Title

Corny, Lame, and Useful: How Secondary School Faculty Use the Learning Software Odyssey

Permalink

https://escholarship.org/uc/item/7s8499pb

Author

Silberman, Peter

Publication Date

2013

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA

Los Angeles

Corny, Lame, and Useful: How Secondary School Faculty Use the Learning Software Odyssey

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Education

by

Peter Silberman

ABSTRACT OF THE DISSERTATION

Corny, Lame, and Useful: How Secondary School Faculty Use the Learning Software Odyssey

by

Peter W. Silberman

Doctor of Education

University of California, Los Angeles, 2013

Professor William Sandoval, Co-Chair

Professor Eugene Tucker, Co-Chair

This study investigated how and why secondary school faculty use the learning software, Odyssey. Faculty were asked about their pedagogical beliefs and instructional practices, the perceived impact of using the software on student outcomes, and how, if at all, Odyssey-using faculty would change the software to increase utility. Data collection methods included a survey of using and non-using faculty, an instant poll, journal entry, and interviews with seven teachers who had used the software. Data revealed that while overall use at the school was low, users perceived myriad and significant value provided by the software. There was no demonstrated relationship between pedagogical beliefs and Odyssey use, and perceptions on the impact of Odyssey on student outcomes were minimal. In response to questions about how to change or improve the software, faculty suggested three main areas for improvement—technical, pedagogical, and visual.

This dissertation of Peter Silberman is approved.

Louis Gomez

James W. Stigler

William Sandoval, Committee Co-Chair

Eugene Tucker, Committee Co-Chair

University of California, Los Angeles

2013

DEDICATION

To my loving wife, ever-supportive family, and those dear to me who have passed. I am who I am

because of you. Thank you.

TABLE OF CONTENTS

CHAPTER ONE: STATEMENT OF THE PROBLEM

Introduction

For decades, scholars have decried traditional classroom teaching as unfit for the post-industrial economy and wholly outdated (Wolk, 2007; Christensen et. al., 2008). In response, alternatives to traditional, brick-and-mortal classroom teaching have emerged, with trends in e-learning particularly pronounced over the past decade (Picciano & Seamen, 2009). E-learning is an umbrella term which includes courses which are taught fully or partially through online delivery methods; within that, blended learning courses can be defined as those combining both traditional classroom teaching with online delivery. Herein, the term blended learning will encompass any mix of traditional classroom and computer-based teaching, though this study focuses only on teachers using specific software (discussed further below) to supplement existing pedagogy. While evidence (Bonk, 2002; Bonk, et. al., 2002; Bonk et. al., 2006; Brown, 2001; Christensen, et. al., 2002; Dean et. al., 2001; DiLeo, 2007; Fitzpatrick, 2001; Galagan, 2000; Hoic-Bozic, et. al., 2009; Lim et. al., 2006; Ngo, 2007; Osguthorpe & Graham, 2003; Rovai & Jordan, 2004; Twig, 1999, 2004) suggests blended learning technology can improve a variety of educational outcomes, significant barriers remain to its use and integration into teachers' pedagogies and classrooms.

Despite such barriers, learners are nonetheless increasingly accessing educational content via blended learning delivery methods. This trend is evident across a variety of learning media. For example, a 2009 report (Kim et. al.) reported that by 2012, 80-90% of workplace training classes would utilize blended learning, and that globally, over 1 billion learners would access course resources and content via blended environments**.** At the post-secondary level, blended learning courses have been found to maintain or increase educational quality and outcomes while reducing cost and allowing for expanded enrollment (Twig, 1999; 2004). Though subjected to comparably less investigation, blended learning delivery within secondary education may hold similar promise (DiLeo, 2007; Ngo, 2007; Harvey-Buschel, 2010, FitzPatrick, 2001).

Despite strong evidence to suggest that information and communication technologies can bring improved learning outcomes, teachers have been slow to use technology as a pedagogical tool (Ottenbreit-Leftwich, 2010). Fisher (2006) and Harris (2005) note that technology has failed to act as a lever for change in the majority of K-12 environments. Instead, as Fisher suggests, teachers must act as change-agents themselves. By contrast, large scale survey results (2005 National Teacher Survey, 2005; Gray et. al., 2010) demonstrate that teachers primarily use technology to facilitate administrative and communications related work. Similarly, students typically use technology to complete homework assignments.

This apparent aversion to technology as a pedagogical tool stands out against a background of rapid change in the availability of computing technology and the expansion of necessary infrastructure such as internet access and bandwidth, improved hardware, and the proliferation of online courses or course resources. For example, in 1994, at least 30% of public schools in the US had internet access (Becker, 2000a); by 2009, 93% of teachers reported having internet access available in their classroom every day. Analogously, by 2009, over 25% of first-year public high school students reported taking at least one blended learning course (Picciano et. al., 2012), up from 5% in 2001-02.

Nonetheless, integrating blended learning in the form of course software into existing courses as a pedagogical tool faces myriad challenges. Included among those is the fact that commercial vendors deliberately distance their products from a set pedagogy or instructional philosophy, instead opting for flexibility and customization in attempt to appeal to a broad base of consumers (Govindasamy, 2001). Purchasing such software does not include clear processes by which to build off of, or integrate with, existing pedagogy. This study will examine how and why teachers use the software, what benefits in perceived students outcomes are gained by use, and finally what changes, if any, to the software itself would lead to increased utility.

History and Background

Though widely seen as a 21st century phenomenon, courses blending traditional classroom and distance delivery systems date as far back as the 1920s, when students completed both in-class and mail-in work (Bersin, 2004). Today, blended learning, also sometimes called hybrid learning, has many definitions, though all include a portion of learning delivered through traditional, brick-and-mortar environments, and a portion through online or digital systems (either remotely or in school) (Driscoll, 2002; Brown, 2001; Young, 2002). Although this study looks only at the use of CompassLearning's Odyssey course software as a compliment to classroom work, extant literature on a variety of blended learning media will be reviewed in subsequent sections.

Blended learning has shown the ability to maintain or increase both educational outcomes and productivity. In a study of 30 post-secondary institutions, Twig (2004) found that twenty-two reduced Dropout, Failure, Withdrawal (DFW) rates while increasing student satisfaction and reducing seat time. The colleges and universities studied utilized blended learning within high-enrollment, introductory courses, which were often 'gateway' classes required as part of a sequence to fulfill general or major requirements. These were also courses where DFW rates were among the highest at the post-secondary institution. Reductions in DFW rates were accompanied by increases in student satisfaction. Similar success and rates of growth have been observed in graduate level courses and corporate training programs (Galagan, 2000).

Although important differences exist between secondary and post-secondary classrooms and between teaching and learning at each level, pedagogical overlaps allow for some utility in drawing on the literature from higher education to inform the utility of blended learning at the secondary level. Twig points to the success of blended learning in reducing direct instruction time and replacing it with higher engagement content—such as low stakes quizzes with prescriptive follow-up activities to address incorrect answers, discussion-rich forums, and practice activities to review content covered in lectures (Singh, 2003). The changes described above can apply to any educational setting which relies heavily on direct instruction, including secondary school classrooms, and is therefore useful background to

understand the potential utility of Odyssey at CCHS. Odyssey in fact provides many of the same features—low stakes quizzes with practice activities to address incorrect answers, discussion forums, short videos/animations to cover content—to name a few (a more detailed description will follow in Chapter 3).

Although the pedagogical benefits of software like Odyssey apply at all levels of education (constructivist, student-centered, high-engagement learning activities), few studies have directly examined educational outcomes in secondary blended environments. There may be several reasons for this. First, the productivity benefits of blended learning—most obviously the capacity to increase enrollment by reducing seat time and the ability to reduce the number of full-time faculty involved in teaching—are not necessarily applicable at the secondary level where population trends dictate enrollment and faculty are primarily teachers (as opposed to researchers and/or administrators). Second, blended learning environments have been grouped broadly with e-learning (Picciano & Seaman, 2009) thus obscuring enrollment and trend data. Therefore, some literature reviewed herein from secondary education is not peer-reviewed, nor is it published, and must be viewed with appropriate discretion.

Still, estimates of enrollment in blended learning courses demonstrate its magnitude as a growing trend in US secondary education. For example, a Sloan Consortium study (Picciano & Seaman, 2009) reported that by November, 2006, at least 3 million students were in enrolled in courses which were 80 percent or more online, with 32.4 percent of districts having at least one student enrolled in blended learning courses in 2007. In total, the report showed, 83.8 percent of public schools in the US either utilized or planned to utilize within three years, fully or partially online courses, predicting 22.9 percent growth between 2009-2011. The authors' 2009 follow-up study indeed found that 1,030,000 were enrolled in either online or blended courses, up 47% from their 2007 report. While their 2009 report showed growth that outpaced their predictions from just two years earlier, the same report essentially corroborated district-wide use found in 2007; nearly three-quarters (74.8%) of all districts enrolled students in blended or online courses. Similarly, In *Disrupting Class* (2008) Christensen et. al., using

4

data from the Piccano and Seaman (2007) reports, as well as from other sources, predicted that by 2016, 25% of high courses would be online and by 2019 over half of all high courses would be online.

CompassLearning, the company manufacturing Odyssey, reports serving over 11 million students at over 20,000 K-12 schools. In academic year 2011, the company reports that over 250,000 unique student logins accessed CompassLearning content. In Pennsylvania, as of 2007, nearly a quarter (24%) of all public schools had adopted Odyssey© software (DiLeo, 2007), enrollment figures similar to those described in Picciano and Seaman (2009). Though understanding of the efficacy and benefits of blended learning on secondary education is limited as compared to understanding at the post-secondary level, evidence suggests that mixed-method delivery systems overall, and Odyssey software specifically, may hold promise for improving educational outcomes across several measures (DiLeo, 2007; Harvey-Buschell, 2010; Alfaro, 2008). Productivity aside, many of the benefits derived from blended learning at the post-secondary level apply within secondary education; blended learning scholars note the ability of educational software to increase active learning, collaboration, and customization while reducing direct instruction—changes beneficial across educational levels (Osguthrope and Graham, 2003; Christensen, et. al., 2008; Blouin et. al., 2009).

Problem in Local Context

Cobra City High School (CCHS) is a "four year comprehensive high school serving approximately 2,300 students in grades 9 through 12," (CCHS, 2011.). CCHS serves a highly diverse student body drawing on several municipalities in an urban area of the southwestern United States. For academic year 2010-11, CCHS enrolled 38.5 percent Hispanic/Latino students, 1.3 percent American Indian or Alaska Natives, 11.1 percent Asian, 23.8 percent African-American, and 21.4 White students (3.9 percent of students were Filipino, Pacific Islander, or two or more non-Hispanic ethnicities). The dropout rate over the same period was 10.0 percent, ranging from 0.0 to 16.7 percent within ethnic groups. Roughly 6.7 percent of enrolled students were English language learners. 68.8 percent of

graduates in the class of 2011 enrolled in post-secondary institutions, with rates ranging from 56.6 percent among Latinos to 80.5 percent among Asians ([State] Department of Education, 2011.).

Fifteen Odyssey software programs were purchased by the Cobra City School District, which serves one of each, elementary, middle, and high schools (as well as a continuation school), in the fall of 2011. According to CCHS principal, Jackson Baldwin, the district hoped Odyssey software would 1) help decrease the cost of summer school programs by reducing the need for full time faculty and increasing fee-based enrollment; 2) help current faculty develop and implement new pedagogy which encourages active learning, collaboration and higher levels of engagement, and 3) would position the Cobra City district at the forefront of a growing trend toward virtual and non-traditional instruction (personal communication, Baldwin, J., December 1, 2011). Courses purchased were as follows:

Math	Algebra I	Geometry			
English	English I, II, III, IV				
Social Science	World Geography	World History	U.S. History I, II	U.S. Government	Economics
Science	Earth/Space Science	Biology			
Health and Wellness	Health				

Given the income and ethnic diversity of the population at CCHS, the site provides a unique opportunity to study the challenges related to the implementation of blended learning.

Need for Study

While evidence at all levels of the K-20 system exists to suggest blended learning can improve educational outcomes while reducing costs, many barriers exist to teachers adopting such technology in his/her practice. Further, though blended learning takes many forms, it is reasonable to believe that pre-packaged programs such as Odyssey will continue to proliferate secondary school classrooms in the future; at present, CompassLearning boasts having served 20 million students across 20,000 schools

nationwide since its inception, and 250,000 in 2011 (CompassLearning, 2011). Additionally, though the company does not publish precise data about usage in California, it is known that the company serves several California charter schools, as well as schools in the San Mateo and Poway school districts (CompassLearning©, 2011). While Odyssey provides fully packaged courses, the program also offers a degree of customization and can be integrated as a resource into current courses. While there are well-documented correlations between various factors, such as computer-savvy, professional development/training, and pedagogical beliefs, and educational technology use, on the whole, teachers are largely using technology for administrative and communications tasks, rather than as tools to improve pedagogy. I also investigated whether there is a correlation between Odyssey usage, including type and extent of usage, and student outcomes (or, in this case, perceptions of student outcomes). Moreover, while professional development, computer savvy, quality hardware (e.g. computer or other computing technology) and constructivist pedagogical beliefs can all lead to increased computer use, little is known about how technology itself can be changed/designed to increase use, particularly according to teacher-users. This issue is particularly important, given the challenges in trying to change a given teacher's pedagogical beliefs, or in the investment required to improve, maintain and keep up to date quality infrastructural resources such as hardware and internet access/bandwidth. In short, it may prove to be easier to work toward better technology integration by changing the technology itself than by changing the user (i.e. teacher) or the environment (i.e. the school).

Research Questions:

1. What value, if any, do faculty members perceive in using Odyssey?
2. Among Odyssey-users, what are faculty members' pedagogical beliefs and instructional practices?
3. According to Odyssey-using faculty, what changes, if any, to the software, including design, features, or functionality, would increase its utility?
4. How, if at all, do type and extent of Odyssey usage affect perceived student outcomes?

Methods

The goal of this project was to understand how and why faculty members are using Odyssey, how, if at all, that use affects perceived student outcomes, and, subsequently, what changes, as identified by Odyssey-using faculty, to the design of the technology would lead to increased use at CCHS.

This research project is a qualitative case study using surveys, journal entries, and interviews. I began by distributing surveys to 49 faculty members in the math, science, language arts, and social science departments. These surveys, answering research question number one, were used to determine amount and patterns of Odyssey use among faculty members. After completing the survey, faculty members were asked to complete one of two tasks: faculty members not using Odyssey were shown a list of 13 possible inhibitors to using Odyssey and asked to respond to up to five of those answers indicating most pressing barriers to Odyssey use. Faculty responded to this list of inhibitors using text messaging on their cell phones, and thus results were displayed immediately on a large screen at the front of the room. Odyssey-using faculty members were asked to complete a separate task: while they watched the results of the text poll displayed on the screen in front of them, they wrote in their journals as to how such barriers did not prevent them from using Odyssey—in other words, how they avoided, or overcame obstacles identified by non-Odyssey using faculty members. Although faculty members were instructed to respond to the results of the instant poll, entries varied, with some simply expressing their sentiments about Odyssey. In total, of the 49 faculty members surveyed, 10 also provided journal responses. At the end of the paper-and-pencil survey, Odyssey using faculty members were invited to provide their email address so that I could contact them to arrange for a follow up interview. In total, thirteen faculty members provided their email address, and a total of eight interviews were conducted.

