be a change in how TTL schools were selected, as there were many schools receiving multiple grants over the years and other schools that were not being included in the program. The goal identified in the ASD 6-Tar Instructional Plan was to have a TTL Teacher in every school, so the selection process changed. "The TTL experience has been one of the BEST professional development opportunities ever! It was the catalyst for huge, positive changes within my classroom, within my students, and within myself. I appreciate this opportunity more than words can express. Thank you!"

TTL Teacher

For the TTL7 year, EdTech worked with the Executive Directors at each level to identify a school that would be a good candidate to be in the TTL program. Then, by working with the identified Principals, three TTL Teachers were selected at each of the identified schools. Each of the TTL7 schools looked at engaging students in the learning process by brining in interactive whiteboards and student response "clickers" to each of the TTL Teacher's classrooms. There were a total of 9 TTL7's and 3 TTL7 schools.

TTL Leadership

TTL1: Mary Wegner and Pam Lloyd TTL2, TTL3, & TTL4: Mary Wegner TTL5 & TTL6: Natalie Moten TTL7: Lynda Van Winkle



Art LaRue, Clark TTL and Students Clark used multi-media technology to embance and motivate student-centered problem solving and discovery.

Highlight TTL School Clark Middle School

The average results of the Standards Based Assessment (SBA) for students in TTL teacher classrooms increased 8% in both Reading and Writing during the year the students were in the TTL teacher's classes.




Transitions Success!!

Although the TTL program is officially ending, it is ending for a good reason ~ it is no longer necessary to provide equipment to teachers around the district so they can have access to technology resources to use with students, and we now know what good technology integration looks like for ASD. The TTL program has served its purpose.

Thanks to the contribution of the TTL Teachers throughout the years combined with the resources and expertise of the EdTech staff, we have over 200 mentors and models of meaningful technology integration in 80% of our schools! Additionally, the EdTech and Curriculum and Instructional Support Departments continue to collaborate in order to systematically increase the purposeful integration of technology into our established curriculum. None of this would have been possible without the Information Technology Department becoming a parter with EdTech to support the use of technology in classrooms around the district, and the district administration and school board's focus on providing funding for EdTech and IT initiatives.

TTL Lives On

Two spin-offs of the TTL program will continue to provide professional development to teachers regarding a 21st century teaching and learning environment ~ the Technology Integration Educator (TTE) program and the Technology Infused Learning (TTL) program.

The TIE program is a train-the-trainer program where classroom teachers receive specialized training in specific district-supported resources, and they in turn provide training to other teachers throughout the district. One factor contributing to the success of the inhouse TIE trainers is because the training is provided by teachers who are using the resource regularly with his/her students.

The TIL program is a partnership with the Training and Professional Development Department, that allows classroom teachers to become mentors for other classroom teachers around the district. The goal of the TIL program is to leverage the experience of TTLs and other teachers with a strong history of infusing technology into classroom instruction to expand effective technology integration around the district.

The TTL program will also live on through every TTL Teacher and through every person who worked to help make the TTL program such a shining example of excellence in professional development. ...and as the saying goes:

Once a TTL ~ Always a TTL!

Highlight TTL School South High School



In TTL teacher's classrooms, the average increase in a student's ability to understand the research process was 6%. The TRAILS assessment looked at a student's ability to define a topic, identify sources, use research strategies, evaluate sources, and recognize ethical uses of information.



Larissa Wright-Elson, South TTL Teacher South focused on students increasing their understanding of the research process through the creation of podcasts

"Technology use in the classroom has empowered students to take control of their own learning and to use that learning to face some of the more difficult challenges in their world. As an educator, I am delighted to have had a chance to have been a part of this project and I think the use of technology in these classrooms is going to serve as a model for the rest of the school and even the rest of the district."

TTL Teacher

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APPENDIX B

TTL Syllabi and TTL Application



Technology Teacher Leader Project Overview:

The Six-year plan for the Instructional Technology Department focuses on providing staff development and access to technology to support the effective integration of technology into the curriculum so as to positively impact student learning. The Department of Education and Early Development (EED) provides the Anchorage School District with Title II D Enhancing Education through Technology (E2T2) funds to support the effective integration of technology. The Technology Teacher Leader (TTL) grant program is designed to empower change at the classroom level, and is based on a systemic design approach to be implemented at a district level over the next four years. This model has been successfully implemented in several districts in Washington and Texas. The project for this year will include approximately 25-30 K-12 Teachers.

This grant provides for the development of a supported community of K-12 technology integration and curricular leaders who leverage their skills, knowledge, and understanding to help schools improve learning and achievement. Through a comprehensive staff development model, TTLs accepted for this program will develop skills that powerfully impact their own classrooms and other teachers within their school.

All grant proposals must be tied directly to the School Improvement Plan. To honor the E2T2 funding priority, we seek applications that target increasing the academic achievement of students from all NCLB groups who are performing below proficiency levels in the areas of reading, writing, and math with a particular focus on reducing the achievement gap.

Each team member must complete the attached TTL Background Information form and the Budget Spreadsheet as part of the grant application. One grant proposal per school will be accepted for consideration. Each school must have two to four teachers that form a team to implement the proposed project. This grant will support approximately \$120,000.00 for hardware and peripherals for students that support effective integration of technology as outlined in the proposal narrative requirements. Schools must limit their requested budget proposal to no more than \$10,000.00. All equipment will remain the property of the school. The attached rubric will be used to score grant proposals. Complete application/proposals must be received in person at the **Instructional Technology Office (Suite 20 @ the Boniface Center) by 5 PM on Monday, April 11, 2005.** Incomplete proposal will not be considered.

TTL Funding - Enhancing Education Through Technology (E2T2) Background:

The investment in these technology-empowered TTLs is in alignment with the No Child Left Behind E2T2 grant goals, which is "to encourage the effective integration of technology resources and systems with teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices."

The primary goal of E2T2 is to increase student achievement through the effective integration of technology into curricula and instruction. The purpose of this grant, therefore is to:

- 1. Improve student academic achievement in content areas, including the technology literacy of all students
- 2. Improve the capacity of teachers to integrate technology effectively into curricula and instruction
- 3. Increase the ability of teachers to teach

TTL Funding - Enhancing Education Through Technology (E2T2) Background (continued):

In implementing School Improvement Plans, recipients of this TTL grant may support activities such as:

- Implementing proven and effective courses and curricula that include integrated technologies that are designed to help students reach challenging academic standards
- 2. Preparing two or more teachers in schools as technology leaders who will assist other teachers
- Using technology to promote parental involvement and foster communication among students, parents, and teachers about curricula, assignments and assessments
- Enhancing existing technology and acquiring new technology to support education reforms and to improve student achievement
- Adapting or expanding applications of technology to enable teachers to increase student academic achievement, including technology literacy, through teaching practices that are based on the review of relevant research through the use of innovative strategies

TTL Professional Development Goals:

- Engage teachers in the transformative process of reflection, information gathering, and action regarding the meaningful use of technology as a tool to enhance student understanding of content
- Connect a community of TTLs together to share best practice strategies and to support one another as they
 work within their school buildings
- · Provide a quality program to develop 'in-house' instructional leaders for participating schools
- Provide schools with a variety of technology-infused models to effectively implement a school-based project to meet the unique needs of the school in improving learning and reducing achievement gap

TTL Professional Development Model:

The TTL Project will provide participating TTLs with hands-on, face-to-face training in:

- · Supporting peers through leadership and mentoring
- · Working with peers in formal and informal settings
- · Using online collaboration tools for on-going and continual support to implement the application plan
- · Using technology tools to enhance formative assessment practices and derive implications from data sources
- · Working with other school leadership to improve School Technology Plans
- · Targeting goals in School Improvement Plans through the use of effective technology
- · Facilitating and participating in an online professional development community
- · Developing skills to deliver effective technology integration modules for school staff

There are two aspects of the TTL professional development model. First, teachers will participate in intensive personal professional development during the Anchorage School District Teacher Academy (ASDTA) in June. Additional support and application of the concepts presented during ASDTA will occur during the summer months in a primarily individual manner. During the personal professional development process, teachers will receive teacher tools (i.e., laptop) to assist with the practice of meaningfully integrating technology into the classroom curriculum. The personal professional development process sets the stage for the implementation of the school-based project that is outlined in a school's TTL grant proposal. The goal of the personal professional development is to promote transform at a classroom level.

The second part of the TTL professional development model is held during the school year and focuses on supporting the implementation of the TTL school-based projects. Included in the yearlong support are approximately four release days designed to further the impact of the school-based project. The TTL grant will pay substitute costs for participation in the on-going professional development opportunities. The goal of the professional development for the school-based project portion is to assist in the implementation of the successful TTL grant proposals, and to promote the leadership of the TTL participants.

Who can apply?

As outlined in the Instructional Technology 6-Year Plan, applications will be accepted from teachers having at least three years of teaching experience (a minimum of two teachers and a maximum of four teachers from each school). In order to meet the Instructional Technology 6-Year Plan of having a TTL team in every school in the district, a preference will be given to schools that are not already a TTL school. Additionally, in accordance with the E2T2 funding priority, a preference will be given to schools that have not made Adequate Yearly Progress (AYP) and those that serve the target student population mentioned previously. TTL teams from all divisions are encouraged to apply.

TTL Candidate Qualities/Attributes:

- · Be respected by other teachers within the building
- · Have a desire to use technology in the classroom
- · Be a team player who is willing to invest in assisting colleagues
- It is beneficial for applicants to have basic computer skills; however, the best teacher applicants are teachers
 who know their craft and want to enhance their student's learning of content and prepare them with skills
 needed for life in the 21st Century

Expectations for TTLs:

Once identified and selected, participating Teacher Leaders are expected to:

- · Attend a half-day Saturday workshop in April
- Attend 2-week ASDTA course in June 2005 (4-credit graded graduate course)
- Participate in 2 online synchronous class sessions during summer 2005 (options for days/times)
- Attend 1 day of professional development during Fall 2005
- Attend 2 days of professional development during Spring 2006
- Facilitate and provide two, 2-hour Afterschool Workshops for colleagues during 2005-06 school year
- · Complete necessary paperwork to document the impact of the school-based project
- Participate in a 2005-06 1-credit course via a synchronous/asynchronous online communication portal
- · Complete pre and post survey assessments
- · Welcome colleagues into your classroom to model effective use of technology to enhance learning
- Read required readings and participate in discussions as part of the 4-credit and 1-credit courses
- · Be a resource for colleagues regarding effective technology integration
- · Meet with school leadership and TTL colleagues to develop and review implementation plan

TTL Project Timeline:

March 15, 2005 - Applications available online

April 11, 2005 - Application due to Instructional Technology

April 18, 2005 - Announce TTL Award

April 30, 2005 - Orientation for selected TTLs (1/2 day)

June 13-23, 2005 - ASDTA 4-credit TTL course (all applicants must attend personal professional development)

Award Process:

The Instructional Technology Department will determine those applications that best meet the funding criteria using the rubric and scoring sheet included in this application. The Instructional Technology Department will notify all schools submitting a TTL proposal via e-mail on April 18, 2005.

Application/Grant Proposal Procedure:

The proposal application must be double-spaced and may not exceed the number of allowable pages. Each school may apply for one competitive grant and must complete the following steps: Important Note: Applications that are not double-spaced and/or that do not adhere to the margin and/or font size specifications will not be reviewed.

- Maximum Application Size (Additional pages will not be read):
 - Page 1 Abstract
 - Page 2-8 Project Narrative
 - Budget Spreadsheet
 - TTL Background Information (one for each member of your team and each member's form must have participant and Principal signatures)

Step 1: Each team member must complete and sign a Background Information form (pages 5-6 of this packet).

Step 2: Each school team prepares a one-page abstract of the project, making note of the AYP status of the school. (One/school)

Abstract format: Maximum of one-page, portrait orientation, 1" margins, double-spaced, 12
point serif font (recommend Times New Roman)

Step 3: Each school team prepares a narrative description of the proposed project that clearly and concisely details the school's proposed project for effectively integrating technology into the curriculum. (One/school)

- Project Narrative format: Maximum of seven pages, portrait orientation, 1" margins, doublespaced, minimum 12-point serif font (recommend Times New Roman).
- Detail the scope and intent of the project included in the project rationale with references to your School Improvement Plan where appropriate
- Detail roles and responsibilities of participating teachers
- Detail how the project will increase student achievement as well as assist with remediation for Benchmark mastery, HSQGE, or student mastery of content related skills where appropriate
- Identify the project objectives, describing how the project will benefit students in meeting your school
 goals and objectives
- Describe how the accomplishment of these objectives will be assessed
- · Detail for continued support of the project after the grant period ends
- Provide data that supports your project rationale as well as how the project helps students to master content related skills

Step 4: Use the Budget Spreadsheet to identify necessary equipment purchases to implement the school-based project designed to increase academic skills of students. All TTL participant professional development tools (e.g., laptop, digital camera, and projector) are separate from the school-based budget and should not be included. (See attached Budget Spreadsheet form.) The budget should include necessary hardware and software to implement the proposed project.