I used interviews to 1) understand what, if any, benefits teachers identify as having been derived from using Odyssey; 2) understand teachers' pedagogical beliefs; 3) gather data around perceived (and potentially actual) student outcomes, and 4) to solicit input about how, if at all, teachers using Odyssey

would change or redesign the software to improve its utility. The literature reveals a significant relationship between teacher attitudes toward computing technology and pedagogical beliefs, respectively, and the integration of technology (Kadel, 2005). Interviews will allow for in-depth investigation of both general and subject/course specific challenges to Odyssey use. Interviews will be used to address all four research questions, and will be the only source of data for research questions two and three.

Public Engagement

The findings of the surveys and observations will be presented to CCHS administrators and faculty toward the creation of a teacher education program to help integrate Odyssey into the curriculum. Findings will also be provided to Odyssey's parent company, CompassLearning, so that it may improve its software based on the results of this project.

CHAPTER TWO: LITERATURE REVIEW

Introduction

This chapter synthesizes extant research relevant to this study. First, I review the history and various definitions of blended learning, selecting that which is most appropriate for this study. Next, I provide a brief overview of Odyssey and similar Learning Management System (LMS) or Computer-Assisted Instruction (CAI, also sometimes known as Computer-Based Instruction, CBI) software programs. Subsequently, I provide a brief overview of the evidence illustrating the benefits of blended learning, particularly within K-12 education. After reviewing the history and benefits of blended learning, I review the relevant literature highlighting factors related to the integration and use of technology, particularly as it relates to pedagogy. Finally, I review literature around the design of Odyssey.

History and Definitions of Blended Learning

By nature, blended learning grew out of its two respective branches—traditional classroom and distance delivery education. Traditional classroom courses date back to antiquity. Though widely seen as a 21st century phenomenon, courses taught outside the traditional classroom have existed for over 150 years (Major, 2001). Prior to the mid-twentieth century, such learning took the form of distance education. At the time, distance education largely consisted of correspondence, via post, between teacher and student. However, in the latter decades of the twentieth century, the development of new forms of media, such as television, radio, facsimile and other forms of remote communication, began to shape the construct and manifestation of the independent student learner. Though the first computers were in use before the 1950s, it was not until 1963 when computer-assisted instruction (CAI) was first employed in public schools (Wright & Wilson, 2007). To understand the history of the use of computing technology schools, it is important to trace the history of not just computers themselves, but also of the infrastructure needed to facilitate such use. The 1970s saw the advancement of computing hardware, highlighted by developments such as the Apple personal computer and portable magnetic storage devices (e.g. 'floppy'
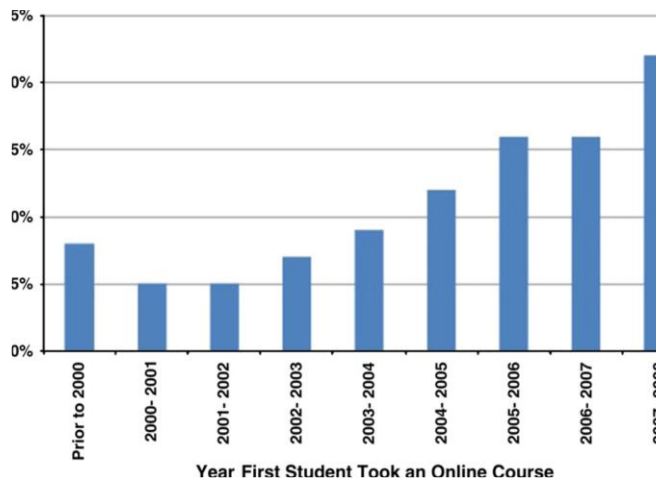
(*Above*) Figure 1: Rise of Online Courses in US Public Schools 2000-2008 (Picciano et. al., 2012, p.128).

disks), advances which pushed the proliferation of computers in schools. By 1980 90% of US public schools contained at least one computer. Though reports vary, by 1994, at least 30% of public schools had internet access (Becker, 2000a; Mendels, 1999) and by 2003, between ninety and one hundred percent of US public schools provided their students on-site internet

access (Becker, 2000a; Perie, M., Moran, R., & Lutkus, A. D., 2005). This dramatic increase was funded largely through the 'E-rate' program enacted by the Clinton administration (Federal Communications Commission, n.d.). By the end of the century, digital resources such as computerized courses, courses loaded onto storage devices like CD-ROM, and eventually courses delivered through online media had emerged, expediting the development of distance learning. Underscoring the rapid progression of computer use in schools, consider the following: in 1981 computers existed in schools at a rate of just 125 students per computer; by 2000, computers were commonplace, available at a rate of 5 students per computer in public schools (Cuban & Peck, 2001). Commensurately, by 2009, 97% of teachers reported having at least one computer in their classroom every day, while 93% of teachers reported having internet access available every day. Although access to computers and the internet should not be interpreted as a proxy for the progression of blended learning, their proliferation nonetheless serves as the foundational infrastructure required to introduce blended learning. Infrastructure, or lack thereof, plays an important role in how and whether CCHS faculty use Odyssey, as will be explored in subsequent chapters.

Courses *blending* traditional classroom and distance delivery began in the 1920s, with the advent of mail-based correspondence courses (Bersin, 2004). Today, blended learning has many definitions. Though numerous and varied, all definitions include, as a fundamental starting point, a portion of learning

delivered through traditional, brick-and-mortar environments, and a portion delivered through online or computer-based systems (Driscoll, 2002; Brown, 2001; Young, 2002). Analogously, this study will consider blended learning as including *both* classroom and computer-based instruction. More directly, this study examines a very specific form of blended learning: traditional classroom courses which are, in any form, supplemented by Odyssey course software at Cobra City High School.

Benefits of Blended Learning

Blended Learning in Post-Secondary Education

Blended learning has shown the ability to maintain or increase both educational outcomes and productivity. As discussed in chapter one, Twig (2004) found that twenty-two of thirty post-secondary institutions studied introduced blended courses which reduced Dropout, Failure, Withdrawal (DFW) rates while simultaneously increasing student satisfaction and reducing classroom time. These institutions introduced blended learning into high-enrollment, introductory courses, (often known as 'gateway' courses) required to fulfill a sequence of general or major requirements. Within these courses, DFW rates were among the highest across post-secondary education prior to blending. The author also reported that reductions in DFW rates were accompanied by increases in student satisfaction. Similar achievements have been observed in graduate level courses and corporate training programs, where blended instruction is increasingly the norm (Galagan, 2000). Evidence suggests similar results in international contexts as well (Hoic-Bozic & Boticki, 2009), where blended courses were analogously effective in reducing dropout rates and increasing active learning, while improving student satisfaction and motivation. Somewhat astoundingly, Rovai and Jordan (2004) even found students' sense of community to be higher in blended courses as compared to both traditional classroom courses and distance-only delivery systems. This likely speaks to the pedagogical benefits of blending, where students may be more engaged, participate in more frequent large- or small-group discussions, and overall, feel a greater sense of belonging and community than in a passive, lecture-heavy classroom course.
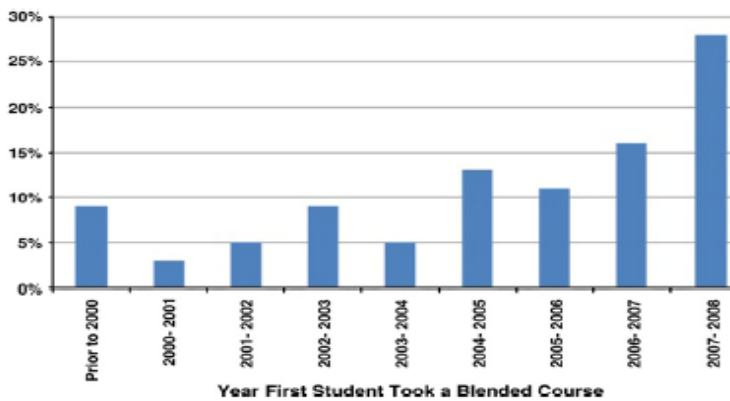
(*Above*) Figure 2: Rise of Blended Courses in US Public Schools 2000-2008 (Picciano et.al., 2012, p.129).

As is the case in post-secondary education, blended learning in K-12 is a rapidly growing trend. Picciano and Seaman (2009) reported that as of November, 2006, at least 3 million students were in enrolled in courses which were 80 percent or more online, with 32.4% of districts having at least one student enrolled in blended learning courses in 2007. In total, the report showed, 83.8 percent of public schools in the US either utilized or planned to utilize within three years fully or partially online courses, and predicted 22.9 percent growth between 2009 and 2011.

As compared to post-secondary education, the benefits of blending computer-based and traditional instruction within K-12 are less clear. Just the presence of computers in schools, or even the frequency computer based instruction, seems to have no clear effect on student achievement. Alspaugh (1999) found no significant relationship between the number of computers in school per student and achievement in any of language arts, mathematics, science and social studies. Similarly, the author found no relationship between the number of computers per student and drop out or attendance rates. While the presence of computers alone does not necessarily equate to changes in student achievement, the picture is no less ambiguous when examining frequency of computer use. Johnson (2000) found that students with, at minimum, weekly computer instruction from computer savvy teachers did not perform any better on NAEP reading assessments than who had less or no computer instruction.

However, several individual and meta-studies paint a slightly rosier picture of the potential for Computer-Assisted Instruction (CAI) in raising scores. Karpyn (2003) found that both student and teacher technology use were positive predictors of student achievement on the Maryland State Performance Assessment. Earlier, Fletcher-Flinn and Gravatt (1995) found that computer assisted instruction raised average achievement of students in the 50th and 60th percentile; interestingly, the authors found no advantage of a pencil-and-paper version of CAI over traditional teaching methods, and argue that the higher quality instruction provided by CAI accounted for the difference in scores. Similarly, Bayraktar (2002) found modest increases in student achievement in science among secondary and college students using CAI, either in simulations or tutorials, individual computer use, or as a supplement to traditional instruction (i.e. blended model) as compared to students instructed in traditional-only methods. In a meta-analysis of 17 studies of K-12 reading achievement, Soe et. al., (2000) found a net positive effect of using CAI to increase reading achievement and suggested that CAI has strong potential as an instructional tool for teaching reading.

However, according to Wenglinsky (2005), the effects of studies showing the benefits of CAI were rarely replicable in large-scale studies. The author argues that results from the NAEP indicate that *quality* of computer instruction was far more important than quantity, and students could show no benefit, modest benefit, or significant benefit from CAI depending on the quality of the program. These results also confirmed that teachers tended to use such technology for, at best, drilling and other didactic teaching methods, rather than as tools to develop higher level thinking. In looking at the 2001 NAEP data, the author concludes that computing technology is best utilized out of school, and that essentially, students find the best ways to leverage such technology for their own learning, particularly as compared to using specific programs or to complete specific tasks using such technology in school.

There may be no clear conclusion as to the effects CAI on student achievement. However the findings discussed above seem to indicate that the ways in which computing technologies are used significantly affect their impact on student outcomes. Osguthorpe and Graham (2003), synthesizing

blended learning scholarship, suggest that well-designed blended learning courses provide the following: pedagogical richness; access to knowledge; social integration; personal agency; and ease of revision. Pedagogical richness is described across several studies, and includes specific examples like small or large group discussions, more dynamic and engaging presentations of material, or even simply the ability to use classroom time to probe more deeply into course materials through discussions. In describing 'access to knowledge,' the authors note the ability to provide many examples to illustrate a concept (as opposed to a single example as you might find in static presentations such as text books). Like 'pedagogical richness,' social integration means that blended learning courses facilitate discussions, not only within the class, but perhaps with classes across the globe studying the same content. Along with Osguthorpe and Graham, Blouin et. al. (2009) analogously suggest that technology has the power to change the nature and function of the classroom. Moving away from the traditional use of classroom time for information delivery, the authors argue that technologically integrated courses, such as those which, at least in part, use Odyssey, could mean classroom time is used to cultivate discussion and intellectualism, develop critical thinking skills, and delve more deeply into course content and concepts. Several scholars corroborate this finding, writing that, rather than dedicating the majority of teaching time to whole-group instruction, technology like Odyssey shifts faculty priorities toward individual students, small groups, and toward student-centered in-class work (Becker, 1994; Schofield, 1997; Penuel and Means, 1999). 'Personal agency' is similarly noted across several publications as critical to explaining the success of blended learning—personal agency describes the process by which a learner can make "nontrivial decisions about what they will study and how they will study it" (Osguthorpe & Graham, 2003: 231). In other words, personal agency in blended learning describes a fundamental aspect of the customization/self-directed process of learning, such as through self-paced reviews, and access to multiple examples or explanations of a single learning unit, as well as by providing other features not necessarily available through the traditional lecture model of instruction. Finally, 'ease of revision' highlights two important features of blended learning courses. First, blended learning courses most often originate from traditional, face-to-face instruction (as opposed to distance education), and second, as a

consequence, curricula can respond to changing needs of the audience, thereby remaining spontaneous, malleable, and reactive.

Findings from Penuel and Means (1999) synthesize many of the benefits of blended learning. The authors found that teachers in highly technologically integrated courses were far less likely to use lecture/questioning as the dominant means of relating information. More importantly, the authors also noted that technology-using teachers were far more likely to have adopted a mentoring or class-supervising role, rather than acting as whole-class instructors. Analogously, the researchers noted that in high-technology classrooms, students were more likely to be working through high-level cognitive projects as opposed to teacher-mandated individual activities.

Beyond the pedagogical advantages, blended learning courses also address issues of computer literacy and access inequities. Though common in US households, computer and internet access are divided sharply along demographic lines. In 2004, only 30% of Black, non-Hispanic and Hispanic households nationally were found to have computers available for use; as of 2009, over 30% of households did not have internet coverage[1] (U.S. Census Bureau, 2009). Enormous disparities exist between accesses for different demographic groups: while white only households have internet access at a rate of 70.5%, and Asians 80.5%, only 54.5% of Black only households and 52.8% of Hispanic only[2] households had internet access. By contrast, nearly all US public schools have both computer and internet access. The use of technology in classrooms, as blended learning would entail, can help develop students' computer literacy. Dating back to the early 1980s, educating students to have high levels of computer literacy has been identified as critical to having a workforce able to compete in the twenty-first century economy. Blended learning, therefore holds the promise of helping reduce technological inequities related to demographics while educating a workforce more qualified for today's economy. Simplified, Cuban &

---

[1] While the U.S. Census Bureau "Current Population Survey" (2009) reports that 68.7 percent of households have internet access, the report also notes that 76.7 percent of households have at least one individual who can access the internet from some location (e.g. a smartphone).
[2] Includes all non-White, Hispanic groups.

Peck (2001) write that, in leveling the technological playing field, the use of computers in school holds the promise of increasing users' social capital.

All the benefits described above could reasonably apply to various forms of and places in education—within elementary, secondary, post-secondary, and even non-academic sectors (e.g. corporate training). However, within post-secondary education, blended learning courses have been widely praised for their ability to reduce cost (Twig, 2004). Particularly in high-enrollment, 'gateway,' courses, blended learning courses have been employed to reduce seat time, as well as time for instructors preparing and delivering lectures (albeit after initial up-front investments in course design). Consequently, post-secondary institutions are able to accommodate higher enrollments, with commensurate increased tuition revenue, while reducing DFW and improving nearly all measures of educational quality (e.g. student satisfaction, outcomes etc.). At present, it is not clear what impact blended learning courses could have on educational productivity within K-12 education, though it is worth noting that the impetus for Cobra City High School's purchase of fifteen Odyssey courses was revenue driven—district administrators believe they can use the software as fully automated courses for which they will charge tuition for summer enrollment, replacing live instructors, who were costly (personal communication with Dylan Baldwin, 2012). It is also worth noting that, as illustrated in Figure 3, among the benefits identified by school districts, improved pedagogy is the second least common reason for offering online or blended courses, just behind financial benefits (Picciano et. al., 2012).

Figure data showing horizontal bar chart with categories:
- Offering courses not otherwise available at the school
- Meeting the needs of specific groups of students
- Offering Advanced Placement or college-level courses
- Permitting students who failed a course to take it again
- Reducing scheduling conflicts for students
- Certified teachers are not available for traditional face-to-face instruction
- Addressing growing populations and limited space
- Online and blended offerings are financially more beneficial
- Online and blended offerings are pedagogically more beneficial
- Students prefer online course activities

Legend: 2005 - 2006, 2007 - 2008

X-axis: 0% 10% 20% 30% 40% 50% 60% 70% 80%

Year First Student Took a Blended Course

(Above) Figure 3. Summary of school district responses to: How important do you believe the following reasons are for a school district to offer fully online or blended learning? (Picciano et. al., 2012, p. 129).

Extent Literature on Efficacy of Odyssey

CompassLearning, the company manufacturing Odyssey, reports serving over 11 million students at over 20,000 K-12 schools. For example, in Pennsylvania, nearly a quarter (24%) of all public schools have adopted Odyssey software (DiLeo, 2007). CompassLearning associates estimate that nearly 200 schools in California use Odyssey in some form, serving approximately 6500 students with active accounts (personal communication with Deborah Stacker, 2012).

Though the impact of blended learning at the secondary level is somewhat inconclusive, research shows that Odyssey specifically may hold promise for improving educational outcomes across several measures (DiLeo, 2007; Harvey-Buschell, 2010; Alfaro, 2008). As a relatively recent and little studied technology, it is important to note that existing literature is derived exclusively from unpublished dissertations and should therefore be viewed with an appropriate degree of discretion. DiLeo (2007) found that, when controlling for other variables such as SES and prior academic achievement, Odyssey users of both language arts and mathematics software outperformed non-users on the state-wise, standardized, Pennsylvania System of School Assessment (PSSA). At the secondary level, Ngo (2007)

18

examined the effectiveness of Odyssey in improving educational outcomes for high school Chemistry. The author found Odyssey users showed greater retention and depth of knowledge around chemistry concepts and course material, and achieved higher on class assessments.

Factors Affecting Use of Computing Technology

While there are numerous variables which affect a teacher's likelihood of using computing technology, such as Odyssey, this review will focus primarily on those most directly relevant to this study—pedagogical beliefs and software design. However, in the immediate section, I will briefly review literature on other factors related to teachers' use of technology in practice.

I)   Teacher Comfort with Technology

Considerable research exists demonstrating the link between teacher comfort with technology and use of technology in his/her classroom (Adelman et. al., 2002; Campbell & Williams, 1990; Cuban & Peck, 2001; Ely & Atkinson, 1978; Ely, 1990; Ely, 1999a; Ely, 1999b; Ely, 1999c; Birman et. al., 2000; Marcinkiewicz, 1994). Teachers who are not comfortable and/or do not frequently use technology in their own lives are considerably less likely to use computer technology in the classroom. Watson (2006) finds that basic technology workshops which address fundamental computing skills (e.g. word processing, email and web-browsing) have long-lasting effects on teachers' attitudes toward computer use and overall perceptions of self-efficacy. Corroborating the aforementioned research, Dupagne and Krendl (1992) confirm that teachers with computer training are far more likely to have positive attitudes toward computer use in their classrooms compared with those who are untrained. Conversely, teachers with little prior use are likely to have high levels of trepidation about using such technology in their teaching practices (Liu & Reed, 1992).

II)   Prior Knowledge

Analogously, Rogers (1995) argues that whether teachers adopt or reject an innovation is largely related to his/her prior knowledge. The author writes that teachers must first have awareness that an innovation exists. Second, teachers must possess *how-to-knowledge*, or an understanding of how to use a given innovation. Third, a teacher must understand the fundamental principles of an innovation, what Rogers calls *principles knowledge*. From there, teachers either form a positive or negative impression of the innovation, which the author calls *persuasion*. Finally, considering the consequences and benefits of adopting an innovation, the teacher engages in activities to either support or reject its adoption, which Rogers calls *decision*.

III)   Conditions for Change and Early Stages of Integration/Adoption

While it is important to consider the factors influencing the use of a technological innovation, it is also important to acknowledge the conditions facilitating change. Ely (1978, 1990, 1999a) outlines several variables affecting the conditions under which change can occur. First, Ely argues, there must be *dissatisfaction with the status quo*. Second, participants must be given *ample time* to acquire knowledge of and familiarity with a given technology. Researchers from the National Center for Education Statistics (1999) confirm this, finding teachers ranked lack of adequate release time as the most significant barrier to using computers in their instruction. Third, Ely argues, teachers must be *involved in the decision-making process* during the implementation stage. Next, the author looks at *resources and support*: are resources, in terms of IT and leadership support, internet bandwidth, availability of computers and software, adequate to support the adoption of the technology into teaching practices? Are computers and internet access present in teachers' classrooms? Finally, Ely looks at the role of incentives: what incentives exist to motivate teachers to adopt new technologies into his/her teaching practices? The process of change, and factors influencing the adoption or rejection of educational technology, are important to consider as I look at current practices around Odyssey in the early stages of its adoption.

It is clear from available literature that the early stages of technological adoption are critical to its use or rejection. There are several variables that can mitigate (or exacerbate) the anxiety which characterizes this early stage. Fullan (1991) offers the following five factors for consideration: 1) Quality of innovation; 2) Access to innovation; 3) Advocacy from administration; 4) Advocacy from peers/teachers; 5) External change agents. Fullan is careful to point out that the origin of such change is critical to how innovations are received. Change originating from teachers, for example, may be far more successful than innovations perceived to be forced from external agents such as district officials or school administrators.

IV)   Attitudes and Self-Efficacy

The successful integration of an educational technology is highly dependent on teacher attitudes and self-efficacy (Campbell & Williams, 1990). Milbrath and Kinzie (2000) find that negative attitudes about computer use impact behavior—teachers are far more likely to integrate technology into their pedagogy if they have positive attitudes toward computer use and comparably high levels of self-efficacy.

V)   Professional Development/Teacher Training

Nearly every scholar to examine factors facilitating teachers' use of computing technology highlights the need for professional development. However, it is also clear that the majority of professional development provided to teachers is inadequate to prepare them for the challenges of reforms in education (Darling-Hammond, 1995; Little & McLaughlin, 1993, Sparks & Loucks-Horsley, 1989). Indeed, the design and content of a professional development program strongly influence its potential for success (Birman et. al., 2000).

Well-designed professional development programs will 1) help teachers set clear goals for their own development (Adelman et. al., 2002); 2) integrate processes for regular feedback and reflection (Guskey, 2003); 3) provide multiple presentations of the possibilities for use of a technology in specific teaching practice, and specially within existing curricula (Kubitskey, B., Fishman, B., & Marx, R., 2003); 4) will

be of duration sufficient to integrate into existing courses while developing specific skills and knowledge (Birman et. al., 2000); and finally 5) should be on-going ((Birman et. al., 2000; Cuthell, 2006; Sparks & Loucks-Horsley, 1989; Vannatta & Fordham., 2004).

Pedagogical Beliefs and Instructional Practices

"Technology is now considered by most educators and parents to be an integral part of providing a high-quality education" (U.S. DOE, 2003, p. 3). Despite the sentiments described in this U.S. Department of Education report, teachers are, predominantly, not using computing technology to develop high-level thinking or for student-centered learning activities. While the majority of teachers use computing technology, it is predominately for tasks which have an analogue counterpart, such as word processing or internet research (Ertmer, 2005). Becker (1994) describes exemplary technology users as having "a classroom environment in which computers were both prominent in the experience of students and employed in order that students grow intellectually and not merely develop isolated skills" (p. 294); it seems that, on the whole, current use of computing technology is far from Becker's vision.

In the sections above, I outlined, in brief, several important variables which facilitate or impede the use of computing technology in education. In this study, I investigated the relationship between teachers' pedagogical beliefs and their use of Odyssey. The literature suggests that low-level technology users are associated with didactic, teacher-centered instructional practices, whereas higher-level users are associated with student-centered, constructivist practices (Becker, 1994; Becker & Riel, 1999). Further, Niederhauser and Stoddart (2001) find that teachers use technology in ways closely related to their pedagogical beliefs. The authors argue that even when technology is presented as a lever for introducing student-centered practices, teachers with didactic or teacher-centered practices are significantly less likely to use the technology as prescribed. Overall, considerable evidence exists to suggest that teacher beliefs are strongly associated not only with type of use but also with levels of computing technology use (Calderhead, 1996; Clark & Lampert, 1986; Kane, Sandretto, & Heath, 2002; Pajares, 1992). Evidence suggests that, even if teachers are exposed to student-centered pedagogy through programs like Odyssey,

22

it could take five to six years to gain enough expertise to begin changing their own practice (Sandholtz, 1997; Becker, 1994; Hooper & Rieber, 1995; Marcinkiewicz, 1993). While it is theorized that teachers will eventually evolve instructional practice to reflect constructivist pedagogies modeled in technology such as Odyssey, there is no empirical evidence to demonstrate this actually happens (Barron et. al., 2003; Newman, 2002). While Odyssey use is still in its infancy at CCHS, this study will look at past and current practices and analyze whether pedagogy has evolved, at least in the short term.

However, it may be that even when teachers articulate student-centered pedagogical beliefs they nonetheless still use computing technology for non-instructional or teacher-centered activities. Ertmer and Ottenbreit-Leftwich (2010) find that some teachers who describe their pedagogical beliefs in ways that align with constructivist pedagogy nonetheless use practices which, the author writes, "might best be described as representing a mixed approach, at times engaging their students in authentic, project-based work, but at other times asking them to complete tutorials, practice skills, and learn isolated facts" (Ertmer, 2005, p.29). In part, this study aims to add to our understanding of the relationship between teachers' pedagogical beliefs and their use of educational technology such as Odyssey. The author writes that instead, teachers, to the extent that they use technology at all, are, as others found, likely to do so in ways that replicate or are closer to activities with which they are already comfortable and familiar. Along the same lines, Zhao et al. (2002) find that the more a new practice differs from an existing practice, the less likely it is to be implemented successfully, regardless of pedagogical beliefs.

Pedagogical beliefs, as a variable affecting type and extent of computing technology use, operates in ways similar to other variables such as prior knowledge, comfort with technology, and professional development. That is, teachers generally use practices with which they are comfortable and familiar. To the extent that pedagogical beliefs are a reflection of instructional practices, they are an important component in understanding why and how teachers use technology like Odyssey. However it's also clear that even when teacher and technological pedagogy align, teacher use of such technology may not be commensurate if previous practices differ significantly than those offered by the technology.

Odyssey Design

23

MULTIMEDIA
PRESENTATION | Pictures | Words

SENSORY MEMORY | Eyes | Ears

selecting images | selecting words

WORKING MEMORY | Images | Sounds

organizing images | organizing words

integrating

Pictorial Model | Verbal Model

LONG-TERM MEMORY | Prior Knowledge
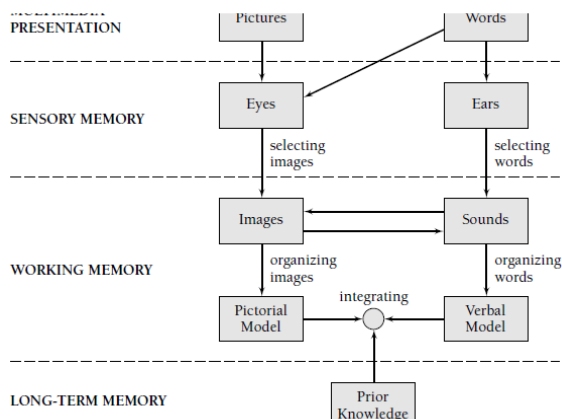
(*Above*) Figure 4. Cognitive Theory of Multimedia
Learning (Mayer, 2002, p. 61)

Previous sections have made clear the impact of the *quality* of educational technology as it relates to teachers' use and to student outcomes. Given that teachers will be asked to respond to how they would like to see the software changed or redesigned, it is important to understand the theoretical underpinnings of software's design.