 Budget Spreadsheet format: Use the Budget Spreadsheet Excel file to identify needed hardware and software items. Total cost cannot exceed \$10,000.00 per proposal. Contact Mary Wegner (742-3778) for permission to include items not listed on the Budget Spreadsheet.

<u>Step 5</u>: Submit one original and two copies of your signed proposal. Complete application/proposals must be received at the Instructional Technology Office (Suite 20 @ the Boniface Center) by 5 PM on Monday, April 11, 2005. Incomplete and/or faxed proposals will not be considered. If three copies of the proposal are sent via inter-school mail, they must be received in Instructional Technology on or before the deadline.

For questions about the TTL application, process, or program, please contact Mary Wegner at 742-3778 TTL FAQ website: http://www.asdk12.org/depts/itech/projects/TTL/faq.html (updated frequently)

Page 4

Background Informa	ition	
Name:		Home Phone:
School:	School Phone:	School Fax:
Grade Level:	Email Address:	I
Other Team Members:		
Please answer the f	ollowing questions:	
. How are you curre	ntly using technology to improve st	tudent learning?
 What experience d 	o vou have with development, impl	ementation and revision of technology plans in yo
building?		69 I V
	res leadershin and support to buildi	ing staff to determine and address technology
 This position requi integration strategi 	es and support. Describe your exper	rience with leadership and support in your buildin
 This position requi integration strategi 	es and support. Describe your exper	rience with leadership and support in your buildin
 This position requi integration strategi 	es and support. Describe your expe	rience with leadership and support in your buildin
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 This position requi integration strategi 	es and support. Describe your expe	rience with leadership and support in your buildin

Page 5

BL	and answer the following guardiane (continued):
PIC	Have do you activaly challenge yourself in your own learning to continue to devalor and implement best
4.	How do you actively challenge yourself in your own learning to continue to develop and implement best
	instructional practices (e.g., course work, conferences, workshops, readings, readership roles, and
	instructional roles)?
-	
5.	What curricular areas do you feel you have the most strengths?
I a	gree to the following:
•	Attand a half day Saturday Orientation on April 30th
-	Attend a nan-day Saturday Orientation on April 50th
	Attend 2-week ASDTA course in June 2005 (4-credit graded graduate course)
-	Participate in 2 online synchronous class sessions during summer 2005 (options for days/times)
-	Attend 1 day of professional development during Fall 2005
-	Attend 2 days of professional development during Spring 2006
	Read required readings and participate in discussions as part of the 4-credit and 1-credit courses
	Complete pre and post survey assessments
	Participate in a 2005-06 1-credit course via a synchronous/asynchronous online communication portal
	Complete necessary paperwork to document the impact of the school-based project
	Facilitate and provide two, 2-hour Afterschool Workshops for colleagues during 2005-06 school year
	As needed, meet w/school leadership and TTL colleagues to develop and review implementation plan
	Welcome colleagues into your classroom to model meaningful use of technology to enhance learning
	Willingness to be a resource for colleagues regarding effective technology integration
Те	acher's Signature:
Sig	nature: Date:
Pri	ncipal's Statement of Support
~	Principals who endorse a teacher to participate in the TTL program must agree to:
	Assist the teacher as needed in developing and implementing a project-based unit of instruction
	Provide teacher with flexibility to adjust schedules to promote team planning and collaboration
	concerning technology integration
Int	erpersonal Teacher Qualifications: 1 2 3 4 5
	(Low) (Medium) (High)
Co	Ilaboration with others
Fle	xibility
Pri	incipal's Signature
Ig	ive my endorsement for this applicant to be part of the Technology Teacher Leader program
Sig	nature: Date:
1	

University of Alaska Anchorage College of Education 3211 Providence Drive Anchorage, Alaska 99508-8269

ANCHORAGE SCHOOL DISTRICT TEACHER ACADEMY ED 565-415 Technology Teacher Leaders (TTL) 4 Credits, Graded A-F Summer, 2005

ASDTA Course Sponsor:	Pam Lloyd, Coordinator Instructional Technology			
Instructors:	Pam Lloyd and Mary Wegner			
Contact Information Address:	5530 E Northern Lights Blvd, Suite 20 Anchorage, AK 99504			
Telephone: FAX:				
Email Addresses:				
Course Meeting Informatio Location:	n Dimond High School			
Start and End Dates of Face-to-Face Class:	June 13 – 23, 2005			
Final Project Due:	August 31, 2005			
Class Days &Times:	Mondays - Thursdays, 8 AM – 5 PM			
Course Description:	Provides introductory to advanced instruction in one or more current issues in educational technology. Participants learn philosophy, strategies, research findings, current status, trends, impact, and predictions for the future. This course features sources of additional information, hands-on practice using the latest techniques with state-of-the-art hardware and software, and independent project development.			
Intended Audience:	Teachers involved in the TTL Grant Project 2005-06			
Course Prerequisite/ Co-requisites:	None			

Alignment with College of Education Vision, Mission, and Conceptual Framework:

We believe that the preparation and support of professional educators is the shared responsibility of the University of Alaska Anchorage and our partners, and that our programs must evolve dynamically in response to unique community needs, research, and continuous program assessment. This professional and continuing education course is designed to meet a professional development needs in response to our partner, the <u>Anchorage School District</u>. The course fits within the mission of the UAA College of Education as we encourage lifelong learning to meet the challenges of a rapidly changing world.

Link to Standards for Alaska Teachers:

This collaborative professional learning effort is firmly rooted in the fundamentals of the standards for Alaska Teachers. It is offered to encourage and support practicing educators attain, maintain, or surpass the standards that, as stated in <u>Standards for Alaska's Teachers</u>, "define the skills and abilities our teachers and administrators need to possess to effectively prepare today's students for successful lives and productive careers." (Roger Sampson, http://www.eed.state.ak.us/standards/pdf/teacher.pdf)

Course Design:

- a. Requires 60 contact hours and approximately 120 hours of work outside of class
- b. Does not apply to any certificate or degree program
- c. No UAA lab and/or materials fees beyond standard charges
- d. This course is based upon the collegial sharing, collaboration, and support of the participants and facilitator as a community of learners. Course activities will include common readings, individual and group discussions (in person and online), direct instruction, guided instruction, independent work, individual and group presentations, collective learning processes, peer learning, and reflective practices.

Instructional Goals and Defined Outcomes:

RESEARCH BASED THEORY/PRINCIPLES/PRACTICES/TRENDS (CONTENT)

1.0 Educational Trends Goal:

Participants will gain an understanding of the latest trends in educational technology in selected topic areas

Instructional Goal:

- Provide information, modeling and examples of meaningful use of technology integration
- Provide Unit of Instruction project outline with rubric
- 1.c Edutopia by The George Lucas Educational Foundation
- Showcase teacher(s) who are using technology as a tool to enhance student learning of content

Defined Outcome:

- Read identified book and reflect on issues presented in online and faceto-face discussion opportunities
- 1.2 Engage in participatory and informational classroom activities

2.0 <u>Emerging Technology Goal:</u>

Participants will use the latest technology available for the classroom

Instructional Goal:

- 2.a Provide in-class sessions to learn the various software/hardware
- 2.b TTL Resource Library
- 2.c Provide hardware/software according to approved Team Tech Plan

Defined Outcome:

- 2.1 Participate in course activities that are designed to provide skills and awareness regarding the various software/hardware available in the district
- 2.2 Use text resources (print and/or Internet), instructors, and peers as needed to assist in gaining skills
- 2.3 Successfully complete a Multimedia Connection Check-off
- 2.4 Working with a partner during the face-to-face class sessions, use technology to create a Daily of the events during one day that contribute to the enduring understanding of this class

THEORY INTO PRACTICE (APPLICATION)

3.0 <u>Application of Knowledge Goal</u>:

Participants will be able to apply what they have learned to their individual classroom or work site settings

Instructional Goal:

- Provide training specifically on the topic of technology integration and research methodology
- 3.b Understanding by Design by Grant Wiggins and Jay McTighe
- 3.c Support and guidance regarding the development of the Unit of Instruction

Defined Outcome:

- 3.1 Design a Unit of Instruction that uses technology as a tool to enhance student learning of content and respects the cultural diversity found in the ASD
- 3.2 Conduct educational research on a topic related to their Unit of Instruction and share results with classmates in the form of an Annotated Bibliography
- 3.3 Create a 30-second Movie that serves as a summary and / or introduction to your Unit of Instruction
- 3.4 Read identified book and reflect on issues presented in online and faceto-face discussion opportunities
- 3.5 Use ASD Site Builder to communicate/share Unit of Instruction

REFLECTION ON THEORY INTO PRACTICE (REFLECTION)

4.0 <u>Community of Learners Goal</u>:

Participants will network and learn to consult with their peers, sharing experiences and reflecting on using technology in the classroom

Instructional Goal:

- 4.a Establish a TappedIn online community for the TTL program and provide instruction in how to access and use this resource
- 4.b Provide software, hardware, and training in the tools needed to create an award for a "secret" colleague
- Provide sample philosophy statements and project outline with rubric

Defined Outcomes:

- 4.1 Contribute to book discussions and other postings in our TappedIn virtual classroom in a timely and meaningful manner
- 4.2 Participate in 2 synchronous online classes during the summer in our TappedIn virtual classroom (choice of times from identified options)
- 4.3 Present a "secret" TTL colleague with a computer-generated award at our Award Ceremony
- 4.4 Attend and contribute to discussions during synchronous face-to-face and online classes
- 4.5 As part of the Unit of Instruction, write a reflection on classroom practice in regards to meaningfully integrating technology into the classroom
- 4.6 Develop and revise a Philosophy of Technology Use in the Classroom statement
- 4.7 Complete a Learning Log for every face-to-face and online class session that addresses salient "take-aways" from the session
- 4.8 As a team, create a Visual Representation of Team Project

RELATIONSHIP TO STANDARDS

5.0 Resources Goal:

Participants will learn what resources are available and how to access resources at the local, state, and national levels

Instructional Goal:

- 5.a Alaska Standards: Content and Performance Standards for Alaska Students
- 5.b Cultural Standards for Alaska Students
- 5.c National Educational Technology Standards for Students: Connecting Curriculum and Technology by International Society for Technology in Education
- 5.d Statewide Library Electronic Doorway (SLED) or other library resources

Defined Outcomes:

- 5.1 Base Unit of Instruction content on student's gaining mastery of identified standards
- 5.2 Implement with students the Unit of Instruction created through the activities of the TTL program

6.0 Planning Goal:

Participants will be able to plan applications for educational technology in instructional settings

Instructional Goal:

- 6.a Provide technology planning resources, and examples
- 6.b Provide a Team Tech Plan project outline with rubric

Defined Outcome:

- 6.1 Comment in each Learning Log on thoughts/ideas/needs in relation to planning for technology integration
- 6.2 Develop in combination with teammates, a *Team Tech Plan* that correlates team's efforts with TTL goals, and outlines spending plan for necessary resources

Writing Style Requirements:

Participants will be required to write with the clarity, conciseness, and creativity expected of a certificated educator.

Attendance and Make-up Policy:

Participants are expected to actively and collegially participate in all classes as a contributing member of a learning community. Attendance at every session is, therefore, very important and make-up for missed classes will be approved by the instructor on an exception basis only.

This course involves interaction in both face-to-face and online environments. In addition to learning the content of this course, it is hoped that the participants will evolve into a community of learners who are able to support and learn with each other. Because of this structure, your participation and attendance is critical not only during the face-to-face ASDTA classes, but also in the on-going discussions occurring in the online environment.

b.