Odyssey is designed based largely on the research of Richard Mayer (1999; 2000; 2001; 2002; Harp & Mayer, 1997; 1998). Mayer's work tests various principles of cognitive theory in the design of multimedia learning software. Mayer (2002) argues that individuals learn better when information is presented with both pictorial-visual and auditory-verbal, representations simultaneously—students gain deeper understanding and are more likely to store information in long-term memory (see Mayer's (2002) Cognitive Theory of Multimedia Learning, above left). Mayer's work advocates that presentations be conversational in style (Mayer, 2000) and provide interesting, but content relevant, presentations of the material. Mayer's work tests theories such as the Dual Channel Assumption (that humans process information through two main channels—visual-pictorial and auditory-verbal) (Baddeley, 1986; 1999; Paivio, 1986), the Limited Capacity Assumption (each of the aforementioned channels has limited capacity and overstimulation can interfere with information processing) (Baddeley, 1986; 1999; Sweller, 1999), and the Active Processing Assumption (learning occurs when individuals engage the two aforementioned channels, selecting words and pictures by which to organize ideas into coherent pictorial and verbal models, and integrating those with related prior knowledge) (Mayer, 1999; 2001; Wittrock, 1989). Mayer, testing the Signaling Principle, also confirms the importance of signaling—visual and/or auditory signals throughout instruction which aid student in identifying keep concepts and how ideas are organized in a given lesson. As illustrated by the screen shots below, Odyssey instructional features closely follow the conclusions from the work of Mayer and others.
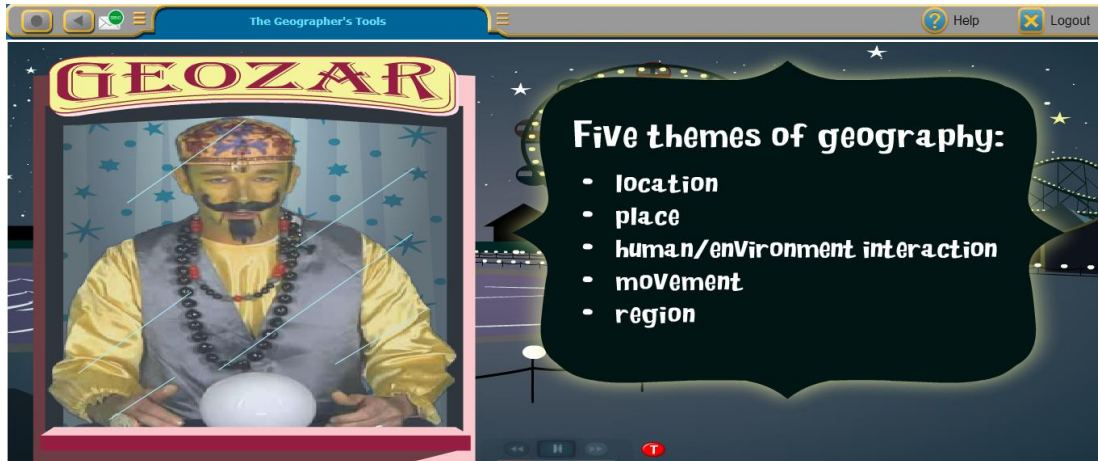
(Above) Figure 5: Example of Signaling, Coupled with Auditory and Visual Narration, In an Odyssey Geography Instructional Unit.

(*Above*) Figure 6: Example of an Odyssey Instructional Unit on Geography Which Combines Auditory Narration with Visual-Pictorial Representations of Learning Object.

Needs and Gaps

This project would add to existing literature in several important ways. First, very little scholarship exists to study Odyssey specifically, a technology that reaches over 11 million students per year. Second, while various studies look at the ways in which practitioners, or teachers, would design LMS software at the outset, no study has asked users in the context of their practice how to change the technology toward its improvement. This study also will add to existing scholarship about the facilitating

or impeding variables in the process by which teachers adopt technological change (Odyssey has been in use at CCHS for less than one year). This project will also help add clarity to the ambiguous literature around the relationship between teacher pedagogy and use of computing technology in practice. Finally, this study will also add to existing scholarship about efficacy, at least according to faculty perceptions around student outcomes.

Summary

While extent research makes clear that LMS technology such as Odyssey may hold great promise for improving student outcomes, largely by adopting constructivist pedagogy and through effective designs based on cognitive theories, ambiguity exists, particularly in K-12, around the relationship between teacher pedagogy, use of technology, and student outcomes. As blended learning continues to proliferate schools at a rapid rate, with some predicting that 50% of all courses would be online or blended by 2025, it is important to understand how and in what ways such technology is most effective. It is also important to understand how such technology could be modified to improve future iterations.

CHAPTER THREE: RESEARCH DESIGN

Introduction

This project sought to determine: 1) how secondary teachers use the computing technology, Odyssey; 2)what, if any, utility such technology provides; 3) how, if at all, technology could be changed or adapted to increase use and utility among faculty members., and finally 4) how, if at all, extent and type of Odyssey use affects perceived student outcomes.

The following questions are addressed through this study:

Research Questions:

1. What value, if any, do faculty members perceive in using Odyssey?
2. Among Odyssey-users, what are faculty members' pedagogical beliefs and instructional practices?
3. Among Odyssey-using faculty, what changes, if any, to the software, including design, features, or functionality, would increase its utility?
4. How, if at all, do type and extent of Odyssey usage affect perceived student outcomes?

Description of Software

Overview

CompassLearning Odyssey is a web-based software tool which allows teachers to assess, prescribe, instruct, and report on progress at the individual student level within a given class. The software can be used in compliment with an existing course, or as a stand-alone, fully automated course. Teachers can use various pieces, or features, of Odyssey for instruction, assessment, or other learning activities, or can simply provide the software as an additional outside resource not integrated into course materials.

Features (See Appendix D or a list, illustrations, and descriptions of Odyssey features)

Site

Cobra City High School (CCHS) is a secondary school which enrolls approximately 2200 students in grades 9-12. CCHS serves a highly diverse population, drawing on Cobra City (which is located between Santa Monica, CA and southwestern Los Angeles, CA) as well as (by permit) Inglewood and metropolitan Los Angeles. For academic year 2010-11, the school enrolled 38.47 percent Hispanic/Latino students, 1.3 percent American Indian or Alaska Natives, 11.08 percent Asian, 23.78 percent African-American, and 21.43 White students (3.9 percent of students were Filipino, Pacific Islander, or two or more non-Hispanic ethnicities). The dropout rate for AY 2010-11 was 10.00 percent, ranging from 0.00 to 16.7 percent within ethnic groups. Roughly 6.7 percent of enrollees were English language learners. 68.8 percent of the graduating class of 2011 went on to attend post-secondary institutions, with rates ranging from 56.6 percent among Latinos to 80.5 percent among Asians (California Department of Education, n.d.). Overall, the site is unusually diverse, both racially and socioeconomically. Further, Cobra City High School recently purchased 15 Odyssey© software programs, making it fertile ground for researching the adoption, or lack thereof, of this particular innovation across a variety of educational settings (e.g. within 10th grade mathematics, or four years of social studies classrooms). Finally, I had the full support of CCHS' principal, and therefore had sufficient access and support of the administration for my research[3].

Research Design

Yin (2008) suggests that the case-study approach is best for asking why and how questions—at the heart of this study are questions about both why—why do faculty members use a technology like Odyssey, and how—how could the technology change to facilitate increased use. Yin also asserts that case-study is an appropriate methodology when the researcher has little control over the variables under

---

[3] The current CCHS Principal, Dylan Baldwin, is in my cohort in the UCLA Educational Leadership Program. As my colleague in the program, I benefited from broad support and access to the school site.

study. In this project, I had no agency over whether, how, or how much a given teacher uses this software. I also had no control and little perceptible influence over a teacher's experiences, pedagogical beliefs, or practitioner skills. Finally, Yin proposes that case-study is most appropriate for studying an event in real time, or real context. Odyssey as a piece of technology is a relatively recent phenomenon in education, and more importantly, it has only been available to CCHS faculty for a short period of time—less than a year, with very little training (most faculty were given a few hours training) and no opportunities to learn or reflect on use and practice (as evidenced by several teachers noting they would like to see Odyssey build a collaboration forum so teachers can share best practices). Further, case-study has provided narrative description, which was important for soliciting information about pedagogical beliefs and instructional practices, and, at the core, for understanding how and why teachers use a technology such as Odyssey.

Overview of Methods

Surveys and Document Analysis

In this qualitative case-study, I used surveys, instant polls, journal entries and interviews to answer research questions. A mix of Paper and pencil surveys (Appendix A), journals, and instant-polls, helped illuminate existing Odyssey use among CCHS faculty and which, in conjunction with interviews, provided answers to research question one.

Interviews

Interviews helped provided understanding about what, if any, benefits have been derived from using Odyssey, solicited information about connections between Odyssey use and pedagogical beliefs and practices, information about perceived impact on student outcomes, and finally, respondents views on

how Odyssey could be changed or redesigned to better suit faculty needs. Interviews are, therefore, the only source of data with respect to research questions 3 and 4, and inform all four research questions.

Methods

Department Meetings: Surveys, Instant Polls, Journal Response

On Wednesday, April 10th, I visited two department meetings at CCHS. I began by distributing paper and pencil surveys (Appendix A) to 49 faculty members present at the math/science department and English/Social Science department meetings, respectively. I was introduced by my site liaison, Dylan Baldwin, and distributed the following to each faculty member present: a one page, back-to-font, survey, a pencil, and a small exam booklet to be used as a journal. I then read consent and introductory instructions related to the survey. After completing the short survey, I asked faculty members not using Odyssey to respond to an instant poll listing thirteen possible inhibitors or barriers to Odyssey usage, listing up to five answers which most resonated with their experience (Appendix B). Faculty, who had been instructed to bring their cell phones with them to the meetings, responded via text message using a cell phone, thus allowing for results to be displayed instantly via the online instant poll service, Poll Everywhere (www.polleverywhere.com). Concurrently, faculty who use Odyssey were provided small exam notebooks (blue books) in which to journal their responses to the data displayed on the instant poll on a large screen at the font of the room; faculty who were journaling their responses were asked to write about how barriers identified by their colleagues via the instant poll were either avoided or otherwise overcome (given their use of Odyssey). Faculty who did not wish to participate were told to simply leave the survey and/or notebook blank, and were not required to respond via text message. After reading instructions for each portion of the survey, instant poll, and journal responses, I reminded attendees that their participation was voluntary, results would be confidential, and asked if there were any questions before beginning. The paper and pencil survey also contained instructions at the top and corresponding to

each question. At the end of the paper and pencil survey, Odyssey-using faculty members were invited to provide their email address so that I could contact them to schedule a follow up interview.

Post-Department Meetings

After the departmental meetings, I identified thirteen surveys which contained an email address. That evening, I emailed each faculty member to arrange an interview (Appendix C). I first emailed faculty members on Wednesday, April 10th, those who had not responded by Sunday evening, April 14th, were re-emailed. Those who had not responded to either of the first two messages were emailed again sometime between Wednesday, April 17th, and Friday, April 19th. In total, eight faculty members responded and were willing to participate in interviews. After responding to my initial email request, I emailed participants times and dates on which we could meet. Once interviews were arranged, I emailed consent forms to participants (typically this was several days in advance, though in two cases, short response times between the time I received an email response and the arranged date/time for the interview dictated that participants had roughly 24 hours to review the consent form). When arranging a time for the interview, I also explained that I would like to analyze teaching documents as a means of understanding pedagogical practices, and requested that interview participants provide documents "such as syllabi, in-class handouts, and assessments." Of the eight participants, only one (Brenda) provided such documents, while one other (Morgan) showed me materials used from Odyssey. As such, document analysis, initially proposed as part of this research design, will not be considered in findings or analysis.

Interviews

Interviews were designed to: 1) investigate faculty pedagogical beliefs; 2) to investigate faculty instructional practices; 3) to investigate faculty perceptions of the value of Odyssey, 4) how those related to current pedagogical beliefs and instructional practices, 5) to investigate how, if at all, Odyssey using faculty would change the software to increase its utility and finally, 6) how, if at all, faculty perceive Odyssey use has affected student outcomes. Because it was expected that fewer than ten faculty members

31

were using Odyssey, I sought to interview as many Odyssey using faculty as are willing to participate. At the end of the survey, respondents were prompted to provide their contact information so that I could contact him/her for a follow up interview—13 did so, in the end, 8 agreed to participate in interviews (process described above). Appendix D lists semi-structured guiding questions to be covered in each interview; Appendix E-Appendix L lists questions asked during interviews to each participant. Prior to interviews, I aggregated survey data and analyzed results (described further in subsequent sections) and designed one interview question as a follow up to survey results. The survey data revealed that outside of videos and assessments, other features were either unused or very lightly used—as Appendix E—Appendix L shows, each interviewee was asked a question about how those survey results compared to his/her use of Odyssey, and was prompted to explain why he/she thought they survey results showed disparate use among the various features of Odyssey.

Interviews ranged from 25-45 minutes in length. Each interview was recorded, and I subsequently used the digital audio recording to transcribe the interview. After transcribing the interviews,[4] I sent interview participants a copy of their typed transcription and allowed them as much time as necessary to review the transcript. In select cases, very small portions of interview recordings were unclear, and participants were specifically prompted to such sections of the transcript to help clarify. In the end, only one section, probably comprising two or three words, remained unclear between the recording and the transcription (the participant never responded to the email providing the transcription and seeking clarification on the ambiguous phrase). I therefore used context and my best guess as to what the interviewee was saying, and inserted that, demarcated by brackets, in the transcription. In all but two cases, interviewees were asked to select an alias for themselves prior to the commencement of the interview, then to introduce themselves on the interview with that alias. In all but one case, those aliases are the names provided on interview transcripts and whenever references to specific faculty members are made throughout. In one exception, the interviewee did not wish to use an alias or be anonymous, so his

---

[4] Note of clarification: I transcribed each interview myself.

actual first name is provided. In two cases, either an interviewee was not prompted to provide an alias, or did not do so when prompted at the time of the interview. I then followed up with each when I sent the transcript and asked them to pick an alias for themself. Therefore, but for one exception, each interviewee's name has been changed to an alias of their choosing.

Access

I gained access to my site through Dylan Baldwin, Principal of CCHS. Prior to visiting CCHS, Mr. Baldwin directed me to submit a short description of my project to Ms. Eileen Carroll, Assistant Superintendent in charge of research. Ms. Carroll approved my research and returned my application on April 9th. I made arrangements to visit CCHS through Mr. Baldwin, initially looking to attend a school-wide faculty meeting on April 17th. I was subsequently bumped out of that meeting because the time was needed for other matters as dictated by the Superintendents' office. As an alternative, Mr. Baldwin arranged for me to visit two department meetings the afternoon of Monday, April 10th—first a Math/Science department meeting, then, immediately following that meeting, the Language Arts[5]/Social Science department meeting. Prior to my arrival, Mr. Baldwin had informed the departments that I would be visiting, and asked attending faculty members to bring a text message-capable cell phone with them to participate in the instant poll.

Subsequent visits to CCHS to conduct interviews were arranged between myself and the participating faculty member. Two interviews took place on Monday, April 15th—one at 3pm, another at 4pm; two interviews took place on Tuesday, April 16th, one at 2:30pm, another at 3:30pm; two more interviews took place on Wednesday, April 17th—one at 2:30pm, another at 3:30pm. All six of the aforementioned interviews took place at CCHS at a location of the interviewees choosing, which in each case was the interviewee's classroom (vacant and private, during after-school hours). On Thursday, April 18th, I conducted one interview by phone at 5:40pm, which was the only time/means provided by the

---

[5] The official name for the department at CCHS is "Language Arts" but is used interchangeably herein with "English" to refer to either the department, or the subject area in which a faculty member teaches.

interviewee. I conducted the interview (by phone) in a closed-door, private office at UCLA. Finally, the eighth interview took place on Friday, April 19th, at 2:30pm in the participant's classroom at CCHS.

Data Analysis

This study follows the model proposed by Creswell (2008) of a "linear, hierarchical approach," (p.185) for data collection and analysis. This approach lends itself to studies where large quantities of qualitative data are being analyzed, and is therefore well-suited to this study. Initial stages data collection inform subsequent steps—journals and surveys will inform interview questions, and all methods help answer research questions. This approach is also supported by Yin (2008), who suggests that theories often arise as a result of data collection.

Surveys

Paper and Pencil Surveys

Each paper and pencil survey returned was manually entered into an excel spreadsheet. On the spreadsheet (Appendix M), each *row* represented a question, and each *column* a respondent—therefore, by scrolling across from left to right, one can view each individual's response to a given question; by scoring down, one can view a single respondents response to each question. All questions were converted to numeric scales as shown in the table below:

Question	Converted Scale				
1	1 = Bachelors	2 = Masters	3 = Doctorate/Other Graduate Degree		
2	0 = False		1 = True		
3	0 =Never	1 = 1-4 Times	2 = 5-8 Times	3 = 9-12 Times	4 = 13 times or more
4-10	0 = Never	1 = Once per year	2 = Once per month	3 = Once per week or more	

(*Above*): Figure 7: Numeric conversion of survey questions

For each question, I tallied the sum total value of all responses and then calculated the mean to find the average score to each question. I also added a row at the bottom of the table to include subject area of the respondent, again converting subject area to a numeric scale (Math = 1; Science = 2; Language Arts = 3; Social Science = 4)[6]. Next, I calculated the number of respondents in each subject area (see Table ???). Subsequently, I sought to determine frequency of Odyssey use for each respondent. To do so, I looked at the highest numeric value (i.e. the value representing the most frequency) response in each of questions 4 and 6-10[7]. This allowed me to consider all features of Odyssey together and look at frequency of use for any given feature as a measure of frequency of use for Odyssey as a whole. To achieve this, I selected the highest numeric value listed in any of questions 4, and 6-10, and then created a new row (labeled "Most Frequent Use of Any Feature") inputting that value for each respondent. Next, I totaled that row and took the mean to give me the mean usage frequency among all respondents of any given feature of Odyssey.

Instant Poll

---

[6] Note: One respondent ("R9") taught both a math and a science course, and was therefore counted once in each subject area. Therefore the sum total of all respondents in all subject areas is 50, one more than the actual number of respondents, 49.

[7] Question 5 "I set up Odyssey modules for my course(s):" was excluded because it is not a valid measure of frequency—faculty members could reasonably set up all modules once at the beginning of the year, or set up modules gradually, either way, a faculty member reasonably be 'using' Odyssey throughout the year. For this reason, Question 5 was omitted in this analysis.

Participants were read thirteen possible reasons why "I don't use Odyssey because…" and asked to respond via their cell phone by texting a different code for each of the thirteen responses to a phone number. Respondents were informed that they should select up to five of the thirteen responses they felt best represented their experience. Only those faculty who were *not* using Odyssey were instructed to respond to this poll.

Results were immediately input and displayed on a screen at the front of the classroom. Although results were tallied and displayed immediately, I took a snap shot of the poll after the first faculty meeting (math/science) so that I could analyze how responses differed between the two meetings/pairs of departments (to be discussed in further detail in subsequent sections).

Interviews

Each interview was recorded on a digital audio file. I then transcribed digital audio files for all eight interviews. After conducting and transcribing the interviews, I was aware of general patterns, themes, and commonalities which had emerged throughout. This served as the basis for coding each interview. Coding entailed reviewing interview transcripts line-by-line and identifying excerpts by, as described further below, at the most micro level, coding categories, which were specific permutations of a broader theme, which in itself was defined by patterns of answers to specific interview questions. Interview questions were designed to address specific research question, adding the top layer under which interview questions, themes, and coding categories were grouped, from most to least macro.

I coded each interview, categorizing responses, initially in two ways: one according to the question asked, and two, by thematic patterns emerging within each question. This resulted in groupings of eleven questions. Within each question, more specific permutations of broad themes emerged, which I called coding categories; in total 62 coding categories emerged (see Appendix N, for a complete table of questions, themes, and coding categories). After coding each interview once, I went back through each interview again to recode—as new codes emerged toward the end of the first round of coding, it was

36

necessary to go back through all eight again to ensure that all interview data appropriate for coding had been captured and to ensure that interviews were coded consistently throughout. After coding and recoding each interview, I had a complete table of interview excerpts supporting the question and coding categories. From there I created 16 codes to capture the themes which emerged from the interviews, and more specifically, the question and coding categories.

I used the questions, themes, and coding categories to create a grid—interview respondents across eight rows, and columns for each of the coding categories, which were grouped by theme, and question (from micro to macro). I also added in columns for subject area. This grid (Appendix N) allowed me to tally responses by category and to then view patterns from the data. In the grid, if an interviewee provided an answer that corresponded to a coding category, I marked an 'x' in the appropriate cell on the grid. Scrolling from left to right, the grid then allows me to look at patterns. For example, within my sample, Language Arts teachers used Odyssey Writer more often than Math teachers (2 Language Arts teachers, 0 Math teachers). Patterns were analyzed, therefore, in a number of ways. First, by frequency: examining the frequency with which respondents provided data that could be grouped under a given theme as a means of understanding broadly what the data tells me in regards to research questions; second, by comparing groups of responses to each other, as, for example subject area and use of various features, or by comparing teaching style to sentiment about Odyssey.

Journal

Journal entries were typed up from hand-written entries in notebooks, assigned a number at random, and compiled by number on one document (Appendix O). These entries were then coded in a very similar manner as with interviews described above. However, rather than being grouped under first research question, then interview question, the journal entries were grouped by research question, then barrier identified, then theme or pattern of response (Appendix P). Journal entries were then analyzed for

patterns and were compared with interview data to corroborate, refute, or otherwise further substantiate conclusions drawn from interview data.

Ethical Considerations

Mr. Baldwin is at minimum a colleague in my program with whom I have frequent contact outside the confines of this research, and at most he is also a friend, one who has been instrumental in facilitating this project. This creates a variety of potential ethical dilemmas, most obviously, coercive participation. Though participation was voluntary, the fact that faculty members' supervisor, the principal, is a champion of Odyssey use at the school and an endorser of my research, creates a strong, perhaps coercive, social and professional incentive to participate. Further, Mr. Baldwin arranged for me to visit two department meetings and was a visible supporter of my research. In addition to extra assurances that participation is voluntary, I ensured faculty participants that they information would be kept confidential, and allowed them to use aliases, thereby also safeguarding that non-participants are equally anonymous. In other words, Mr. Baldwin was not aware of what faculty members are or are not participating. Although I believe this alleviated some of the pressure to participate, anonymity has challenging within modestly sized faculty body where very few are using Odyssey and responses contain many identifying pieces of data other than name.

Additionally, Mr. Baldwin has said privately that he believes Odyssey can, in particular, help weaker teachers improve their pedagogy. By soliciting information about teaching methods and strategies, the information revealed could expose vulnerabilities or perceived weaknesses. Consequently, data is only presented in aggregate and anonymized form, and data with the potential to damage individual teachers has been edited out of the final report delivered to CCHS and Mr. Baldwin.

Reactivity and Credibility

Though I do not represent CompassLearning and have no financial or personal stake in the success of the software at the school, the project presumes (with significant evidence from the literature)

that Odyssey has some utility in improving teaching and learning across disciplines at CCHS. Despite any direct stake, I it could have been perceived that I was a champion of Odyssey's cause (though the frequency and pervasiveness of negative commentary regarding Odyssey runs contrary to such an assertion). However, if such a perception existed in the minds of participants, it would have been detrimental for a variety of reasons, perhaps most obviously that participants would provide inaccurate data related to their use of, sentiments about, or other elements of their experiences with Odyssey. To guard against these concerns, Mr. Baldwin said plainly in his introduction that he was aware that faculty were overwhelmingly not using Odyssey and that "no one should be afraid of being outed" as not using the software. Additionally, I was deliberate in framing survey questions and other solicitations of information in a way that did imply utility or otherwise presume positive outcomes related to Odyssey. I was also deliberate in making clear that negative perceptions, attitudes toward or feelings associated with Odyssey are welcome and useful data as part of this research, stating as much clearly in introductory or instructional language.

Given that surveys and interview solicited overlapping data, it was important to recognize and mitigate potential priming from one mode of data collection to the next. Interviewees could have been influenced by previous data collection, trying to align their responses to data provided through surveys or documents. To mitigate this concern, I stated plainly that although I aggregated survey results, they were not matched to a given participants survey, and that "I [had] no idea what [they] put in [their] survey."

Reliability and Validity

In establishing reliability and validity, here again Yin (2008) is prescriptive. He suggests four tests of condition to ensure internal and external validity. Within this study, validity is constructed through data collection across multiple sources—journals, separate surveys and interviews. Yin argues that such methodology not only allows for triangulated data (Merriam, 2009), but also allows for a logical progression from one data collection method to the next (described above). Finally, Yin describes pattern

matching logic, whereby patterns emerging from a single data source (e.g. interviews) can be matched or compared against those arising from other sources (e.g. surveys or journals). This helps ensure internal validity within the study. Finally, theories and evidence found in the literature can also be compared to and matched against those arising from data within this study.

Summary

Studying Odyssey use at CCHS presented a unique opportunity to examine the use of LMS technology in its infancy at the school, examining the utility of such technology, as well as the relationship between pedagogy, use of technology, and perceptions of student outcomes. As LMS technology continues to proliferate schools at a rapid pace, it is critical to understand how and in what ways such technology can be effective, and how future iterations of the software could be changed to be more effective.

CHAPTER FOUR: FINDINGS

This project investigated how and why faculty at CCHS used the educational software, Odyssey, examining its perceived impact on student outcomes, the relationship between teacher pedagogical beliefs and practices, and finally, how Odyssey-using faculty would change or redesign the software to increase utility. This chapter presents the findings yielded from survey, journal entry, and interview data collected from CCHS faculty.

The chapter presents findings from the aforementioned data collection methods and is organized by research question, grouping themes and patterns of responses together within the appropriate research question. Before presenting findings which answer research questions, I provide 1) a summary of the primary findings regarding how and why teachers use Odyssey, and 2) an overview of the sampled collected.

How and Why CCHS Faculty Use Odyssey – Summary

Overall, Odyssey use is low at CCHS. Over 70% of faculty surveyed said they had "never" used even the two most popular features of the software (videos and assessments) over the past year. Of the eight faculty members interviewed, seven had used Odyssey for summer courses, and just two continued to use the software during the academic year. What's more, all eight expressed significant concerns about either the software itself—its utility, its pedagogical value—or its software (technical or infrastructural limitations were particularly challenging). Therefore, it would be easy to write that the primary conclusion to be drawn from this project is that, according to data collected, Odyssey holds relatively little value to secondary school faculty at CCHS.

However, even in the context of limited use and significant concerns, data reveal a surprisingly wide range of different uses and significant utility. Pedagogically, Odyssey provides value along four dimensions—*repeat exposure*, *remediation*, *differentiation*, and *customization/individualization* Below, I

briefly summarize the specific permutations of each theme, while providing greater depth in subsequent sections of this chapter.

According to faculty in this study, Odyssey proved valuable as a tool for providing students an opportunity for *repeat exposure* to course material. Interviewees described using Odyssey to help students review, help reinforce concepts taught in class, and as a means of making up lost credit (e.g. as in missed homework assignments).

In this study, Odyssey was primarily used for *remediation*. Seven of eight interviewees used Odyssey during summer, remedial courses. However, interviewees also noted that Odyssey could be useful in helping students who either failed all or a portion of class begin to make up the credit during the school year, or, to help students who transferred mid-year understand material others had previously mastered. In other words, Odyssey was seen as a useful tool for helping students remediate.

According to interviewees, Odyssey was also valuable as a means of providing *differentiation*, or a "different voice, a different face." By differentiating, teachers were better able to both reach students who struggled to master content based on classroom instruction and help keep students engaged by "reaching them on their level," and "mix[ing] it up" as a "break" from classroom work.

Data collected herein also revealed that, pedagogically, Odyssey proved useful to teachers in providing greater opportunity for *customization/individualization*. By working independently on Odyssey, students were able to self-pace and self-assess. Further, teachers could direct their focus to students most in need of help or attention while others continued to progress through Odyssey content.

Given that most teachers (seven of eight) interviewed used Odyssey in summer school , and most (six of eight) did not continue using Odyssey during the school year, it is unsurprising that most teachers believed the software to be primarily useful for struggling, low-performing or non-traditional students. All teachers interviewed believe Odyssey to be useful for such students, while very few teachers (two) saw any utility for higher-performing students. Videos and assessments were the most commonly used

42

features, which, particularly for the low-performing/struggling/non-traditional students, were the best means of providing *repeat exposure, remediation, differentiation* and *customization/individualization*.

In short, despite significant criticisms by Odyssey-using faculty, and in the context of very low overall use, Odyssey proved to provide significant utility to those students arguably most in need of additional resources and assistance.

Data/Sample Overview

On Wednesday, April 10th, I visited two department meetings—Math/Science, and Language Arts/Social Science departmental meetings. Between the two meetings, 49 surveys were returned to me, ten journals, and a total of 92 responses were submitted to the instant poll. Assuming the same number of survey respondents also responded either via journal or via text/web to the instant poll, then 39 people responded, on average, between two and three times (2.35 average responses per person, assuming 39 responders). Of the 48 surveys returned, the distribution by subject area was as follows: Math, 13; Science, 10; Social Science, 12; Language Arts, 13 (one respondent was both a Math and a Science teacher). After my initial visit on April 10th, I contacted thirteen faculty members who had provided an email address volunteering to participate in interviews. Of those thirteen, ten responded; of those ten, I was able to arrange for and carry out interviews with eight faculty members[8].

Research Question 1: What value, if any, do faculty members perceive in using Odyssey?

Inherent in research question #1 are several interrelated sub-questions necessary to explore in order to understand the value faculty perceive in using Odyssey. First, what specific features of Odyssey

---

[8] One responded but did not have availability, the other responded several weeks after I had completed data collection.

are faculty using? Second, what is the context in which Odyssey is used? Third, according to faculty, for whom is Odyssey appropriate? And finally, fourth, how, pedagogically, is Odyssey a useful tool?

Before discussing use of specific features, I provide an overview of the patterns of Odyssey use, detailing how and why faculty use specific features of the software. Next, I present data which illustrate the context in which Odyssey is used, with particular attention paid to summer use, where seven of eight faculty members first used Odyssey. Finally, I tie together the patterns and context of use by discussing the pedagogical benefits of using Odyssey, as evidenced by data from faculty interviews, as well as (to a lesser extent), surveys, instant poll results and journal entries.

Use of Odyssey Features

Faculty were surveyed about six specific features of Odyssey—videos and assessments, which were most used, as well as Gradebook, Community, Writer and Test Builder—which were all almost completely unused (see Figure 8). Journal entry and interview data help illuminate why overall use was low, and in particular, why four of the six features were essentially unused. However, in subsequent sections I will present interview and journal entry data which highlight the value of Odyssey, even in the context of limited use at CCHS and despite myriad criticisms from users. In the next section, I will briefly overview patterns of Odyssey use at CCHS, and in subsequent sections, will provide a more detailed presentation of findings related to use of specific features.