Course Assignments, Assessment of Learning, and Grading System:

Course grading will be A-F based upon the following (examples and rubrics provided)

- Participation and Collegial Support 20%
 Participants will be expected to actively and collegially participate in discussions, activities, and other process experiences during face-to-face and online learning
 - Unit of Instruction
 40%

 Participants will complete Unit of Instruction that focuses on content mastery by students through use of a classroom project that uses technology in meaningful way. Included in the Unit will be current research on the topic presented, and assessment measures that address student mastery of standards. In addition to the Unit itself, a 30-second movie that summarizes your Unit and an ASD Site Builder webpage that communications your Unit to others will be created

c. Philosophy of Technology Use in the Classroom 10% Participants will develop and revise a Philosophy statement that shares their views on the role technology plays in student learning of content

- d. Daily 5% Working with a partner, pick one day during the face-to-face class sessions and create a digital artifact that documents the learning that occurred that contribute to the enduring understanding of the course
- e. Learning Logs 5% After every face-to-face and online class session, participants will write an entry related to their learning that took place as well as any necessary planning to implement ideas/thoughts/needs
- f. Team Tech Plan 5% Each team will submit for approval a plan that aligns their actions with the goals of the TTL program and identifies necessary spending needs
- g. Multimedia Equipment Connections 5% Participant will demonstrate mastery of use and connectivity between devices
- h. Presentation Award 5% Participants will present to a "secret" colleague in the TTL program, a computergenerated printed award that follows principles of effective design techniques
- Visual Representation of Team Project 5% Each team will create a 5-slide multimedia presentation that describes the project

Quality of Work

Assignments, projects, papers, presentations, etc. will be graded for quality as follows: "A" work goes beyond the assignment in originality, scholarship or critical thinking;

- excellent in all aspects, and shows leadership in the area being addressed
- "B" work is complete, comprehensive, and well prepared; clearly indicates that considerable time and intellectual effort was expended in preparing the assignment
- "C" work is average; completed as requested, on time, and in appropriate format
- "D" work is below average; incomplete or chronically late; in inappropriate format; does not meet course standards, shows limited effort and understanding.
- "F" indicates that the student has not met the guidelines for "A-D" work. ASDTA Technology Teacher Leaders UAA Syllabus Page 5

Course Calendar/Schedule:

Day	Activities						
April 30,	Orientation Session:						
2005	 Welcome to the TTL World 						
	 Overview of the components of the TTL Grant Project 2005-06 						
	Course books introduced:						
	 Understanding by Design by Grant Wiggins and Jay McTighe 						
	 Edutovia by George Lucas Educational Foundation 						
	 NETS for Students: Connecting Curriculum and Technology by ISTE 						
	Team Tech Plan Worksession						
	Visual Representation of Team Project discussed and assigned (Due						
	6/13/05 - first day of ASDTA class)						
	Due: Team Tech Plan						
Monday	ASDTA Kownote Session						
June 13, 2005	Whole Crown - Welcome!						
June 13, 2005	Daily Presentation						
	Overview of Calendar						
	Overview of Calendar Natabaok Items						
	Share three Visual Representations of Team Projects						
	Catting to Know You Activity						
	Share Unit topic and select Peer Partner						
	Small-Croup:						
	Daily worksession						
	Cetting to know your lanton software and TTL tools						
	Discussion: What angages students as learners?						
	Due Visual Paracantation of Team Project						
Tuesday	Whole Crown						
June 14, 2005	Daily Presentation						
June 14, 2005	Share four Visual Ramesantations of Team Projects						
	Philosophy of Technology Use in the Classroom project description and						
	rubric discussed and assigned (Due on 6/16/05)						
	Small-Group:						
	Ineffective/Effective Software Activity						
	Resources ligsaw:						
	 IASON Project (http://www.jasonproject.org/) 						
	 MarcoPolo (http://www.marcopolo-education.org/) 						
	• Webauests (http://webauest.sdsu.edu/)						
	 Nettrekker (http://www.nettrekker.com/) 						
	 Kathy Schrock (http://school.discovery.com/schrockguide/) 						
	 The Clobal Schoolhouse (http://www.gsn.org/) 						
	• CARET (http://caretiste.org/)						
	 LEGO Robotics and MINDSTORMS (http://www.oreilly.com/ 						
	catalog/lmstorms/resourcesindex.html)						
	 ISTE/NETS (http://www.iste.org) 						
	 Apple Learning Interchange (http://ali.apple.com/) 						
	 Introduction to TappedIn Virtual Classroom Environment 						
	 Introduction of Multimedia Connection Check-off task 						
	Introduction to Multimedia:						
	Equipment Overview:						
	○ Video camera ○ Document Camera ○ Projector						
	O Digital camera O Connectors/Adaptors O Scanner						
	Daily worksession						
	Due: Multimedia Connections Check-off						

Course Calendar/Schedule (continued):

Day	Activities
Wednesday	ASDTA Keynote Session
June 15, 2005	Whole Group:
	 Daily Presentation
	 Share four Visual Representations of Team Projects
	 Overview Essential Ouestions, Endearing Understandings, and
	concents of Backwards Design
	Intro to Unit of Instruction Template
	Small-Group:
	Examine examples of Units of Instruction
	 Peer Partners help each other complete EO. ER. and Standards on
	Unit of Instruction Template
	iMovie instruction
	Daily worksession
	Photoshop Elements
	Adobe Acrobat PDF Creation
	Multiple Movies
	Due:
	 Unit of Instruction's Essential Ouestions
	 Unit of Instruction's Enduring Understanding
	 Unit of Instruction's Standards Identified
Thursday	Whole Group:
June 16, 2005	 Daily Presentation
	 Share three Visual Representations of Team Projects
	 Unit of Instruction's Template Consultation with Tim
	 Work with Peer Partners in Unit of Instruction's Culminating Task
	and Assessment
	Small Group:
	 iMovie instruction
	 Practice Peer Teaching (Acrobat and Photoshop Elements)
	Atomic Learning
	 Daily worksession (sign-up)
	Due:
	 Unit of Instruction's Culminating Task
	Unit of Instruction's Assessment
	 Philosophy of Technology Use in the Classroom
	• Learning Logs for 6/13, 6/14, and 6/15
Monday	ASDTA Keynote Session
June 20, 2005	whole Group:
	 Daily Presentation Elements of "Cood" Design and nighteen taking activity
	 Elements of Good Design and picture taking activity Spacial Cueste: Shallow Szipczew and Pace Johnson Movie Making
	 Special Guests: Sheney Szipszky and Ross Johnson – Movie Making Small Croup;
	Introduction to Storyhoarding and Scripting
	Init of Instruction's Movie Consultation with Todd
	Research Techniques and Resources
	 Daily workession (signup)
	Due:
	Unit of Instruction's Movie Treatment
	Unit of Instruction's Storyboard
	 Unit of Instruction's Script

Course Calendar/Schedule:

Day	Activities
Tuesday	Whole Group:
June 21, 2005	 Daily Presentation
· · ·	Unif Movie Worksession
	Small Group:
	Peer Teaching:
	 Adobe Acrobat PDF Creation
	 Photoshop Elements
	 Atomic Learning
	Choice Learning:
	 Introduction to Inspiration
	 SMARTBoard Overview
	 Introduction to ASD SiteBuilder
	 How to Make an Award Certificate
	 iWorks
	 Daily worksession
	Due: Award Certificate for Peer Partner
Wednesday	Whole Group:
June 22, 2005	 Daily Presentation
	 Special Guest: Gary Caves – JASON Project
	 Annotated Bibliography Worksession
	Small Group:
	Research Techniques
	 iLife (iPhoto & iTunes)
	 iLife (iPhoto, iTunes, & Garageband)
	 Daily worksession (sign-up)
	Due:
	 Unit of Instruction's 30-second Movie
	 Annotated Bib posted in TappedIn
Thursday	Whole Group:
June 23, 2005	 Daily Presentation
	 Unit of Instruction Movie Showcase
	Award Ceremony
	Small Group:
	 Unit of Instruction Worksession
	 TappedIn Worksession
	SiteBuilder Worksession
	Due:
	Unit of Instruction's Site Builder webpage
	 Learning Logs for 6/16, 6/20, 6/21, and 6/22
Fick One:	Eautopia Book Discussion in TappedIn
7/12 @ 5 PM	
7/13 @ 7 AM	
7/13@5PM	Halasta lia la Daiza Ral Diamaia in Tana K
B/9 @ 7 AM	Understanding by Design Book Discussion in TappedIn
8/9@5PM	
8/10@7AM	
8/10 @ 5 PM	Due
Aug 21 2005	Init of Instruction's Townlate
Aug 51, 2005	DDE of Unit of Instruction
	· r br of unit of Instruction

Course Project Elements Summarized: (Project Descriptions and Rubrics presented by 6/13/05) Participation and Collegial Support

- Online book discussions
 - Participate in 2 virtual class sessions (choice of dates from options)
 - identified)
 - 3. Participate in class activities and experiences
 - 4. Share class work in process in face-to-face and online environments
- 5. Read/reflect/comment on TTL colleague's work in online virtual classroom
- Visual Representation of Team Project
- Unit of Instruction
 - 1. 30-second Movie that summarizes or introduces Unit
 - 3. Research-based (Annotated Bibliography shared)
 - 4. Discussed with TTL colleagues in online virtual classroom
 - 5. Standards-based (content, cultural, and technology)
 - 6. ASD Site Builder webpage created to communicate/publish Unit
 - 7. Implementable with students (includes Lesson Plans)
 - 8. PDF of Unit (with Bookmarks and embedded 30-second Movie)
- Philosophy of Technology Use in the Classroom
 - 1. Written statement
 - 2. Discussed with TTL colleagues in online virtual classroom
- Daily
- 1. Work with TTL colleagues to create 1 artifact of face-to-face class activities
- Digital creation of artifact using iMovie
- Present artifact to TTL colleagues
- Learning Log
 - Created for each face-to-face class session
 - 2. Identifies learning "take-aways"
 - 3. Identifies planning thoughts/ideas/needs
- Team Tech Plan
 - 1. Team goals aligned with TTL project goals
 - 2. Specific spending needs aligned with team goals
- Multimedia Equipment Connections
 - Equipment identification and practice performing connections
 Individual demonstration of ability
- 2. Individual den Presentation Award
 - 1. Develop concept for an award that honors your Peer Partner
 - Follows elements of "good" design
 - Digital creation of award
 - Present award to TTL colleague

Related Professional Organizations:

International Society for Technology in Education Association of Supervision and Curriculum Development

Course Texts, Readings, Handouts, and Library Reserve:

Required Text/Materials:

Armstrong, A., & Chen, M. Eds. (2003). Edutopia: Success stories for learning in the digital age. Indianapolis, IN: Jossey-Bass.

International Society for Technology in Education. (2000). National educational technology standards for students: Connecting curriculum and technology. Eugene, OR: ISTE.

Wiggins, G. & McTighe, J. (2000). Understanding by design. Upper Saddle River, NJ: Prentice Hall.

Course Texts, Readings, Handouts, and Library Reserve (continued):

Content References:

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Periodicals:

Education Leadership. Alexandria, VA: Association of Supervision and Curriculum

Development.

Learning & Leading With Technology. Eugene, OR: International Society for Technology in

Education.

Journal of Research on Technology in Education. Eugene, OR: International Society for

Technology in Education

T.H.E. Journal: Technological Horizons in Education. Acton, MA: Information Synergy, Inc.

Websites:

- Association Supervision & Curriculum Development: http://www.ascd.org
- ASKERIC: http://www.askeric.org
- ISTE: http://www.iste.org
- Kathy Schrock: http://discoveryschool.com/schrockguide/
- Northwest Educational Lab: http://www.netc.org
- MARCO POLO: http://www.marcopolo.com
- Technology & Learning: http://www.techlearning.com
- TECHNOT: http://www.technot.com
- Web66: http://web66.coled.umn.edu/schools.html

Standards Addressed:

Π.