Odyssey Use by Feature
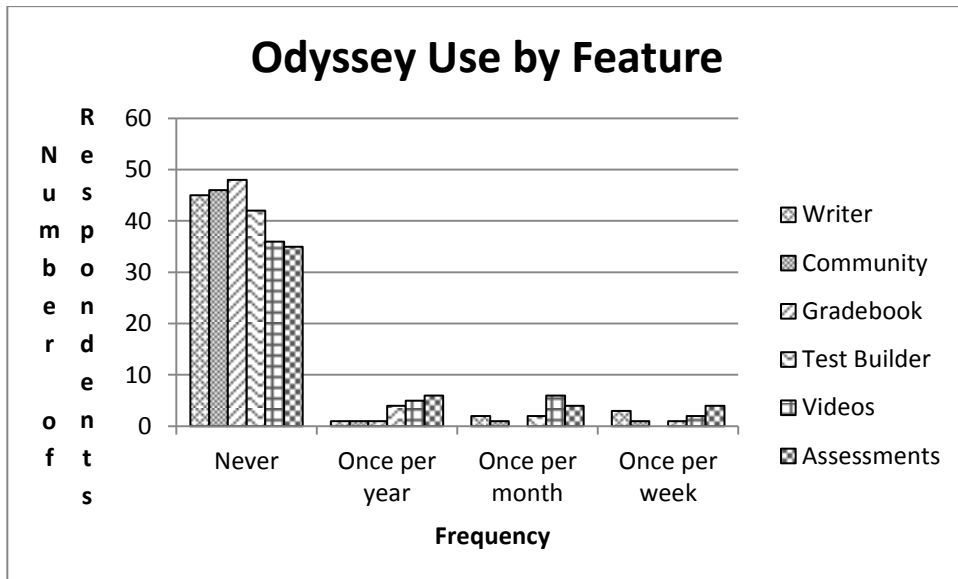
(Above) Figure 8: Odyssey use by Feature

More than a quarter (26.5%) of faculty surveyed responded that they did not know how to login into Odyssey, which in part explains low overall use of Odyssey at CCHS. The Odyssey Gradebook feature is replicated by another software program offered by CCHS—Aeries—which is available for all courses and with which faculty members are already familiar. Therefore, all interviewees used Aeries and did not use Odyssey's Gradebook. Similarly, the utility of Odyssey Community was, at least in part, replicated by Edmodo, a website which allows teachers to host online discussions, blogs, chat forums and other similar, online-community like functions. As with Aeries, interview data suggested faculty members using Edmodo were comfortable with the site and had successfully integrated the technology into pedagogy. Criticisms of Odyssey Writer were primarily pedagogical, and are detailed in the sections to follow. Videos and Assessments were the two most used features, but both were criticized because of perceived pedagogical limitations—the tone of presentations was seen as immature, and assessments were either too long or too short, or were "information recall" based rather than analytical. One teacher, Morgan, levied a similar criticism against the Odyssey Writer prompts, noting that they were overly simplistic, a point which will be expanded upon in subsequent sections. While teachers who had used

Odyssey (interviewees) expressed both technical and pedagogical criticisms, all faculty sampled pointed to infrastructural challenges—namely access to computers/computer lab time, and secondarily, internet speed, as primary barriers to Odyssey use. Beyond infrastructure and pedagogy, training deficits may also have been responsible for lack of use, at least in the case of the Test Builder feature—while several teachers expressed an interest in being able to customize assessments—exactly the function of Test Builder—such expressions made it clear they were unaware of the feature or how it could be used.

In the succeeding section, I will detail the use of specific Odyssey features, from most to least used, by blending evidence from surveys, interviews and journal entries.

1) Videos

Of the forty-nine survey respondents, thirty-six reported never using videos, five used videos once per year, six once per month, and two once per week. Seven of the eight interviewees had assigned Odyssey videos as part of unit work through Odyssey. In fact, video use was essentially a proxy for using Odyssey[9]. As corroborating evidence, note that the same number (thirty-six) of respondents said they both knew how to login to Odyssey and had logged into Odyssey "1-4 Times" as said they had used videos "Once per year." Most likely, this is because Odyssey videos are a necessary, built-in chunk of a unit, and students are not able to navigate forward in the lesson until they had watched the video. Therefore, while only one journal entry specifically mentions the videos, there are entries where the author describes using Odyssey in ways that would almost certainly entail using videos. One math teacher, Aaron, described both the utility and limitations of the videos in Odyssey:

> I feel like the videos are very fast, and they just…buh-buh-buh-buh-buh, okay, now take the quiz. I like the idea of listening to video, trying questions, listening again, and being able to take the quiz—I like all of that. But sometimes when I listen to the instructions on the video, it even confuses me, because, they're not even going fast, it's just constant. Whereas when I teach, it's like I say one thing and then I stop, and then I want to make sure they understand that, then I go to the next thing. But they give like a 5 to 10 minute video and then, here's the question from the whole video. So the kids have a hard time following along, especially when it's a more difficult

---

[9] The interviewee who had not used videos, Brenda, had not yet used Odyssey at the time of the interview.

concept. So I can definitely see that there are issues with that, however just the exposure itself is beneficial to the kids.

Similarly, the one journal entry (#7) to specifically mention videos, read, "In core class, I feel my direct instruction benefits the students more than the videos provided by Odyssey." Many of the benefits highlighted by Aaron—self-pacing, repeat exposure, along with others not expressed above, like remediation, and differentiation—appear frequently throughout the interviews. Many of the benefits highlighted by Aaron—self-pacing, repeat exposure, along with others not expressed above, like remediation, and differentiation—appear frequently throughout the interviews. However, interview data related to video use also highlights a broad concern about the tone of presentations within the software expressed throughout the study. For example, although Andrew had said several times previously in the interview that he liked Odyssey and the students liked Odyssey, and had even gone as far as to say, "Yeah, videos and assessments were great," he nonetheless later expressed a very different sentiment:

> Honestly… I find Odyssey useful, I don't actually like it, I don't think it's that user-friendly for kids, and I think it's kind of corny, I think it's super corny the way they present a lot of the things. And that's what the students said, they're like, "really do we need to watch a cartoon, we're fifteen years old, right?"

Touching on the same issue, Eleanor asked me, "have you watched the videos and it's a goofy guy saying 'oooh it's cold here, I'm standing in Alaska!'" Although not discussing the videos specifically, Laura responded to the question, "how is Odyssey useful to you?" in part by saying, "I don't dislike the program itself, I think [there] are some modules that are immature. I was teaching 11th grade and I felt like maybe the 9th or 10th grade kids would have responded better to it." Similarly, one journal entry reads, "[Odyssey is] obviously a great break from a 6 hour day, but it's too much work during a typical school day. It's lame as well. The students dislike it and it's presented in a format that makes them feel like middle schoolers." While universal, there was wide concern from interview participants about the tone of videos and animations, with words like "corny," or "lame" among the common descriptors. Nonetheless, videos were among the most commonly used features, as measured both in survey and interview data.

Summary: Data from this study showed that videos allowed teachers an opportunity to provide students a "different voice" or alternate presentation of course material, and, similarly, an additional resource for review, reinforcement and repeat exposure. However, the videos and other presentations in Odyssey were criticized as "corny" and "lame," or, in other words, inappropriately immature and elementary.

2) Assessments

Of the forty-nine survey respondents, thirty-five reported having never used pre-made assessments; six did so once per year, and four each for once per month and once per week. As with videos, seven of the eight interviewees had used Odyssey assessments, though there was considerable variation in how they found assessments to be useful. None of the ten journal entries specifically mentioned using the assessments, though several described use which could include use of assessment, as was the case with videos. Interviewees described various utility of the assessments. For example, Eleanor, who characterized assessment questions as "similar" to those she would create herself, described her use as follows:

> I was using the pre made assessments that were in there. So I would assign them a video, and they'd have to do the assessment, but I also set a passing level, so if they didn't reach, I think it was 70%, it forced them to re-watch the video again and take the quiz again.

Jane, who also described the assessment questions as similar to those she created for classes, said they were, "pretty typical of what you'd see in an English classroom… what symbol is being used in the story and how does it enhance the telling of the story… there was one where it was write an actual essay… where they had to analyze an actual character, and that's an essay that I do in my own classroom." In addition to providing a similar alternative to their own assessments, Jane, Aaron and Eleanor each spoke about the ability to set passing rates required before moving on, set the number of times a student could re-watch the video, and in general, the value in be able to self-assess through Odyssey, then return to a video, and subsequently take the same test/quiz again. Toward that end, Jane explained:

…it depends on the teacher…want[s] to set it up—the teacher can decide that [the students] have to get a 60% on the quiz in order to proceed to the next lesson, so if they get a 60% the first time they take it, then they can go to the next mini lesson; if they don't then they have to re-take the quiz. Now you can choose as a teacher to have them re-watch the video again, before they take the quiz, or you can just allow them to re-take the quiz as many times as they need to get that. Some teachers can set it up…where "okay, I want you to get a 60% on the quiz to pass, but I only want you to have to take it three times" so if you don't hit that 60% by the third time you automatically have to move on anyways.

However, interviewees also expressed several concerns about the assessments: two noted inaccurate responses, several criticized the (perceived) inability to customize from the bank of questions available, and, similarly, were either too long or too short. For example, Anna, a math teacher, describes her concerns in the following:

I'm not exactly a fan of all of their assessments, I like some features, not all of them… I feel [the assessments] are not flexible enough in terms of, I don't need five problems from the same category, I might need two. This might be one group of questions that I really don't want to waste that much time on because I feel that's not essential …So, to me, not having the option of really having control of the type of problems I'm going to send to my students…to me is annoying. So, lack of customization of assessments.

Jane who had been unable to navigate the Test Builder feature successfully, raised a similar concern:

There was an issue when I gave the first assessment with the pre-chosen unit that I used, the final unit assessment was 20 questions, or it was like 10 questions, and I didn't feel that that was an appropriate final unit assessment for an entire unit. I felt that was more like an informative quiz.

Eleanor also said, "I think [the assessments] were like ten questions or something like that, so they'd have a video and then ten questions…my assessments tend to be longer because I don't do it just on one segment…I test on four or five lectures."

Summary: While videos and assessments were the two most used features in Odyssey, they were not without limitation, according to interviewees. Assessments were seen as a useful tool for self-assessment and self-pacing, but were criticized in areas where they differed from teachers' own assessments—either in length (too short or too long) or in analysis (information recall versus analytical inquiry). Teachers valued the ability to have students self-pace and self-

assess, particularly as a means of review or reinforcement, but offered criticisms of the program

where it differed from their own pedagogy or assessment.

3) Test Builder

Survey results show that forty-two of forty-nine respondents never used the Test Builder feature.

Four responded that they used the feature once per year, two once per month, and one once per week.

Interview data reveal that two of the eight faculty members used Test Builder. Andrew, a math teacher,

described his use as follows:

> Yeah I would, absolutely [use Test Builder], I would pick out topics and say, okay everybody has to finish these quizzes here on what I just taught. And it was helpful because I'd teach certain topics in the morning and I didn't want them to take a test on just something I hadn't taught. That was nice, that was easy, that was nice.

Jane, the Language Arts teacher, tried to use Test Builder, but encountered technical difficulties:

> …for the test builder—I tried to play around with that and it was so convoluted I didn't understand how to actually build a test, it was easier for me to find a pre made unit that had a test on it then try to pick out [questions]… So what I ended up having to do was copy and pasting the entire bank of questions into Microsoft Word and create the whole test using all 40 questions. And then I actually gave it to them like a bubble in and use a scantron. As a teacher myself I was creating a unit assessment it wouldn't be 10 multiple choice questions.

Jane's challenges with this particular feature might help explain an otherwise paradoxical finding; while

almost all interviewees expressed an interest in having the ability to customize assessments, very few

used the feature which allowed them to do so—Test Builder. Therefore, it may be that

technical/navigational challenges prevented teachers from adequately leveraging this feature; it also could

be that teachers were not sufficiently trained on Odyssey and were either unaware of its availability or

were unskilled in how it could be found and utilized.

Summary: Conversely, although teachers universally expressed a desire to customize assessments

within Odyssey, which is the function of Odyssey Test Builder, 85% of survey respondents and six of

eight interviewees had never used the feature. Both technical problems and training deficits appear to be

to blame for the lack of use.

4) Odyssey Writer

Forty-five respondents, or 92% of those faculty members surveyed, never use Odyssey Writer in their course(s). One respondent uses Odyssey Writer once per year, two use that feature once per month, and just one respondent reports using Odyssey Writer once per week or more[10]. Interview data reveal that two of eight teachers used the Odyssey writer feature. Only one journal specifically mentions the Odyssey Writer feature, the entry reading as follows: "The 'Writer' section is useless in my opinion." The relative dearth of use of the Writer feature can be understood through sentiments expressed in interviews. For example, Morgan, a Language Arts and Journalism teacher, offered the following comments:

> I remember myself quickly moving away from the writing assignments… the prompt I felt wasn't what I wanted them to really focus on. So it might be like, 'compare and contrast…,' whereas I wanted them to interpret theme …So I kind of felt like the prompts were a little elementary for high school. I think the prompts were—they didn't target…the standards that we were working on at the time.

By contrast, Jane, another Language Arts teacher who had used Odyssey Writer as part of her summer course, shared pedagogical concerns about the prompts, but differed from Morgan:

> It depends on the unit. I think some units would be appropriate for higher level learners simply because there's no scaffolding, or the scaffolding isn't necessarily at the right points in the learning process, so someone that was higher level wouldn't necessarily need the scaffolding, so they could troubleshoot on their own and be able to successfully address the assessment. So for example the writing prompts would probably be better for a higher level learner. Where the straight reading comprehension quizzes that they give would probably be more appropriate for a lower level learner.

Unlike Morgan, Jane would also describe the Odyssey prompts as "similar" to prompts she would develop and assign herself. Jane also liked that Odyssey Writer allowed for feedback on written assignments to be provided electronically, instead of written on hard copies, and liked other built-in tools such as the outlining tool and dictionary. Laura, a Language Arts teacher, expressed sentiments similar to Jane's, with an emphasis on the ability to provide "instantaneous" feedback:

---

[10] Journal entry data revealed that one teacher uses Odyssey in an Odyssey-based course. It appears that his/her use significantly skews interview data as he/she appears to be an outlier as compared to other Odyssey users.

51

I actually used Odyssey Writer during the summer because I had them writing a paper every day and so we would go in and they would write it, and I could respond really quickly, because through Odyssey Writer you can set up five, six different comments of your own and put it in there and just click them out. I found Odyssey Writer actually to be helpful in responding to them… I wanted them to have that instantaneous feedback because the class is only three weeks so I could give them that. Then the next day they could come in and I could say 'well what was your feedback from yesterday? How can you change that?' Now, during the school year when you have a hundred and eighty-five papers coming in, then the purpose was different. The purpose was instantaneous feedback during summer school because we only had three weeks.