International Society for Technology in Education (ISTE) National Educational Technology Standards (NETS) and Performance Indicators for Teachers:

- I. Technology Operations and Concepts
 - Demonstrate introductory knowledge, skills, and understanding of concepts related to technology
 - B. Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies
 - Planning and Designing Learning Environments and Experiences
 - A. Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners
 - B. Apply current research on teaching and learning with technology when planning learning environments and experiences
 - C. Identify and locate technology resources and evaluate them for accuracy and suitability
 - D. Plan strategies to manage student learning in a technology-enhanced environment
 - E. Identify and apply instructional design principles associated with the development of technology resources
- III. Teaching, Learning, and the Curriculum
 - A. Facilitate technology-enhanced experiences that address content standards and student technology standards

Standards Addressed (continued):

- III. Teaching, Learning, and the Curriculum (continued)
 - B. Use technology to support learner-centered strategies that address the diverse needs of students
- IV. Assessment and Evaluation
 - C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity
- V. Technology Leadership
 - B. Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning
 - C. Apply technology to increase productivity
- VI. Social, Ethical, Legal, and Human Issues
 - C. Identify and use technology resources that affirm diversity

Cultural Standards for Educators:

- A. Culturally-responsive educators incorporate local ways of knowing and teaching in their work
- Recognize the validity and integrity of the traditional knowledge system
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- International Society for Technology in Education. (2002). National educational technology standards for teachers: Preparing teachers to use technology. ISTE: Eugene, OR.
- State of Alaska Department of Education and Early Development. (1997). Standards for Alaska teachers. Retrieved September 10, 2003, from http://www.eed.state.ak.us/standards/pdf/teachers.pdf.
- State of Alaska Department of Education and Early Development. (1995). Content standards for Alaska students: English language arts. Retrieved September 10, 2003, from http://www.eed.state.ak.us/contentstandards/English.html.
- State of Alaska Department of Education and Early Development. (1999). Performance standards for Alaska students: Reading. Retrieved September 10, 2003, from http://www.eed.state.ak.us/tls/PerformanceStandards/reading.pdf.
- State of Alaska Department of Education and Early Development. (1999). Performance standards for Alaska students: Writing. Retrieved on September 10, 2003, from http://www.eed.state.ak.us/tls/PerformanceStandards/writing.pdf

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University of Alaska Anchorage College of Education 3211 Providence Drive Anchorage, Alaska 99508-8269

ANCHORAGE SCHOOL DISTRICT TEACHER ACADEMY ED 565-415 Technology Teacher Leaders (TTL): Increasing Student Achievement Through Technology Integration 1 Credit, Graded A-F Spring, 2006

ASDTA Course Sponsor:	Pam Lloyd, Coordinator Instructional Technology
Instructors:	Pam Lloyd and Mary Wegner
Contact Information Address:	Instructional Technology 5530 E Northern Lights Blvd Anchorage, AK 99504
Telephone: FAX:	
Email Addresses:	
Course Meeting Informatio Location:	n iTech Lab and Online
Start and End Dates:	February 15 – May 24, 2006
Final Project Due:	May 31, 2006
Class Days &Times:	Varies
Course Description:	Provides introductory to advanced instruction in one or more current issues in educational technology. Participants learn philosophy, strategies, research findings, current status, trends, impact, and predictions for the future. This course features sources of additional information, hands-on practice using the latest techniques with state-of-the-art hardware and software, and independent project development.
Intended Audience:	Teachers involved in the TTL Grant Project 2005-06
Course Prerequisite/ Co-requisites:	None

Alignment with College of Education Vision, Mission, and Conceptual Framework: We believe that the preparation and support of professional educators is the shared responsibility of the University of Alaska Anchorage and our partners, and that our programs must evolve dynamically in response to unique community needs, research, and continuous program assessment. This professional and continuing education course is designed to meet a professional development needs in response to our partner, the *Anchorage School District*. The course fits within the mission of the UAA College of Education as we encourage lifelong learning to meet the challenges of a rapidly changing world.

Link to Standards for Alaska Teachers:

This collaborative professional learning effort is firmly rooted in the fundamentals of the standards for Alaska Teachers. It is offered to encourage and support practicing educators attain, maintain, or surpass the standards that, as stated in Standards for Alaska's Teachers, "define the skills and abilities our teachers and administrators need to possess to effectively prepare today's students for successful lives and productive careers." (Roger Sampson, http://www.eed.state.ak.us/standards/pdf/teacher.pdf)

Course Design:

- Requires 15 contact hours and approximately 30 hours of work outside of class
- Does not apply to any certificate or degree program b.
- No UAA lab and/or materials fees beyond standard charges c.
- d. This course is based upon the collegial sharing, collaboration, and support of the participants and facilitator as a community of learners. Course activities will include common readings, individual and group discussions (in person and online), direct instruction, guided instruction, independent work, individual and group presentations, collective learning processes, peer learning, and reflective practices.

Instructional Goals and Defined Outcomes:

RESEARCH BASED THEORY/PRINCIPLES/PRACTICES/TRENDS (CONTENT)

1.0Educational Trends Goal:

Participants will gain an understanding of the latest trends in educational technology in selected topic areas

Instructional Goal:

- 1.a Discuss book designed to help teachers successfully integrate technology into their classroom using the TappedIn synchronous discussion tools
- 1.bProvide information, modeling and examples of meaningful use of technology integration
- Showcase teachers who are using technology as a tool to enhance student 1.c learning of content

Defined Outcome:

- Contribute to the Book Discussion for assigned chapter and also the 1.1
- discussion regarding how technology impacts your classroom Attend Gathering and February 1st and 2st Training professional development 1.2 opportunities to assist in the implementation of School-Based Project
- 2.0Emerging Technology Goal:

Participants will use the latest technology available for the classroom

Instructional Goal:

- Provide in-class sessions to learn various software/hardware resources 2.a
- TTL Resource Library 2.b
- 2.c Provide hardware / software to implement TTL School-Based Project

Defined Outcome:

- Participate in February 1st and 2nd Training opportunity designed to 2.1support professional development in technology integration
- 2.2 Participate in TTL Mondays designed to provide skills regarding the various software/hardware available on the TTL computers
- Use text resources (print and / or Internet), instructors, and peers as 2.3 needed to assist in gaining skills
- 2.4Implement TTL School-Based Project

THEORY INTO PRACTICE (APPLICATION)

3.0 <u>Application of Knowledge Goal</u>: Participants will be able to apply what they have learned to their individual classroom or work site settings

Instructional Goal:

- 3.a Support for implementation of TTL School-Based Project
- 3.b Opportunity to receive direct support from iTech staff to assist in the implementation of the TTL School-Based Project

Defined Outcome:

- 3.1 Implement TTL School-Based Project
- 3.2 Request support from iTech staff as needed

REFLECTION ON THEORY INTO PRACTICE (REFLECTION)

4.0 <u>Community of Learners Goal</u>:

Participants will network and learn to consult with their peers, sharing experiences and reflecting on using technology in the classroom

Instructional Goal:

- 4.a Use TappedIn online community for the Book Discussion, and provide online office hours for people to refresh / practice how to use this resource
- 4.b Provide template for Midterm Podcast and Final Report
- 4.c Provide opportunity to revisit Philosophy of Technology Use in the Classroom statement created during summer class

Defined Outcomes:

- 4.1 Participate in practice TappedIn sessions as needed, and participate in Book Discussion using TappedIn
- 4.2 Submit Midterm Podcast indicating in narrative format the impact of using technology to enhance student learning in your classroom
- 4.3 Submit Final Report indicating in quantitative format the impact of the TTL school-based project on student mastery of identified learning goal(s)
- 4.4 Revise Philosophy of Technology Use in the Classroom statement and provide reflection of changes between original Philosophy created during ASDTA and current beliefs regarding technology use in the classroom

RELATIONSHIP TO STANDARDS

5.0 <u>Resources Goal:</u>

Participants will learn what resources are available and how to access resources at the local, state, and national levels

Instructional Goal:

- 5.a Alaska Standards: Content and Performance Standards for Alaska Students
- 5.b Cultural Standards for Alaska Students
- National Educational Technology Standards for Students: Connecting Curriculum and Technology by International Society for Technology in Education
- 5.d Statewide Library Electronic Doorway (SLED) or other library resources

Defined Outcomes:

- 5.1 Participate in activities offered to TTL's so as to achieve mastery of various standards related to meaningful technology integration
- 5.2 Implement with students the Unit of Instruction created through the activities of the TTL program

6.0 <u>Planning Goal:</u>

Participants will be able to plan applications for educational technology in instructional settings

Instructional Goal:

- 6.a Provide technology planning resources, and examples
- 6.b Provide structure and support for TTLs to offer Afterschool Workshops for colleagues at their school
- Provide structure and support for a TTL Steering Committee to assist with planning and coordination of TTL activities
- 6.d Provide structure and support for completion of Assessment Guide designed to help structure assessment measures for TTL School-Based Project

Defined Outcome:

- 6.1 Participate in Afterschool Workshop planning activities during Gathering
- 6.2 With TTL teammates, conduct Afterschool Workshops for your school
- 6.3 Submit Afterschool Workshop Summary information including handouts and participant evaluations
- 6.4 If interested, participate as a TTL Steering Committee member to assist with planning and coordination of TTL activities

Writing Style Requirements:

Participants will be required to write with the clarity, conciseness, and creativity expected of a certificated educator.

Attendance and Make-up Policy:

Participants are expected to actively and collegially participate in all classes as a contributing member of a learning community. Attendance at every session is, therefore, very important and make-up for missed classes will be approved by the instructor on an exception basis only.

This course involves interaction in both face-to-face and online environments. In addition to learning the content of this course, it is hoped that the participants will grow the community of learners begun during the summer professional development opportunity. Because of this structure, your participation and attendance is critical not only during the face-to-face opportunities, but also in the on-going discussions occurring in the online environment.

Course Assignments, Assessment of Learning, and Grading System:

Course grading will be A-F based upon the following (project guides will be shared):

- Participation and Collegial Support 20% Participants will contribute to discussion during the online Book Discussion, and actively and fully participate in all face-to-face training opportunities.
- Midterm Podcast and Final Report 30% Participants will submit information to complete the requirements for both the Midterm Podcast and the Final Report.
- c. Re-Visit of Philosophy of Technology Use in the Classroom 20% Participants will revise their Philosophy statement that shares their views on the role technology plays in student learning of content, and write a reflection regarding the changes.
- d. Afterschool Workshops 30% Participants will work with TTL colleagues to assess staff at their school regarding the workshops to be offered, assist with organization and planning, and participate in the presentation of at least one Afterschool Workshop. Participants will also write a reflection and submit documentation.

Quality of Work

Assignments, projects, papers, presentations, etc. will be graded for quality as follows: "A" work goes beyond the assignment in originality, scholarship or critical thinking; excellent in all aspects, and shows leadership in the area being addressed

- "B" work is complete, comprehensive, and well prepared; clearly indicates that considerable time and intellectual effort was expended in preparing the assignment
- "C" work is average; completed as requested, on time, and in appropriate format
- "D" work is below average; incomplete or chronically late; in inappropriate format; does not meet course standards, shows limited effort and understanding.
- "F" indicates that the student has not met the guidelines for "A-D" work.

Course Calendar/Schedule:

Session	Activities
1	Gathering Training Session:
	 Finalize School-Based Project Assessment Plan
	 Preparation and support for Afterschool Workshops
	 Refresher course for TappedIn online community
	Empowering Thinking Book Discussion activities
2	 TTL Monday: Opportunity to conduct or participate in training in a specific application or skill
3	School-based Project Midterm Podcast Due: Narrative documentation
	of progress towards increase in student achievement based on school-
	based projects
4	 Afterschool Workshops: Vehicle to spread technology integration
	skills to the colleagues in your school
	 Book Discussion: Opportunity to discuss specific techniques and
	issues related to integrating technology into the classroom
5	February 1" & 2" Training:
	Conference-type of training for TTLs to support on-going professional
	development in technology integration. Topics include: Creating
	iDVDs, Working with Digital Images in Photoshop Elements,
	SMARTBoards in the Classroom, Using the Internet to Build
	Community Digital Images Tips & Tricks, GarageBand to Spur
	Creativity, Using Excel to Communicate, SiteBuilder to Extent
	Clearning Community, Flow to Create a Podcast, Movie in the
	Engaging Presentations Vito Media Diender, Creating
	Engaging Presentations, Internet Resources, Pages – Publication Made
	Tricks, and WebOuests
	Revisit of Philosophy of Technology Use in the Classroom Duo
6	School-based Project Final Report Due: Quantitative documentation of
0	progress towards increase in student achievement based on school-based
	projects
L	projecto

Course Texts, Readings, Handouts, and Library Reserve:

Required Text/Materials:

- Gordon, D.T. (2003). Better teaching and learning in the digital classroom. Boston: Harvard Education Publishing Group.
- International Society for Technology in Education. (2000). National educational technology standards for students: Connecting curriculum and technology. Eugene, OR: ISTE.
- November, A. (2001). Empowering students with technology. Glenview, IL: Pearson Professional Development.
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 - Design developmentally appropriate learning opportunities that apply Α. technology-enhanced instructional strategies to support the diverse needs of learners
 - В. Apply current research on teaching and learning with technology when planning learning environments and experiences

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 - Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity
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APPENDIX C

Lesson Plan

Web 2.0 in the Classroom

a conversation among TTL's facilitated by Dr. Enid Silverstein

Please test your audio (Tools>Audio). You should also have received some files for use during this session.

Welcome

- It is with deep appreciation and a grateful heart that I THANK YOU for taking the time to help me with my doctoral dissertation study!
- Please feel free to use audio, text, and the other interactive features of Elluminate (e.g., whiteboard) as you would like



Setting the Stage

- Goal: Hold a facilitated discussion to further your use of Web 2.0 as a teaching and learning tool
- Agenda:
 - Defining Web 2.0
 - STEM Examples
 - 5 Elements
 - Biggest Bang for the Buck
 - Survey

Defining Web 2.0

• Gail Lovely's Top 10 for Young Learners:

http://glovely09.wetpaint.com/page/TopTen +for+Young+Learners

 Take a look at the 10 tools via the article and this website, and find 3 things that all 10 tools have in common.

Defining Web 2.0

- Using the whiteboard, contribute your 3 things that all of Gail Lovely's Top 10 Web 2.0 tools have in common
- Sharing
- Establish a common definition of Web 2.0

STEM Examples

- Lesson walk-through:
 - Read 2 lesson examples created in the 2010-11 school year
 - Highlights of technology and where it was used
- How was technology used to enhance the learning of content?
 - Be prepared to discriminate between the use of technology, and the use of a Web 2.0 tool.

5 Elements

In small groups of 3-4, and thinking about any content area use of a Web 2.0 tool, use the Breakout Rooms to discuss and identify 5 Elements that a Web 2.0 tool does (e.g., connects non-proximal groups).

Breakout Room Directions

- When it is time, move yourself to the Room of your choice. (No more than 4 in a Room, please.)
- Identify a spokesperson.
- Discuss and identify 5 elements that a Web 2.0 tool accomplishes. (You can use the whiteboard to brainstorm and record them.)
- Be prepared to share out in this Main Room.

5 Elements

- Each spokesperson types the 5 elements onto the whiteboard.
- Discussion regarding reasons for choices.



Biggest Bang for the Buck

- When considering the use of Web 2.0 tools in the classroom, where will educators get the biggest bang for the buck? Choose your first and second choice.
- Use the polling feature to identify your top reason to use Web 2.0 tools to enhance learning of content

Thank You!!

- My deepest appreciation for your contribution to the field of synchronous online teaching and learning, and helping me complete my doctorate!
- Two study participants who complete this discussion and the survey will win a \$50 Amazon gift certificate ⁽²⁾
- Thank You!!

Survey

- Please complete the online survey that identifies your:
 - Age
 - Years of Teaching Experience
 - Teaching Area
 - Comments: Anything you would like to share regarding today's discussion
- Survey Link

APPENDIX D

Critical and Integrative Thinking Rubric

Guide to Rating Critical & Integrative Thinking Washington State University, Fall 2006

For each of the seven criteria below, assess the work by:

a) circling specific phrases that describe the work, and writing comments
 b) circling a numeric score

Note: A score of 4 represents competency for a student graduating from WSU.

1. Identifies, summarizes (and appropriately reformulates) the problem, question, or issue.

Emerging		Deve	Mastering				
1	2	3	4	5 6			
Does not attempt t identify and summ	to or fails to arize accurately.	Summarizes issue, aspects are incorre Nuances and key d or glossed over.	though some ct or confused. letails are missing	Clearly identifies the challenge and subsidiary, embedded, or implicit aspects of the Issue. Identifies integral relationships essential to analyzing the issue.			
Comments:							

2. Identifies and considers the influence of context * and assumptions.

Emerging		Deve	Mastering				
1	2	3	4	5	6		
Approach to the iss or socio-centric ten issue to other conto political, historical,	ue is in egocentric ms. Does not relate exts (cultural, etc.).	Presents and explor contexts and assum the issue, although	res relevant nptions regarding in a limited way.	Analyzes the issue with a clear sense of scope and context, including an assessment of audience. Considers other integral contexts.			
Analysis is grounde with little acknowle biases.	d in absolutes, dgment of own	Analysis includes so verification, but pri established authorit	ome outside marily relies on ties.	Analysis acknowledges complexity and bias of vantage and values, although may elect to hold to bias in context.			
Does not recognize assumptions and un implications, or doe	context or surface nderlying ethical is so superficially.	Provides some reco and consideration o their implications.	gnition of context f assumptions and	Identifies influence of context and questions assumptions, addressing ethical dimensions underlying the issue.			
Comments:							

Contexts may include:

Cultural/social	Scientific
Group, national, ethnic behavior/attitude	Conceptual, basic science, scientific method
Educational	Economic
Schooling, formal training	Trade, business concerns costs
Technological	Ethical
Applied science, engineering	Values
Political	Personal Experience
Organizational or governmental	Personal observation, informal character

з.	Develops,	presents,	and	communicates	OWN	pers	pective	, hy	pothesis (or pos	ition.
----	-----------	-----------	-----	--------------	-----	------	---------	------	------------	--------	--------

Emerging		Developing		Mastering	
1	2	3	4	5	6
Position or hypothesis is clearly inherited or adopted with little original consideration.		Position includes some original thinking that acknowledges, refutes, synthesizes or extends other assertions, although some aspects may have been adopted.		Position demonstrates ownership for constructing knowledge or framing original questions, integrating objective analysis and intuition.	
Addresses a single source or view of the argument, failing to clarify the established position relative to one's own.		Presents own position or hypothesis, though inconsistently.		Appropriately identifies own position on the issue, drawing support from experience, and information not available from assigned sources.	
Fails to present and justify own opinion or forward hypothesis.		Presents and justifi without addressing does so superficial	es own position other views, or γ.	Clearly presents and justifies own view or hypothesis while qualifying or integrating contrary views or interpretations.	
Position or hypothesis is unclear or simplistic.		Position or hypothe dear, although gap	sis is generally s may exist.	Position or hypothesis demonstrates sophisticated, integrative thought and is developed clearly throughout.	
Comments:					

4. Presents, assesses, and analyzes appropriate supporting data/evidence.

Emerging		Deve	loping	Mastering		
1	2	3	4	5	6	
No evidence of search, selection or source evaluation skills.		Demonstrates adequate skill in searching, selecting, and evaluating sources to meet the information need.		Evidence of search, selection, and source evaluation skills; notable identification of uniquely salient resources.		
Repeats information provided without question or dismisses evidence without adequate justification.		Use of evidence is qualified and selective.		Examines evidence and its source; questions its accuracy, relevance, and completeness.		
Does not distinguish among fact, opinion, and value judgments.		Discerns fact from opinion and may recognize bias in evidence, although attribution is inappropriate.		Demonstrates understanding of how facts shape but may not confirm opinion. Recognizes bias, including selection bias.		
Conflates cause and correlation; presents evidence and ideas out of sequence.		Distinguishes causality from correlation, though presentation may be flawed.		Correlations are distinct from causal relationships between and among ideas. Sequence of presentation reflects clear organization of ideas, subordinating for importance and impact.		
Data/evidence or sources are simplistic, inappropriate, or not related to topic.		Appropriate data/evidence or sources provided, although exploration appears to have been routine.		Information need is clearly defined and integrated to meet and exceed assignment, course or personal interests.		
Comments:						

5. Integrates issue using OTHER (disciplinary) perspectives and positions.

Emerging		Deve	loping	Mastering		
1	2	3	4	5	6	
Deals with a single perspective and fails to discuss others' perspectives.		Begins to relate alternative views to qualify analysis.		Addresses others' perspectives and additional diverse perspectives drawn from outside information to qualify analysis.		
Adopts a single idea or limited ideas with little question. If more than one idea is presented, alternatives are not integrated.		Rough integration of multiple viewpoints and comparison of ideas or perspectives. Ideas are investigated and integrated, but in a limited way.		Fully integrated perspectives from variety of sources; any analogies are used effectively.		
Engages ideas that are obvious or agreeable. Avoids challenging or discomforting ideas.		Engages challenging ideas tentatively or in ways that overstate the conflict. May dismiss alternative views hastily.		Integrates own and others' ideas in a complex process of judgment and justification. Clearly justifies own vier while respecting views of others.		
Treats other positions superficially or misrepresents them.		Analysis of other po thoughtful and mos	ositions is itly accurate.	Analysis of other po nuanced, and respe	ositions is accurate,	
Little integration of little or no evidenci others' views. No e reflection or self-as	perspectives and e of attending to vidence of seessment.	ways of knowing. Some evidence of reflection and/or self-assessment.		Integrates different epistemological wa Connects to career responsibilities. Evi and self-assessmer	: disciplinary and ys of knowing. and civic dence of reflection it.	
Comments:						

6. Identifies and assesses conclusions, implications, and consequences.

Emerging		Deve	loping	Mastering		
1	2	3	4	5	6	
Fails to identify conclusions, implications, and consequences, or conclusion is a simplistic summary.		Conclusions consider or provide evidence of consequences extending beyond a single discipline or issue. Presents implications that may impact other people or issues.		Identifies, discusses, and extends conclusions, implications, and consequences. Considers context, assumptions, data, and evidence. Qualifies own assertions with balance.		
Conclusions presented as absolute, and may attribute conclusion to external authority.		Presents conclusions as relative and only loosely related to consequences. Implications may include vague reference to conclusions.		Conclusions are qualified as the best available evidence within the context. Consequences are considered and integrated. Implications are clearly developed, and consider ambiguities.		
Comments:						
7. Communicates effectively.

Emerging		Deve	loping		Mastering
1	2	3	4	5	6
In many places, language obscures meaning.		In general, language does not interfere with communication.		Language clearly and effectively communicates ideas. May at times be nuanced and eloquent.	
Grammar, syntax, distracting or repea evidence of proofre inconsistent or inap	or other errors are ated. Little ading. Style is apropriate.	Errors are not distri although there may problems with more of style and voice.	acting or frequent, y be some e difficult aspects	Errors are minimal. appropriate for aud	Style is lience.
Work is unfocused organized; lacks lo ideas. Format is ab or distracting.	and poorly gical connection of sent, inconsistent	Basic organization i transitions connect they may be mecha appropriate althoug inconsistent.	is apparent; ideas, although anical. Format is gh at times	Organization is clear between ideas enha Consistent use of a Few problems with of presentation.	r; transitions ance presentation. ppropriate format. other components
Few sources are cit correctly.	ed or used	Most sources are ci correctly.	ted and used	All sources are cited correctly, demonstr understanding of et social issues involve information.	d and used ating conomic, legal and ed with the use of
Comments:					

Overall Rating

	Criteria	Score
1.	Identify problem, question, or issue	
2.	Consider context and assumptions	
3.	Develop own position or hypothesis	
4.	Present and analyze supporting data	
5.	Integrate other perspectives	
6.	Identify conclusions and implications	
7.	Communicate effectively	
Con	nments:	

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APPENDIX E

Self-Report Demographic Questionnaire

Redefining Synchronous Learning for the 21st

Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking Self-Report Demographic Questionnaire

Participant Number:

Age:

Years of Teaching Experience:

Teaching Area:

Share anything you would like regarding the synchronous online discussion on the topic of Web 2.0 use in your classroom:

APPENDIX F

Anchorage School District Approval Email

From: Vorachek_Laurel Subject: RE: Research Date: February 24, 2009 1:06:14 PM AKST To: Sun_Xiaogen

, Wegner_Mary

Mary,

If you need a formal letter to submit to your university, please let Xiaogeng know and he can put one together. If the email will suffice, that is good too. Laurel

-----Original Message-----From: Sun_Xiaogeng Sent: Tuesday, February 24, 2009 12:58 PM To: Wegner_Mary Cc: Vorachek_Laurel Subject: RE: Research

Mary,

Laurel and I have reviewed your research request. It meets the district's research requirements and has been approved pending the official IRB approval. The final approval will be granted once we receive the IRB approval.

Thanks.

Xiaogeng Sun Assistant Director of Program Evaluation Anchorage School District



Date:	April 20, 2011
To:	Mary Wegner
From:	Xiaogeng Sun, Ph. D. Assistant Director of Program Evaluation
Re:	Approval of Plan – Redefining Synchronous Learning for the 21st Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking

I have received and reviewed your request. Your file is complete. Your plan is approved as written. Conditions of this approval are:

- Protocols for confidentiality, informed consent, and the right to refuse participation must be followed.
- Any changes must be submitted to this office for approval prior to implementation.

Thank you, Xiaogeng Sun

Xiaogeng Sun, Ph.D. Assistant Director of Program Evaluation Anchorage School District

APPENDIX G

Initial Invitation Email and Informed Consent

Subject Line: Opportunity to help out Mary Wegner :)

Hello!

As you are likely aware, I have been working on my doctorate for a number of years now, and I am finally at the point in the process where I can actually do my study! You are receiving this email because I am inviting you to be part of my doctoral study.

After all of these years I am at the point of needing to do my study when it isn't likely the best time for you to be part of my doctoral study; however, this start of summer gives us 3 advantages:

- The start of summer is a great time to think of possibilities for next year and your work with students as evidenced by the growing success of ASDSA.
- Enid Silverstein, Executive Director of Curriculum and Instruction, is retiring at the end of June, so this is the very last opportunity you may ever have to work with such a visionary thinker - Enid will be the person facilitating the discussion that you will learn about further down in the email.
- 3. At least 2 of you who participate in my doctoral study will receive a \$50 Amazon gift certificate that just might encourage you to buy that one thing you really wanted to buy before summer started and... being part of this study will take less than two hours!

The objective of my dissertation is to understand whether the use of synchronous online narrative tools of the 21st century (i.e., Elluminate) supports the process of thinking critically, and to better understand the types of communication that occur when there are a variety of interaction avenues (audio, text, and interactive media). I am conducting a case study to examine how TTL study participants communicate in Elluminate during a synchronous online discussion about the use of Web 2.0 tools in education, and how critical thinking skills are employed throughout the discussion. The official title of my dissertation is as follows - Redefining Synchronous Learning for the 21st Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking.