Overall, the Odyssey writer feature was not widely used—92% of survey respondents had never used the feature in the past year; three interviewees had used it. Of the three, one made it clear she had moved 'away' from that feature quickly while the other two expressed positive sentiments. Just one journal entry mentioned Odyssey Writer, and in that context only to call it, 'useless.'

Summary: Positive sentiments related to the Writer feature centered on its ability to facilitate immediate feedback and provide prompts "similar" to those created by a given teacher. Criticism of the feature focused on "elementary" or inappropriately unsophisticated prompts and on a lack of appropriate support, or "scaffolding," built into the program.

5) Odyssey Community

Survey results indicated that forty-six teachers never use Odyssey Community, one uses it once per year, one uses it once per month, and one uses it once per week or more. Of the eight interviewees, only one, Jane, had tried the community feature, calling it 'fluff.' However, three teachers, Brenda, Eleanor, and Laura, used a web-based platform called Edmodo to host online discussions, blog, and for threaded discussions—uses that in part replicate those found through Odyssey community.

Summary: Community was among the least used features of Odyssey by faculty considered in this study. It was criticized as "fluff" or lacking any value. Three teachers used another web-based platform, Edomodo, to replicate elements of Community such as online discussions.

6) Odyssey Gradebook

In both interviews and surveys[11], Odyssey Gradebook was all but unused. Only one of forty-nine survey respondents said they had ever used the feature, and then just once per year. Of the eight interviewees, only one had tried gradebook, but articulated limitations. Primary among them, Culver City uses another program, Aeries, for grade accounting. Jane, who said she had tried Gradebook, found it cumbersome to try to transfer her Odyssey grades into Aeries, and as not all her grades came from Odyssey, she ended up manually inputting Odyssey grades in Aeries. Jane described her experience with Gradebook as follows:

> I tried using the gradebook—it was too confusing for me, it was much easier for me to use the online system that we have now—the Aeries—just because I'm familiar with it, that took me a long time to use, now I feel proficient with it, it's easy, it's fast, I can use it, I didn't want to spend the time trying to figure out that gradebook when I have one that works.

The other seven interviewees all said they exclusively used Aeries, noting they'd been pushed to learn it and had become familiar and comfortable with that as their grading tool.

Summary: Odyssey was unused by CCHS faculty considered herein because they already use, are familiar with, and have available for all courses the grading software, Aeries.

Use of Odyssey Features – Summary

Outside of videos and assessments, other features of Odyssey were very lightly used. By both frequency and pervasiveness, videos and assessments were the most popular features, and in essence, could be seen as proxies for Odyssey use more generally. Of the faculty surveyed, 73.5% knew how to and/or had logged into Odyssey at least once over the past year. However, the same number (36) said they had never used either videos or assessments (35) over the past year. Over the forty-nine faculty surveyed, just ten self-identified as an Odyssey-user and responded via journal rather than instant poll. Survey results showed that only fifteen of forty-nine respondents (30.6%) had used at least one feature of Odyssey in the past year. Of those fifteen, only seven (14.3%) had used a feature of Odyssey more than

---

[11] Gradebook was not mentioned in any journal entry.

once in the past year. In fact, survey results may even be somewhat skewed toward *overuse* as one journal entry noted the author used Odyssey daily in an Odyssey-based class and just seven survey respondents used either more than one feature throughout the year or one once per month or more. As suspected at the outset of the project, Odyssey is not used by a majority of faculty at CCHS. While seven of the eight faculty members interviewed had used Odyssey extensively over the summer, just two continued their use during the school year.

Context of Use

Before discussing the ways in which faculty found Odyssey useful, it is important to understand the context in which faculty described their use of Odyssey. Fifteen of forty-nine survey respondents used at least one feature of Odyssey in the past year. Odyssey-using faculty members were instructed not to participate in the instant feedback poll but rather to journal their responses, so it could be inferred that despite surveys identifying fifteen individuals who had used at least one feature of Odyssey in the past year, only ten individuals self-identified as Odyssey users (by grouping themselves with individuals doing journal responses rather than text-responses). A third means of measuring use would be to use the number (13) of individuals who provided an email address to be contacted for a follow up interview about Odyssey use. Using these three measures as a guide, it can be inferred that between ten and fifteen individuals have used Odyssey in the past year at CCHS.

In the subsequent sections, I present findings related to the context in which faculty used Odyssey. Because my sample was skewed (seven of eight) toward faculty members who had used Odyssey for summer school, I will address this section first in greater detail, and present data to explain why faculty members saw this as a particularly good context, and why most (five of seven) are not using Odyssey during the academic year.

1)   Summer School

Seven of eight interview respondents and four of ten journal entries specifically articulated using Odyssey during the summer. Using Odyssey during the summer, teachers were allotted specific times each day when they could use the computer lab at school, therefore giving them regular access every day around which they could plan their lessons. As one respondent, Laura, put it:

> The reason Odyssey worked for me in the summer is because we got timed in the lab that was prescribed every day. I knew that I could have the lab in the afternoon from like 12:30 to whenever I had it, but it was already built in my day, so I was able to use or not use it if I wanted to… When you're with kids for 6 to 6 and a half hours a day you're grateful for a break because you can't constantly lecture.

Similar sentiments were expressed about summer use from journal entries (from entry #9):

> I taught Odyssey during summer school and cannot see integrating it during the traditional school year. It's obviously a great break from a 6 hour day, but it's too much work during a typical school day.

Not only did Odyssey give teachers a chance to break up their day, or as teachers described it, "mix it up" or avoid hearing a teacher "drone on," but it also provided a chance to reinforce lessons, and hear the same material explained through a "different voice" in a "different way." The concepts of reinforcement and differentiation appeared repeatedly throughout my data, and will be discussed in more detail in subsequent sections. Pedagogically, Odyssey provided a chance for differentiation, or, more literally, a break, from the six-hour days during summer school. Perhaps equally or more important, teachers had regularly scheduled computer lab times which meant, first, they had sufficient access to computers (addressing the primary concern of non-users in the instant poll) and second, they had a set-time around which they could plan and make optimal use of the software.

Five of seven teachers who used Odyssey over the summer did not continue use during the year. All seven teachers articulated infrastructural challenges to using Odyssey during the year. Seven of eight complained that they were "never" able to schedule time in the computer labs. CCHS also offers computers on carts, which teachers either said took too long to get set up, or were similarly booked. Laura, for example, said, "it was a resource that I was grateful for in the summer, but I have not used it at all this year. I thought I would with my regular 11th class…for quick assessments, but I can't get into the

lab, ever, so I'm not going to try." The two teachers who used Odyssey during the year took different

approaches to addressing these infrastructural limitations. Aaron scheduled most of his lab time at the

beginning of the year or semester, thus guaranteeing he had lab time at regular intervals in his curriculum.

Morgan simply used the software for homework, obviating both computer and internet access challenges.

Aaron, who continued to use Odyssey in the lab, noted frustrations with the internet at CCHS. Jane tried

to use Odyssey during the year for homework but encountered myriad technical problems and gave up.

In short, while Odyssey was seen as "godsend" during the summer for providing a "break" from

the six hour day, infrastructural limitations were primary in preventing teachers to continue using the

software during the year.

2) Out of Class Work

Three of eight interview respondents and four of ten journal entries specifically mention

assigning Odyssey for out of class work, in some cases, specifically for homework, in other cases as extra

credit work or more generally as reinforcement. For example, journal entry #4 provides the following, "I

assign Odyssey as extra credit even though there [is] insufficient access to computers by allowing

students to do Odyssey assignments at home/after school." The value, Eleanor noted was that, "the

students that weren't getting it, are now getting. So by assigning [Odyssey] for homework, it helped them

out." Aaron, one of just two teachers who continued using Odyssey during the school year, articulated the

context in which he uses as Odyssey as follows:

> Whatever they don't finish in the lab, I'll assign for them to finish as homework. Or, sometimes
> if a kid comes to me and says that they need to make up some homework grades, and I'll just
> have extra stuff on there.

Teachers used Odyssey for out of class work for several particular reasons, primary among them, it

allowed teachers to leverage Odyssey without having to schedule computer lab time, and to skirt other

infrastructural problems such as slow internet speed. For example, Morgan explained why she uses

Odyssey for homework as follows:

I know that one of the responses was that we don't have enough access, but I see it being more used for homework, as a review for home…in a regular school day where you're just with students for a 55 minute class period I wouldn't want to take them all over to the computer lab and have them do this, because that would be an entire class period…I was kind of surprised on that access to technology thing because I think it works much better as something you assign for them to do at home.
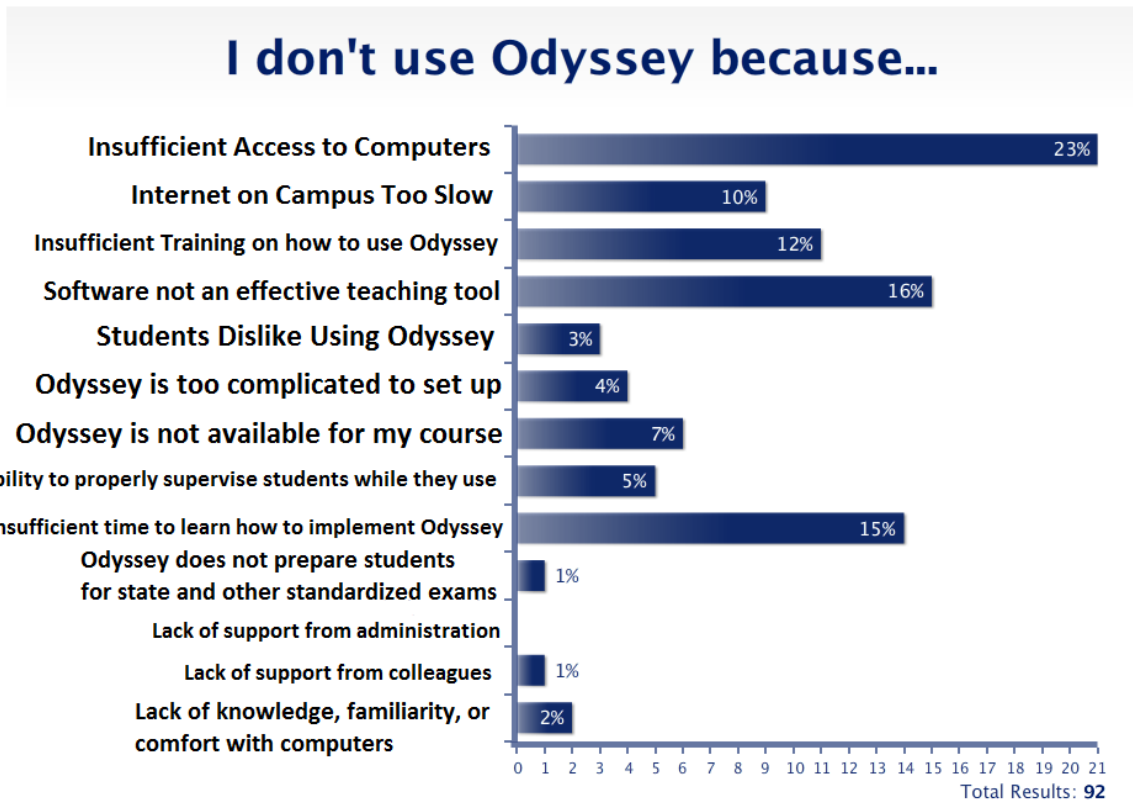
Aaron was the only teacher interviewed who uses Odyssey during class time and during the academic year, but did so in a very limited way. At the beginning of the year Aaron scheduled one day per month in the computer lab. Aaron would try to schedule his computer lab day to correspond with the end of a unit taught in the classroom, so that students could then hear the same content taught through Odyssey, with corresponding self-assessments. Aaron describes the context in which he uses Odyssey below:

What I do is that I schedule all of my days in the beginning of the year. So I'll go to the tech lab before I know other people will get to it… [and I'll request] one day a month... For example, if we're working on chapter one in class I'll schedule a lab day where we'll go in there and we'll spend an hour doing Odyssey's chapter one which is totally different from what I'm doing but it's just different content so they get exposed to a different teacher, a different quiz, a different lesson, but it's the same thing, so it's kind of like supplementary. So every time I have a chapter one in my class, then they'll have Odyssey chapter one so they'll do it on their own time, sometimes I'll do for homework, but most of the time it's just in the tech lab.

3) Context of Use – Summary

Results from this study show teachers overwhelmingly (seven of eight interviewees, seven of ten journal entries, thirty-four of forty-nine survey respondents) do not use Odyssey during the academic year. Instead, teachers using Odyssey at all tended to do so either as a break during the six-hour day over the summer, or for out of class work, such as homework or extra credit. Instant-poll survey results, interview data, and journals all converge on several specific reasons why Odyssey was not perceived to have utility in class. The most common response to the instant poll, with twenty-one responses, representing 23% of the total number of responses was the answer choice, "Insufficient access to computers." The fifth most common response, with 9 responses, representing 10% of the total responses, was the answer choice, "Internet on campus too slow." Similarly, all eight interview respondents discussed either computer lab access, the availability of computers on campus, or the internet speed, as a challenge to using Odyssey. Further, even though journal responders were prompted to discuss how they overcame the challenges displayed via the instant poll, four journal entries nonetheless agreed that

57

internet speed and access to the tech lab/computers on campus were barriers to using Odyssey during the school day.

I don't use Odyssey because...

Category	Value
Insufficient Access to Computers	23%
Internet on Campus Too Slow	10%
Insufficient Training on how to use Odyssey	12%
Software not an effective teaching tool	16%
Students Dislike Using Odyssey	3%
Odyssey is too complicated to set up	4%
Odyssey is not available for my course	7%
Inability to properly supervise students while they use	5%
Insufficient time to learn how to implement Odyssey	15%
Odyssey does not prepare students for state and other standardized exams	1%
Lack of support from administration	
Lack of support from colleagues	1%
Lack of knowledge, familiarity, or comfort with computers	2%

Total Results: **92**

(Above) Figure 9: Instant Poll Results

Appropriateness

Within the question of how is Odyssey is useful is another question—for whom is Odyssey useful? Interview participants were asked this question during data collection, the results are presented in the succeeding section.

1) Struggling, Low-Performing, or Non-Traditional Students

As will be detailed more in the next section, one of the primary values of Odyssey as identified by faculty, is the ability for student to leverage repeat exposure to the same material—students for whom

traditional classroom work is ineffective or insufficient have the chance to re-watch lessons through Odyssey, or to hear, as Morgan said, "a different voice, a different face."