My premise is that students of the 21st century seek connection with each other through synchronous online avenues (i.e., chat), yet the education community does not embrace the use of these tools within the formal process of schooling. This creates a disconnect between the way that students learn and the way that they are schooled. My hope is to better understand the pedagogical value of using synchronous online narrative tools, so we can harness the power of this natural form of communication amongst today's students. Not that I hope we start having students chat during class, but if there is pedagogical evidence to support the educational use of synchronous resources, perhaps one example is that we could encourage them to chat outside of class about their school-based projects.

Enid and I have developed a lesson plan that is likely to produce a lively discussion in Elluminate. The discussion should take about an hour and 15-30 minutes, and then there is a quick online 4-question survey to take after you are done with the discussion that is focused on using Web 2.0 resources with your students.

A resource you will be talking about during the Elluminate discussion is Gail Lovely's blog with her Top 10 Web 2.0 resources: http://glovely09.wetpaint.com/page/TopTen+for+Young+Learners

Supporting websites that talk about Gail Lovely's speech and blog:

- http://edfood.org/2011/02/top-10-web-2-0-tools-for-young-learners/
- http://thejournal.com/articles/2009/02/02/top-10-web-20-tools-for-young-learners.aspx

Now for the disclaimers:

Participation in this study is completely voluntary, and you can refuse to participate and can discontinue participation in the study at any time. Your total participation is expected to last less than 2 hours. There will be a total of 30 TTLs that are part of this study, so to help facilitate a richer conversation in Elluminate there will be two different time options for interested TTLs to choose between. Both of the options will follow the same lesson plan, and there will be 15 TTLs in each time slot. Ending or not participating will have no impact on your involvement in the TTL program.

Should you choose to be a participant in this study, your participation will involve the following:

- Return the attached Informed Consent ASAP
- If you are interested, participate in an optional Elluminate training session

- · Read and follow emails and other correspondence associated with this study
- Participate in a no more than 90 minute, synchronous online discussion held in Elluminate during your selected time slot (Note: You do not have to participate in all aspects of the discussion)
- · Complete the self-report demographic questionnaire, which includes the following:
 - Age
 - Years of teaching experience Teaching area
 - Opportunity to share anything you would like regarding the synchronous online discussion on the topic of Web 2.0 use in your classroom
- Agree to only use your assigned participant number when communicating in Elluminate and when completing the selfreport demographic questionnaire so that you remain anonymous

Each study participant who participates in the no more than 90-minute Elluminate discussion and completes the self-report demographic questionnaire will be entered into a drawing to win one of two fifty- dollar (\$50.00) Amazon gift certificates.

If you are still reading this long email, then perhaps you are interested in being part of this study! If yes, please reply to this email, and identify the day you would like to be part of the Elluminate discussion. (Note: Given the timeline, I am sending this to a few more than 30 TTLs, as some of you may not be available once the school year ends, and there isn't much time for turn-around. The first 15 to sign up for each time spot will get to be part of my doctoral study.) You have been selected out of all of the TTLs because I believe you may be interested in the topic of the discussion.

- Wednesday, May 25th starting @ 4:10 pm (after ASDSA)
- Tuesday, May 31st start @ 4:10 pm (after ASDSA)
- · No preference, as either time option works for me

If you are interested in being part of my doctoral study, please sign and return the attached Informed Consent form ASAP, as the first discussion date is next week. You can email your consent form to me with the name of someone who can serve as a witness, sign, scan, and email it back to me, or fax the signed form to me at

Also, let me if you need to borrow a headset for the Elluminate discussion. You do not need a headset to have an Elluminate discussion; however, many people prefer to wear a headset. Headsets can be used onsite (@ Dimond Hight School for the session on the 25th. I will talk more about an optional Elluminate refresher session if you indicate you are interested in being part of my study.

Thank you for considering this opportunity, and please don't hesitate to contact me if you have questions O

I hope this finds you well, and enjoying the last week of school! Mary

Attachment: MW_Consent.pdf

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Partici	pant:	
Princi	pal Investigator:	Mary Wegner
		Title of Project: Redefining Synchronous Learning for the 21st Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking
1.	I conducted by Mary Dr. Linda Polin.	, agree to participate in the research study being y Wegner as part of her doctoral degree, which is under the direction of

2. The overall purpose of this research is:

The objective of this descriptive case study is to understand whether the use of synchronous online narrative tools of the 21st century supports the process of thinking critically, and to better understand the types of communication that occur in a communication event that has the potential for a variety of interaction avenues (audio, text, and interactive media). A case study approach that uses qualitative data will be used to examine how Technology Teacher Leader (TTL) study participants communicate in the various channels of interaction (audio, text, and interactive media) during a synchronous online discussion held in Elluminate, and how critical thinking skills are employed throughout the communication. Additionally, a self-report demographic questionnaire will be analyzed to identify trends in age, years of teaching experience, and teaching area, as it pertains to the types of communication and employment of critical thinking skills, including thoughts study participants would like to share about the experience itself.

My participation will involve the following:

- · Returning this Informed Consent by the deadline
- · Participate in the optional Elluminate training session, if needed
- · Read and follow emails and other correspondence associated with this study
- Agree to only use your participant number when communicating in Elluminate and when completing the self-report demographic questionnaire so that all information is completely anonymous
- Participate in the no more than 90 minute, synchronous online discussion held in Elluminate during your selected time slot (Note: You do not have to participate in all aspects of the discussion)
- Complete the self-report demographic questionnaire, which includes the following request for information:
 - o Age
 - Years of teaching experience
 - Teaching area
 - Share anything you would like regarding the synchronous online discussion on the topic of Web 2.0 use in your classroom

- My participation in the study is expected to last less than 2 hours.
- I understand that the possible benefits to myself or society from this research are:

The information gained from this study has many potential benefits. First, the information may directly impact the curriculum associated with Anchorage School District's (ASD) technology infused learning professional development programs like TTL. Secondly, there is an established need to gain information about ways in which synchronous online communication can be used to enhance interaction and critical thinking. This knowledge has the potential to lessen the disconnect between formal education and the ways in which students of the 21st century are learning outside of school. Finally, this study is significant because it has the potential to impact the development of online courses at a point in time when new online courses and programs are being created around the world as well as within ASD.

Each study participant who participates in the 90-minute discussion and completes the self-report demographic questionnaire will be entered into a drawing to win one of two fifty-dollar (\$50.00) Amazon gift certificates.

- Participation will involve no physical risk.
- I understand that I may choose not to participate in this research. Ending or not
 participating in this study will have no impact on my involvement in the TTL program.
- 8. I understand that I must only use my assigned number during all study interaction in order to maintain my anonymity, as the discussion will be recorded using Elluminate's built-in Record feature. I further understand that the discussion will be transcribed and analyzed to examine both the types of communication that takes place in each of the communication avenues (text, audio, and interactive media), as well as an analysis of critical thinking.
- I understand that my participation is voluntary and that I may refuse to participate and/or withdraw my consent and discontinue participation in the project or activity at any time without penalty or loss of benefits to which I am otherwise entitled.
- I understand that the investigator(s) will take all reasonable measures to protect my anonymity and that my identity will not be revealed in any publication that may result from this project. My anonymity will be maintained in accordance with applicable state and federal laws.
- 11. I understand that the investigator is willing to answer any inquiries I may have concerning the research herein described. I understand that I may contact Dr. Linda Polin if I have other questions or concerns about this research. If I have questions about my rights as a research participant, I understand that I can contact Dr. Yuying Tsong, Chairperson of the Graduate and Professional Institutional Review Board, Pepperdine University,

12. I understand to my satisfaction the information regarding participation in the research project. All my questions have been answered to my satisfaction. I have received a copy of this informed consent form which I have read and understand. I hereby consent to participate in the research described above.

Participant	s	Signature	

Date

Witness

Date

I have explained and defined in detail the research procedure in which the subject has consented to participate. Having explained this and answered any questions, I am cosigning this form and accepting this person's consent.

Principal Investigator

Date

APPENDIX H

Subsequent Invitation Emails

Help Wanted: Looking for 30 TTL's who want to talk! <email address>

Dear <name>,

Hi. I hope your summer is off to a great start, and that you are relaxing and enjoying a well-deserved break! As you likely know, I am in the process of working on my doctorate, and need to get 30 TTL's to be part of an online conversation in order to conduct my doctoral study. I picked TTL's to be my study group because each of you have had professional development and access to technology when working with students. In my review of the literature, these two factors surfaced as important considerations for using online resources in the classroom. Besides, when wouldn't I want to work with the TTL's – you are an amazing group of people!

Last month I sent out an initial email inviting you to be part of this conversation, and heard back from a few of you that you were interested but the first set of proposed date options didn't work with your schedule. I was surprised that I didn't hear back from more of you, and then I realized my first email might have gone to spam, as it was a mass email from my Gmail account with everyone on the BCC line so as to protect your anonymity. I also realized that for some of you I had the wrong email address (e.g., doe_john@ instead of doe_johnathan@). Consequently, I am sending each of you an individualized email in the hopes that this does in fact reach you.

The actual online conversation will last no more than 1 ½ hours, and there is a short 5 question survey to answer after the conversation ends. Elluminate will be the tool used to hold the conversation, which will be facilitated by Dr. Enid Silverstein. Enid and I have developed a lesson plan that is likely to produce a lively discussion around the use of Web 2.0 in the classroom. The conversation is appropriate for novice as well as experienced users of Web 2.0 tools. There will be 2 conversations with 15 people in each conversation grouping. ASD Assessment and Evaluation has granted permission for me to contact TTL's to be part of this study, and I hope you will consider helping me out.

Your anonymity is critical, and consequently I have assigned each of the potential study participants a unique number that was assigned by alphabetical order by first names. Should you choose to be part of this study, please only use this number when communicating in Elluminate and when completing the Doodle to identify the dates and times of the actual conversations. Proposed dates and times are Tuesday, 6/21, Thursday, 6/23, or Friday, 6/24 at 9 am, 2 pm, or 4 pm.

Your unique number is: <#>

Doodle to indicate available dates and times: http://www.surveymonkey.com/s/PYRDFLC

The objective of my dissertation is to understand whether the use of synchronous online narrative tools of the 21st century (i.e., Elluminate) supports the process of thinking critically, and to better understand the types of communication that occur when there are a variety of interaction avenues (audio, text, and interactive media). I am conducting a case study to examine how TTL study participants communicate in Elluminate during a synchronous online discussion about the use of Web 2.0 tools in education, and how critical thinking skills are employed throughout the discussion. The official title of my dissertation is as follows - Redefining Synchronous Learning for the 21st Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking.

I am happy to hold an Elluminate refresher session for you if that would be helpful, and you can use a

REDEFINING SYNCHRONOUS LEARNING

headset or you can just participate using your computer's built-in microphone and speakers. The power of using Elluminate is that you can participate from anywhere in the world where you have access to the Internet; I hope you will consider participating even if you are traveling. I hope you find the conversation stimulating, and you can help forward the use of online communication in education.

Thank you, and please do not hesitate to contact me if you have any questions!

In deepest appreciation, Mary

Cell: Email: Skype: Facebook: Second Life: Fax:

Attachment: Consent Form

Follow-up on Mary's Doctoral Dissertation Study <email address>

Dear <name>,

Thank you for expressing interest in being part of my doctoral study! I have your consent form, and have finally been able to identify some new potential dates. Your anonymity is critical, and consequently I have assigned each of the potential study participants a unique number that was assigned by alphabetical order by first names. Please only use this number when communicating in Elluminate and when completing the Doodle to identify the dates and times of the actual conversations. Proposed dates and times are Tuesday, 6/21, Thursday, 6/23, or Friday, 6/24 at 9 am, 2 pm, or 4 pm. If these date and time options don't work with your schedule, please use the Comment area on the Doodle to indicate some better options.

Your unique number is: <#> Doodle to indicate available dates and times:

Thank you, and please do not hesitate to contact me if you have any questions!

In deepest appreciation, Mary

Cell: Email: Skype: Facebook: Second Life: Fax: Web 2.0 Pilot Group Discussion for Mary's Dissertation <email address>

Hi, <name>!

Thank you for agreeing to be part of the pilot group of my doctoral dissertation study! The pilot conversation will allow Enid a chance to practice facilitating the two actual sessions that will be used in my dissertation study, and it will allow myself and another person an opportunity to practice the coding of information once the conversations have concluded. The actual online conversation will last no more than 1 ½ hours, and there is a short 5 question survey to answer after the conversation ends. Elluminate will be the tool used to hold the conversation, which will be facilitated by Enid. Enid and I have developed a lesson plan that is likely to produce a lively discussion around the use of Web 2.0 in the classroom. The conversation is appropriate for novice as well as experienced users of Web 2.0 tools.

Your anonymity is critical, and consequently I have assigned each of the pilot discussion members a unique number based on the alphabetical order of your first names. Please only use this number when communicating in Elluminate, and please work with Enid and Martina to identify the date and time when you will hold your pilot discussion.

Your unique number is: <#>

The objective of my dissertation is to understand whether the use of synchronous online narrative tools of the 21st century (i.e., Elluminate) supports the process of thinking critically, and to better understand the types of communication that occur when there are a variety of interaction avenues (audio, text, and interactive media). I am conducting a case study to examine how TTL study participants communicate in Elluminate during a synchronous online discussion about the use of Web 2.0 tools in education, and how critical thinking skills are employed throughout the discussion. The official title of my dissertation is as follows - *Redefining Synchronous Learning for the 21st Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking.*

I will need the attached Consent Form returned to me if you agree to be part of the pilot study. Thank you, and please do not hesitate to contact me if you have any questions!

In deepest appreciation, Mary

Cell: Email: Skype: Facebook: Second Life: Fax:

Attachment: Consent Form

«Email_Address» More of Mary's Dissertation Study – Almost There!

Greetings, «First»!

I still need more TTL's to participate in my doctoral study, and I am hoping that the next opportunity will work for you to be involved. The conversations held so far have been very thought provoking, and I have heard from a number of your TTL colleagues that they considered it to be a good use of their time. The actual online conversation will last no more than 1 ½ hours, and there is a very brief survey to answer after the conversation ends.

Enid Silverstein and Martina Henke are facilitating the conversations held in Elluminate. Enid has retired as ASD's Executive Director of Curriculum and Instructional Services and is moving out of state; consequently, the opportunity to finish my study is quickly evaporating. I would <u>really</u> appreciate it if you would consider being part of my study if you are anywhere in the world where there is an Internet connection and a computer.

The date and time options for the conversation are **Tuesday**, **7/19** @ **9** am or **Wednesday**, **7/20** @ **2** pm. Please use the following Doodle link to indicate your interest in participating on as many date and time options as you are available:

Your unique number is: **«No»**. Should you choose to be part of this study, please only use this number when communicating in Elluminate and when completing the Doodle to identify the dates and times of the actual conversations.

Thank you, and please do not hesitate to contact me if you have any questions!

-

In deepest appreciation, Mary

Cell: Email: Skype: Facebook: Second Life: Fax: «Email_Address» Mary's Dissertation Study – Fall Opportunity to Participate

Greetings, «First», and a happy fall to you!

I hope you had a fabulous summer, and that your school year is off to a great start! It was fun to get to hear about so many people's travels this summer while in communication about possible participation in my study. TTL's traveled all over the country, and as far away as Iceland and Italy this summer! Now that fall is here, I'm back to focusing on finishing up my doctoral dissertation study, and am hoping that you will be interested and available in participating in an online conversation this month.

Comments shared from the study sessions held so far indicate that the conversations have been thought provoking and meaningful. The actual online conversation will last no more than 1 ½ hours, and there is a very brief online survey to take after the conversation ends. The conversation will be held in Elluminate and facilitated by Dr. Enid Silverstein and Martina Henke.

I am really hoping to wrap up my study this month so that I can move on to data analysis and write my last two chapters. I'm am in the 9th year of working on my doctorate, so to say that I am anxious to finish my dissertation is a bit of an understatement; however, in order for me to finish I need your help.

The date and time options for the online conversation are **Monday**, **9/12** @ **4 pm** or **Tuesday**, **9/13** @ **4 pm**. Please use the following Doodle link to indicate your interest and availability in participating in my study: |

Your unique number is: «No»

Please use your unique number when completing the Doodle and when communicating in Elluminate. Thank you, and please do not hesitate to contact me if you have any questions!

In deepest appreciation, Mary

Cell: Email: Skype: Facebook: Second Life: Fax: «Sent_Confirmation» «Email_Address» It is not too late to be part of the study!

Greetings!

I just wanted to let you know that it is not too late to sign up to be part of a discussion on Monday (9/12) @ 4 pm or Tuesday (9/13) @ 4 pm. I am almost... almost... done with my doctoral dissertation study but need a few more TTL's to agree to be part of a discussion in Elluminate. Please consider contributing 1-½ hours of your very valuable time to help shape the future of how online learning can support our work in the schools. If Monday or Tuesday @ 4 pm doesn't work with your schedule, we can look at other dates/times; please let me know what might be some options for you to participate.

If you are interested in participating in the study, add your check mark to the Doodle found at: and use your unique number, which is: **«No»**

THANK YOU, and I hope you have an awesome weekend! Mary

APPENDIX I

Confirmation Email and Study Session Attachments

Confirmation for Mary's Doctoral Study Session «Email_Address» Dear «First»,

Thank you for agreeing to be part of my doctoral study! Your confirmed time slot is **«Timeslot»**. Dr. Enid Silverstein will facilitate the discussion in Elluminate about Web 2.0, and Martina Henke will also be available if you have any questions. The pilot conversation proved to be a lively discussion where both new and experienced participants in the world of Web 2.0 felt they learned much about the topic. The actual online conversation will last no more than 1 ½ hours, and there is a short 4 question survey to answer after the conversation ends.

If you have not done so already, please send me back the attached Consent Form. You can fax this to me at 966-1260, sign/scan/email it to me, or put it in the mail to me at 407 Monastery St, Sitka 99835. If either of these options presents a problem for you, please contact me and we can brainstorm another way to get your official permission to be part of my study.

Please log into Elluminate using the link below a few minutes before the conversation starts, as this will give you time to check your audio and download the files you will be using during the conversation. I have attached files to this email (BonesComic.pdf and CircuitsNumbers.pdf) in case you want to look over them prior to the conversation. You will also be discussing the attached article (Top10Wweb2.pdf), which has a supporting webiste of: http://glovely09.wetpaint.com/page/TopTen+for+Young+Learners - All of these resources will be available to you once you log into Elluminate, and I include them here only for those who like to read ahead.

Elluminate Link: «Link» - The Elluminate link will also show up on the main calendar: http://elluminate.asdk12.org/index.html

If you don't have access to a headset, you can still participate in the conversation using your built-in microphone and speakers. Please let me know if you would like a quick refresher course in how to use Elluminate. At the beginning of the conversation, Enid and/or Martina will also be offering a brief review/reminder about the tools of interaction that will be used during the conversation.

Once the conversation had concluded, please go to the survey link to add your demographic information and comments. Two participants who complete both the conversation and survey will win a \$50 Amazon gift certificate, as a small token of my appreciation for your time and willingness to participate in this discussion.

Survey Link: http://www.surveymonkey.com/s/PYRDFLC

Please use only your participant number when communicating in Elluminate and completing the demographic survey. Your unique number is: «No»

Let me know if the timeslot no longer works for you, and we can reschedule you into another slot. I don't have the words to express how grateful I am to you for being part of this conversation. All I can say is... Thank You!!

In deepest appreciation, Mary

Attachments:

- BonesComic.pdf
- CircuitsNumbers.pdf
- ConsentForm.pdf
- Top10Web2.pdf

Top 10 Web 2.0 Tools for Young Learners

by Chris Riedel

Gail Lovely is adamant about the nature and potential of Web-based learning tools. "Web 2.0 is about trust," she said at a recent talk. "It's about sharing and collaborating." And, she insisted, it's about putting the power to learn and create in the hands of the students.

Technology needs to trickle up, she said, not down. We need to give the most powerful tools to the most vulnerable populations because they are the ones who need it. "Young learners, nonreaders," she continued, "need high-speed access, they need animation and graphics and sound. And that's the truth."

According to Lovely, and education technology consultant and speaker at the FETC 2009 conference in Orlando, FL in January, it was the recognition of those needs that led her to develop a "top 10 list" of go-to technology tools to help inspire young students and empower under-funded teachers. "The important thing to remember here," she said, "is that this isn't about simply providing you with 10 links. It's much more important to ask, 'What are you going to do with these things? How are you going to use these tools?' That's why we're here," she said. "So I can show you not only what's out there but also how other educators are using these resources to teach their students right now."

1. Wikis

Lovely rounded out her top 10 with Wikis and Wiki platforms, citing these as the most powerful of the Web 2.0 tools. "Wikis," she said, "are even more versatile than blogs. You can do anything with a Wiki," from embedding all kinds of content to promoting collaboration to creating an entire community all on a single platform. "In fact," she said, pointing to her presentation slides on the giant screen behind her, "You've been looking at a wiki this whole time during our discussion."

2. Blogs

Nearing the top of the list, the versatility of blogs, said Lovely, is what makes them so valuable. Blogs provide opportunities to reach out to a range of community stakeholders including administrators, other teachers and students, parents, and the community at large. "Blogs have the power to give kids an authentic audience," she said. "It gives them a voice."

3. Voicethread

Coming in at No. 3, Voicethread is audiovisual tool that gives users the ability to upload images or video files and then add audio or text comments. "The power of this," said Lovely, "is in the commenting."

4. Glogster

While referred to as an "interactive poster," Glogster--Lovely's No. 4 pick--is, in effect, a personal Web page complete with embedded media links, sound, and video capabilities. Students can work with Glogster individually or as a group to create presentations, share information, and interact with their peers. Lovely stressed the importance of signing up for the "EDU" version, which prevents other users from viewing class-specific "Glogs."

5. Skype

This tool, according to Lovely, not only has the potential to improve class participation and

collaboration, but it can also help cut costs by providing free voice and video calling to other Skype users worldwide. Some uses of the platform include multi-class and cross-district collaboration, professional development, and virtual field trips.

6. Animoto

Animoto is an automated presentation generator that focuses on using images to communicate a message. "This tool is great for class collaboration," said Lovely, and it is easier than using PowerPoint.

Two versions of the platform are currently available: a paid version for general public use and a free education version offering unlimited use for teachers and students.

7. Yack Pack

Coming in at No. 7 on Lovely's list was "Yack Pack," an Internet-based voice communication tool that works a lot like voicemail for the Web. Users define a "pack"---a group of individuals they want to communicate with---and then record messages for the group, an individual, or even a subset within the group using a standard computer microphone. When members of the pack log in, they can listen and respond to the messages.

Using Yack Pack Live--a component of Yack Pack--users have the added ability of broadcasting their messages in real time using a small widget that can be embedded in a website. Uses of the platform, said Lovely, include multi-class collaboration, or even parent-teacher communications.

8. Create-A-Graph

"This may be an odd choice for the list," Lovely conceded as she revealed her No. 8 pick, "because, in some ways, it's not really Web 2.0. It's not quite as collaborative as some of these other tools. But if you want to cut to the chase and teach kids about creating graphs and reading data, this is a great tool."

Create-A-Graph is a Web-based tool aimed at giving students an accessible way to learn graphing fundamentals. The tool is easy and flexible, according to Lovely, and allows them to learn important concepts using their own information.

9. <u>Voki</u>

No. 9 on the list is Voki, a text to speech generator that, according to Lovely, has a lot of very interesting applications. "This is more than just something cute that can be embedded in a Web site," she said, referring to the animated figure being projected on the screen. "What if the Voki was reading a list of spelling words? What if it was speaking another language? What if I had a Web site that had a Voki embedded to tell my kids what was going on so that the one's that couldn't read could hear it? What if kids used Voki to say something important?"

The site offers a high level of customization ranging from the overall look of the Voki to the sound of its voice. But, Lovely warned, "as with all tools, there has to be a task and a deadline." Let them play with it once, she said, and then have them get to work.

10. Kerpoof

Kerpoof is a site that provides a variety of creative tools for animation, drawing, and movie creation. Users can choose from a range of preset characters and environmental options, or they can create their own. The site offers drag-and-drop simplicity coupled with advanced animation

REDEFINING SYNCHRONOUS LEARNING

and editing capabilities that, according to Lovely, open the platform up to a range of curricular applications.

Chris Riedel, "Top 10 Web 2.0 Tools for Young Learners," T.H.E. Journal, 2/2/2009, http://www.thejournal.com/articles/23898

Plan Title:	Bones and S	keletons: LE 7	Feeth & Jaws wit	h Comic Life
Grade Level:	4		Subject(s):	Science
Synopsis: brief s Students will cr template "talkin data will be use activity that wil can help engage their teeth will I notebook page)	ummary of lesson i opture a photo (i og bubbles" to la d to answer que l help teachers a e students who a be accurate and . See finished co	including final prod n Comic Life) of the their own to stions from the and students into re reluctant to v a realistic repre- pomic at the end of	hect or outcome of their upper and beth. Their comp lesson (as found is grate technology write down their of sentation of their of these instruction	lower teeth. They will use the oleted Comic Life science notebook in the teacher's manual). This is one in the science kit. Using Comic Life observations. In addition the photo of mouth (as compared to the kit science ins.
PURPOSE: SI	andards directly re	lated to content kn	owledge and classro	om work
Standard: Text &	Reference Number	(if applicable)		Methods of Assessment: Formative & Summative
netevant content, s	ecnnology, ELL, St	L standards		
2. Technology 5 Communication (http://www.iste standards-2007.	itandards as ide: 2B, Technolog org/standards/r aspx)	ntified in ISTE 1 gy Operations & nets-for-students	NETS•S: Concepts: 6B s/nets-student-	students & teacher.
WHAT WILL S	TUDENTS KN	OW AND BE /	BLE TO DO?	
Enduring Under Overarching theme	standing: of inquiry	N/A	101010101	
Essential Questi	ons:	N/A		
Learning Object Students will know How to verbally r	ive (Teaching F nake scientific ob	oint): servations.	<i>Students wil</i> Create a dig understandit	l be able to ital artifact that represents their ig of the content.
LEARNING I What is the plan for	EXPERIENC	E & INSTRU will you engage st	CTIONAL ST udents in the process	RATEGIES-

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Map out the instructional strategies and the process you will use to launch and set up	Materials -	Time
your lesson	Tools	
 How will you introduce the purpose of the lesson? 	1	
This activity is used in conjunction with LE7		20.45
 How will students work during independent time? (Independently, small groups) 	Computers	30-45 minutes
pairs)?	with Comic	(one lab
The teacher will decide based on previous lessons what works the	Life	session)
best with their students. This activity can be for individual students	Life.	
or in pairs.		
 Will there be public records (charts) of students' thinking? If so, how will these be 		
displayed and used to support learning?		
The comics can be printed so student's can personally share them		
with a younger student.		
 If infusing technology, how is it integral to the learning process? Students create 		
artifacts that use text to communicate and exchange ideas.		
Use of Comic Life differentiates for learning styles, appealing to the		
visual learner.		1
 How will you access student prior knowledge and experience in the opening? 		
Class discussion and other lessons in the Bones and Skeletons		
Science Kit.		
 How will you know students understand the task/activity? 		
Students will submit their comic to the class Hand In folder on the		
school file server for teacher review. Students will be able to discuss		
their comic.		
(See example of finished Comic Life at the end of these directions.)		
After completing the exploring and discovery of their own teeth.		
students log in to their accounts.		
Open Comic Life		
 Click Comic Life's "Canture" tab and use the "Excesse" 		
button to take a photo of lower teeth		
Drea whete of lower teeth to templete error and lobal lower		
 Drag photo of lower teeth to template area and label lower 		
teeth using speech bubbles.		
 Save work appropriately naming the document including the 		
student's name.		
 Click Comic Life's "Capture" tab and use the "Freeze" 		
button to take a photo of upper teeth.		
 Drag photo of upper teeth to template area and label lower 		
teeth using speech bubbles.		
 Add titles to photos using Lettering. Save work. 		
 Export as "Fixed Resolution PDF" to the Deskton 		
 If Class Folders are being used and you wish the chudent to 		
submit the work electronically the student can drag the DDE		
file into the class Hand In folder		
me mo me class riand in lolder.		
Neter	-	
Note:		
This technology integration can be used at the end of Session One or		
at the end of Session Two as a cumulative artifact for LE7. The title		
of the Comic Life would then become Omnivore.	!	

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MONITOR & SUPPO	ORT STUDENT THINKING DUDING INDEDED	
confer) Key Domains: As	sessment. Student Engagyment	DENT TIME (practice and
 What specific questions understanding? 	statements, and actions will you use to assess student's	Marken Service and Service and Service
Student observations	and asking students to share and surlain the	
Comic Life picture an	two actions that can be used to	
student's understandi	ng	
How is technology being	ug.	
If the activity takes m	ore than one session student progress (formative assessment)	
work in the class Han	d In folder on the set of St	
 How will you keep track 	of student understanding source and server for review.	
share? To keep track of	Individual understanding?	
The student's Comic	Life can be personally shared with a younger	
student to demonstrate	e their understanding of the types of teeth and	
their function.	of the types of teeth and	
 How will you plan for st 	udents interacting with each other?	
Students are largely in	dependent in this activity.	
 What student responses in administration? 	might prompt you to call for a mid workshop share or	
If students seem to be	misished in the second	
familiar ansuch with a	mislabeling their pictures, if they are not	
fammar enough with t	ne Comic Life tools, if students edit	
iorniating in a less rea	idable way (e.g. colors on background, text	
odd colored, pictures o	or speech bubbles on top of each other)	
By using technology, how	will it support student learning?	
by using technology s	tudents save time and learn to use digital	
the mouth	aking pictures of mouth instead of drawing	
the mouth.		
STIPPOPTING PE	OURCES & ADDITION	
DOLLON THIS RE	SOURCES & ADDITIONAL INFORMA	TION
Deflection	leachers should be familiar with how to use C	omic Life. This activity doesn't
Kellection	need to be done in the lab. It can be set up in th	e room with a few computers
Comments	with built in cameras and Comic Life for stude	ats to login to and complete
Suggestions	their LE7 Science Notebook data sheet. Teach	ers can contact the STEM or
 Modifications 	EdTech Departments for support with integrating	ig technology into the lesson
		e mare reader.



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Plan Title:	Circuits and Pat	hways: LE 9: Brightness Meter	Granhing	CONTRACTOR OF THE
Grade Level:	4th	Subject(s):	Science	
Synopsis: brie, This activity i brightness of t their findings	summary of lesson incluss based on LE9 in Ci he bulbs, they will g using the graphs as s	iding final product or outcome rcuits & Pathways on page P.12 raph the results using a spreads cientists do.	9. After students neet. Students wil	have measured t be able to expla
PURPOSE:	Standards directly relate	d to content knowledge and classes		
Standard: Text	& Reference Number (if	applicable)	Methods of A	ssessment: Format
Relevant content,	technology, ELL, SEL st	tandards		
1. Science Star 2. Technology and Informatic results. (http:// standards-2007	ndards as identified i Standards as identifi n Fluency 3D: Stude www.iste.org/standa /.aspx)	n Science Kit Teacher Guide ied in ISTE NETS•S: Research ents process data and report rds/nets-for-students/nets-stude	Rubric to be students & t	generated by eacher.
WHAT WILL	STUDENTS KNOW	AND BE ABLE TO DO?	No. Contraction of the	na filosofia a
Enduring Under Overarching them	erstanding: ne of inquiry	N/A		1. 20. 90 CM 960 960 960 19
Essential Ques Questions to guid	tions: tinquiry	N/A		
Learning Object Students will known How to use bri How to collect	ctive (Teaching Poin w ghtness meter the results	t): Students will b Create a grap Analyze and d	e able to h in a spreadsheet explain data in a s	preadsheet
LEARNING What is the plan f OPENING/LAN Environment and C	EXPERIENCE & "learning and how will INCH/SET UP Key De withing	INSTRUCTIONAL STR. you engage students in the process? mains: Purpose, Student Engagement, C	ATEGIES-	gy, Classroom
 This act spreads at the en of data Student teacher noteboo spreads 	ivity – the purpose o heet is to analyze dat ad of LE9. It replaces and uses a spreadshee s work either in group preference. The data k and then used in the neet for all students.	f which is to create and use a a as scientists do – takes places s the paper and pencil gathering et. ps or individually depending on can be written the science e lab to demonstrate use of the	Materials - Tools Computers Projector Science Notebook with the data from LE9	Time 30-45 minutes (1 lab session)
Directions belo • Open N • Choose • Save (ch	w are for creating the umbers. a blank spreadsheet. oose naming conven	e spreadsheet in Numbers: tion so teacher/students can fin	d	

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•	In cell A1 type: Bulbs			
•	In cell B1 type: Brightness		1 .	
•	In cell A2 type in the number of bulbs, in cell B2 type in the brightness meter level.			
•	Continue down with the number of bulbs and the brightness			
	Highlight cells A1 to the last cell with data in actions D			
	Click on the toolbar "Charts" and choose the line grant (The			
	icon shows two lines but the graph will show only one line	1	1	
	because of the data entered)			
	The graph will show up on the spreadsheet it may be below			
	the data and can be dragged up to the right of the data			
	The spreadsheet can also be resized by clicking on the			
	spreadsheet and in the lower right corner click and drag			
1	smaller so only the cells with data are showing maybe a few		1	
	more empty cells too. (Save!)			
•	To format the chart: click on the chart, go to the Inspector			
1	(which maybe opened already)			
•	Click on the Axis tab (it might be clicked already), Under			
	Value Axis (Y), to the right of Max & Min, change Steps			
	from 4 to 10.]	
•	Click on "Choose Axis Options" for both the X- & Y-axis			
	and choose "Show Title."			
•	Triple click on the Value Title and change to Brightness.			
	Triple click on Category Title and change to Bulbs.			
•	Delete the Brightness with the open circle icon.			
•	Double click on Chart 1 and change to an appropriate title.			
•	Click on "Choose Axis Options" for the Y-axis and choose			
	Click on #Charge tails Outly P.C. at M			
•	"show gridlines"			
	Save. Student can turn in their spreadsheet using the class			
	Hand In folder on the school file server. Contact your			
	EdTech teacher for help with this, if you choose			
•	There are other options to change, if you choose: color.			
	width of line, and the circles that show the point. The options		-	
	are found in the inspector.			
After c	reating the line graphs, review how to read a line graph and			
explain	the results.			
-	To loom more shout the Analyte Manual and the			1
•	http://www.stomiologming.com on one of the			
	video tutorials on Numbers			
	video tatoriais on Numbers.			

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 Ask students to science and post participating? (create it? Technology is i follows best pra work. Scientists too, will the students 	explain the graph. Look for the use of ssibly mathematical vocabulary. working in groups, are all students Can all students explain the graph and how to integrated into the lesson in a manner that actice of scientists using various tools in their s use graphs to show patterns and trends. So, dents.	
SUPPORTING RE Reflection • Comments • Suggestions • Modifications	SOURCES & ADDITIONAL INFORMATION Teachers should go over how to create a spreadsheet b students. Teachers can contact the STEM or EdTech D with integrating technology into the lesson.	efore doing this with Departments for support

APPENDIX J

Human Participants Protection Education Certificate

Completion Certificate

This is to certify that

Mary Wegner

has completed the Human Participants Protection Education for Research Teams online course, sponsored by the National Institutes of Health (NIH), on 01/26/2006.

This course included the following:

- key historical events and current issues that impact guidelines and legislation on human participant protection in research.
- ethical principles and guidelines that should assist in resolving the ethical issues inherent in the conduct of research with human participants.
- the use of key ethical principles and federal regulations to protect human participants at various stages in the research process.
- · a description of guidelines for the protection of special populations in research.
- · a definition of informed consent and components necessary for a valid consent.
- · a description of the role of the IRB in the research process.
- the roles, responsibilities, and interactions of federal agencies, institutions, and researchers in conducting research with human participants.

National Institutes of Health http://www.nih.gov

APPENDIX K

Institutional Review Board Approval

PEPPERDINE UNIVERSITY

Graduate & Professional Schools Institutional Review Board

January 12, 2011

Mary Wegner

Protocol #: E1210D06 Project Title: Redefining Synchronous Learning for the 21st Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking

Dear Ms. Wegner,

Thank you for submitting your application, Redefining Synchronous Learning for the 21st Century: A Descriptive Case Study to Examine Multi-Channel Synchronous Online Communication and Critical Thinking, for exempt review to Pepperdine University's Graduate and Professional Schools Institutional Review Board (GPS IRB). The IRB appreciates the work you and your faculty advisor, Dr. Linda Polin, have done on the proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations (45 CFR 46 -

http://www.nihtraining.com/ohsrsite/guidelines/45cfr46.html) that govern the protections of human subjects. Specifically, section 45 CFR 46.101(b)(2) states:

(b) Unless otherwise required by Department or Agency heads, research activities in which the only involvement of human subjects will be in one or more of the following categories are exempt from this policy:

Category (2) of 45 CFR 46.101, research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: a) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit a **Request for Modification Form** to the GPS IRB. Because your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the GPS IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the GPS IRB as soon as possible. We will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the GPS IRB and the appropriate form to be used to report this information can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* (see link to "policy material" at <u>http://www.pepperdine.edu/irb/graduate/</u>).

6100 Center Drive, Los Angeles, California 90045 · 310-568-5600

Please refer to the protocol number denoted above in all further communication or correspondence related to this approval. Should you have additional questions, please contact me. On behalf of the GPS IRB, I wish you success in this scholarly pursuit.

Sincerely, Ymynsting

Yuying Tsong, Ph.D. Clinical Professor/Research Methodologist Psychology Division Pepperdine University Graduate School of Education and Psychology 6100 Center Dr. 5th Floor Los Angeles, CA 90045

cc: Dr. Lee Kats, Associate Provost for Research & Assistant Dean of Research, Seaver College Ms. Alexandra Roosa, Director Research and Sponsored Programs Dr. Yuying Tsong, Interim Chair, Graduate and Professional Schools IRB Ms. Jean Kang, Manager, Graduate and Professional Schools IRB Dr. Linda Polin Ms. Christie Dailo