The collective sentiment of the group was best summarized by Eleanor, who remarked, "what I hear from other teachers is that the really weak students…the students that weren't getting it, are now getting**."** Seven of eight teachers interviewed were asked who they felt Odyssey was most appropriate for—all seven felt either it was more useful for lower ability level students, or that it was inappropriate for higher level learners. Teachers interviewed described the software as, "a little bit too easy for the most advanced students" (from Anna), or "a little elementary for high school" (from Eleanor), both in terms of presentation and analytical sophistication. Several teachers noted that Odyssey offered an alternative—to traditional classroom instruction, or sometimes to texts. For example, Anna noted, "if [students] cannot learn through traditional means they're willing to go out of their way to use this and [it] make[s] a difference."

2) Higher Level Students

Two teachers, Jane and Aaron, could see some utility for higher level students which others did not. Jane explained the appropriateness for different students as follows:

> It depends on the unit. I think some units would be appropriate for higher level learners simply because there's no scaffolding, or the scaffolding isn't necessarily at the right points in the learning process, so someone that was higher level wouldn't necessarily need the scaffolding, so they could troubleshoot on their own and be able to successfully address the assessment. So for example the writing prompts would probably be better for a higher level learner. Where the straight reading comprehension quizzes that they give would probably be more appropriate for a lower level learner.

Aaron echoed a similar sentiment, noting that Odyssey does not provide as much guidance as a teacher, and could therefore be appropriate for, "the really astute students who try to pay attention and listen anyway." Interestingly, another teacher, Anna, touched on the same points in articulation of a different rationale: "based on my observations and experience…when it comes to advanced students, you can

throw them a book, they will learn well themselves." What's more, this comment came after a follow up question I asked her about a prior remark in which she said she thought Odyssey, "allow[s] some of my more advanced students [the] chance to preview material," a point which she later amended in the quote above. Nonetheless, the idea that Odyssey is useful as an alternative to both traditional classroom instruction and to text books or reading was a theme that appeared several times throughout interviews, and will be discussed in more detail in subsequent sections.

3) Grade Level

Several teachers also expressed hesitation in using Odyssey for upperclassmen, and some for any high school students. For example, as previously noted, Morgan, "felt like the prompts were a little elementary for high school." Such hesitation taps back into concerns teachers expressed over the tone in which material was presented; for example, Eleanor felt, "for 9th graders the man is goofy presenting the information, they get it," but, "it wasn't a high enough level for what I want my senior students to be prepared when they're going to college next year." Similarly, Aaron qualified who is appropriate for Odyssey in saying, "9th graders have been okay with it, it's not too corny." Even for 9th graders, however, there was hesitation; Andrew opined, "I think it's super corny the way they present a lot of the things. And that's what the students said, they're like, 'really do we need to watch a cartoon, we're fifteen years old, right?'" Perhaps most directly, Anna looked at course content and delineated appropriateness as follows, "I definitely can see more usage of it in terms of middle school or even elementary school and probably all the way up to high school's algebra 1, and maybe first semester of algebra 2." She went on to explain her rationale:

> Because for typical students, you don't even need a program—they can ask their questions, get an answer from a teacher or from a friend, and they'll be fine, so there's really not much value to typical students who are …probably getting an A, or B, or C in the class, this customization…is probably more suitable for students who really, really have trouble.

She also went on to discuss the limits of Odyssey for "typical" students—in particular, that if they fully understand a given unit, they cannot move forward until they have completed all the videos/assessments as sequenced in the lesson by the instructor. This concern was echoed by Morgan, who explained:

> …you know there's some kind of sequencing thing where you assign several things at once then students may not be able to move on without completing the thing before it. So…just figuring out those little things, that would make life easier in using Odyssey.

Ironically, self-pacing was repeatedly highlighted as one of the benefits of using Odyssey, which affords students the opportunity to work on a particular unit, assess, then go back and re-watch videos to address weaknesses. In part, the limits articulated by Anna and Morgan are user-imposed limits—that is, users are able to set parameters for sequencing. However, other concerns, such as those regarding tone, scaffolding, and length and sophistication of assessments are not attributable to users but to the software itself.

Appropriateness – Summary

In this study, Odyssey was described as "goofy," "super corny," and "lame"—all ways of articulating a concern about the overall tone and maturity of the presentations for a high school audience. Faculty were also concerned about the relatively unsophisticated, information-recall assessment questions. However, faculty saw benefit in the software for its ability to afford students the opportunity to learn via video rather than text/instructor, and to learn in a non "traditional" way. When considered together, Odyssey was widely identified by faculty in this study as most appropriate for underclassmen or lower ability level learners.

Pedagogical Value

In answering research question 1-- what value, if any, do faculty members perceive in using Odyssey?—I have explored two inherent sub questions; first, how is Odyssey used—what specific features of Odyssey are faculty using; and second, for whom is Odyssey useful—who do faculty believe benefits from using Odyssey. While preceding sections answer how and who questions, the why

question—why is Odyssey valuable—remains largely unanswered. This section presents findings which provide answers by illustrating the pedagogical value of Odyssey.

1) *Repeat Exposure*

One of the primary values of Odyssey as articulated by interviewees was the ability to provide students with repeat exposure to the same material. One of the first conversations I had at CCHS was with a science teacher who participated in a pilot interview[12]; the conversation sparked my interest in conducting research on the use of Odyssey in part because of one remark—the teacher observed that many students in her class, a class required for graduation, needed to see material twice, three times, sometimes six times, before they fully understood concepts and could pass assessments. She explained that because of the tangle of state standards and inflexibility in the academic year, she was lucky to cover all material in her course just once, let alone five-to-six times. The availability of Odyssey, however, meant she did not have to cover material six times—students could review material on their own as often as they liked, the net effect of which, as she told me, was to reduce the failure rate in her class by a third. In her mind, one third more students had the potential to earn their degree from CCHS because Odyssey was available as a tool which provided opportunities repeat exposure.

While this teacher chose not to re-interview formally for this study, her sentiments were nonetheless echoed by colleagues at CCHS. Seven of eight teachers articulated an Odyssey use or benefit related to the idea of providing repeat or additional exposure to course material. Additionally, although journal responders were not specifically prompted to provide information about why they used Odyssey (just how they overcame barriers identified by non-Odyssey using faculty), six of ten entries nonetheless articulate uses/benefits of Odyssey related to repeat exposure. For example, entry #2, considers Odyssey to be, "very helpful for reinforcement," while entry #6 used the software "as a re-teaching tool," for

---

[12] The interview referenced was completed as part of course requirements and occurred prior to the submission of this project to the UCLA Office of Human Resource Protection Program, and is therefore not included within this study.

which the author "felt it worked well." The author of entry #10 outlined two particular uses, "it is good for a break in the day and for review." Finally, the author of entry #5 felt students benefitted from the "supplementary material," available in Odyssey, but agreed that it was inappropriate "as a primary resource." Even while clearly articulating the limits of Odyssey's value, both journal entries and interview data make clear the benefits of Odyssey for affording opportunities for repeated and additional exposure to course material.

Although seven of eight interviewees and six of ten journal entries highlighted using Odyssey as a tool for repeat exposure, three more specific permutations of this theme emerged—review, reinforcement, and credit recovery/credit make-up. The following sections discuss in detail each of those three permutations.

a) Review

Five of eight teachers and two journal entries specifically discuss using Odyssey for "review," while an additional journal recognized Odyssey's benefits as a "re-teaching" tool. Anna, who highlighted Odyssey's benefit as a review tool several times during her interview, explains, "I would definitely recommend this program to students who really feel like they need additional practice," sometimes of material from two or three years back, "just to make sure they don't [have] to struggle in the future." More generally, Eleanor sees repeat exposure as one of the primary benefits of Odyssey, underscoring that, "the good thing about Odyssey is that you can go ahead and you can re-watch [the lesson], and the teacher can set it up in such a way that you can go back so many times." In particular, Morgan saw this as essential for summer school students, who had failed to pass the class during the academic year and were retaking it over the summer. Toward that end, Morgan explained, "It was useful during summer school because those students need repeat exposure to new material," and later in the interview added, "then they were able to review that materials I taught in class and hopefully have some of it sink in."

The idea of using Odyssey as a tool for repeat exposure, or more specifically, for review, blends other prominent themes—self-pacing/self-assessment, supplemental resources for lower-level or lower-performing students, alternative presentations of the same material—themes captured in the following quote, from Morgan:

> …during the summer I think that it may have helped the lower level students grasp the information and be able to do with the information what was being asked of them because they were able to individually select things, go back to things, reference the text again, there were a lot of opportunities to go back if you didn't understand something.

Within this sub-section, I define *review* very narrowly and literally—only those excerpts which speak literally to the use of Odyssey for *review* are discussed or included. However, because this and subsequent sub-sections fall under the broader grouping of *repeat exposure*, there is natural overlap and redundancy. Nonetheless, I have purposely parsed out these permutations to identify potential variants on the larger theme (*repeat exposure*). In this vein, the next sub-section, "reinforcement," contains very similar sentiments and context regarding the benefits and use of Odyssey.

b) *Reinforcement*

While overlaps and redundancies exist between "review" and "reinforcement," context is an important point of differentiation. Both imply post-primary (or repeated) exposure to material, but review in the context of this data typically carried a connotation of a broader reexamination of material which had been presented before, whereas reinforcement typically carried a connotation of more targeted buttressing of material presented initially in a different format (e.g. by a teacher in class or through reading text). For example, I've cited the excerpt below in previous sub-sections, however the extended quote illustrates the concept of *reinforcement* as it was presented in the data:

It was useful during summer school because those students need repeat exposure to new material and so I would use it to reinforce something I taught in the classroom. So looking at the list of assignments here,[13] for example they did a persuasive speech so I taught them aspects of a strong successful, persuasive speech in class, we read examples of persuasive speeches, we read the MLK speech, watched it on video.

In the example above, it's clear that reinforcement is targeted to a specific element of the unit, and that Odyssey is used in part as a tool to present material in a different format. Morgan, quoted above, mentions reinforcement twice in her interview, and the term appears again in a journal entry (#2): "Very helpful for reinforcement, not primary teaching." While not as pervasive as *review* or *repeat exposure* more generally, reinforcement nonetheless appears three times in the data in a context slightly distinct from review, and underscores another use for the software.

2) Remediation

All summer use of Odyssey, which represented seven of eight interview respondents, and four of ten journal entries was remedial—students who had failed a class during the academic year were able to take a six-week summer course to make up the credit. While summer remediation was therefore a primary use of Odyssey in this study, remediation as a theme appeared more broadly outside the context of summer and for other, more specific uses. Such contexts and uses are detailed in the passages below and in subsequent sub-sections.

a) Remediation – General

As discussed in previous sections, Odyssey is widely seen as a tool, as Andrew says, "that's really useful to students [who] are struggling." Within that context, Odyssey could help provide instruction to students struggled specifically because of weaknesses in specific content areas. For example, Anna explains:

I have kids who come to me in Algebra 2 and are probably missing most of their Algebra 1 skills—they come from another district or another town …but by the time they hit certain a class, they're struggling, and they're going to end up hitting the ceiling. I feel that it's not productive for them to sit in a classroom where they look at everyone else doing well and then—I mean, kids

---

[13] Morgan is showing PS various modules/assignments on Odyssey at his/her computer.

always know there's a deficit when they have one—they're very self-aware, they're teenagers, and for them to sit there and be unproductive—I'd rather use this program if I could.

The excerpt above highlights both themes previously discussed, as well as new concepts not yet presented, such as the idea that Odyssey can help deflect some of the shame or embarrassment associated with struggling or lagging behind peers. In previous sections, we've seen many of the ideas touched on by Anna in the passage above echoed by her colleagues. For example, Morgan explains how a recent Odyssey assignment in her class could be useful:

> Yeah, I assigned it today. And those students who are already really familiar with Greek mythology—perhaps they read it on their own, they're really into the Percy Jackson series, you know they're just, up on it already…they're like, 'yeah I don't think I need to do that.' They already know, this isn't something they really need to do, whereas the ones who've had little exposure, those students who aren't as well read as some of the others in class, that would be really helpful to them… we're talking about mythology and some students are just going off with all their knowledge on Greek mythology and some of them are sitting just looking around like, 'am I the only one that knows nothing about this stuff? [I] had no exposure in my previous education, my parents never talk about this stuff, we never had any books around the home.' So that's I realized they could use a little more.

Both passages highlight the idea that Odyssey could help students catch up to their peers by allowing them to review information unfamiliar to them. In a sense, this refers to material that others had learned earlier in a sequence of courses or earlier in a course and in that way is remedial; but for some students, as explained by Morgan and Anna, that exposure is primary.

b) *Credit Recovery/Credit Make-up*

Using Odyssey for to help students learn or re-learn previously presented material extends beyond the examples provided above, and beyond remedial summer courses. Faculty interviews and journal entries reveal more specific uses for Odyssey which included allowing students to make-up points lost from incomplete homework or low assessment grades, as well as for remediation during the academic year. In speaking to Odyssey's use as a tool for making up missed work, Brenda explains, "I set it up as a way to make up work that they'd missed. So for every video quiz that they took they were able to replace

a zero with the usual 20 points that I give for an assignment." Similarly, one journal entry, #4, provides the following: "I assign Odyssey as extra credit even though there [is] insufficient access to computers by allowing students to do Odyssey assignments at home/after school." Aaron, as was discussed in the "Context of Use" section, also allowed students to make up points through Odyssey, "…usually I'll have 15% [as] homework, so Odyssey is included in that. So in that way, kids have other opportunities to make those points."

Related to *credit recovery/remediation* but distinct from uses described above, Aaron also used Odyssey to run an after school remediation program. Aaron explains the program in the excerpt below:

> The other way I've used Odyssey, which was last year…was, I used it with [Simon] as a course make up. For example, this is what we did—everybody who got a D or F first semester, they're still in my class second semester, so I make them sign a contract where they're going to retake the whole first semester on Odyssey during the second semester to make up that half a year grade. So the stipulation is they have to pass second semester. Because we have a lot of kids who fail first semester, pass second semester and they can't go on to geometry. So instead of having to retake the whole algebra course over again and waste a whole other year I did an after school program where they would come after school I would teach them the lessons once a week, so Tuesday and Thursday, teach them Tuesday, then Thursday they were on Odyssey and they had to pass every chapter from Odyssey. If they did and they passed the course, then we changed their grades from first semester to a C, C being the highest they could get.

So while *repeat exposure*, *review*, *reinforcement* and *remediation* all have similar connotations—going back through previously presented course material—CCHS faculty nonetheless expressed a variety of distinct variations on such themes in explaining the utility of Odyssey--credit make-up/credit recovery, among them.

c) Intervention

As a pre-cursor to whole-course remediation, one teacher, Anna, sees Odyssey as useful for diagnosing and identifying the need for intervention, then helping to provide remedial instruction to struggling students. In fact, Anna felt Odyssey was best as an "intervention program" and felt "that for any students who are struggling or require intensive intervention," Odyssey could, "actually assess a student about what they need," and therefore be " a pretty powerful tool." Although this particular use of

Odyssey as a diagnostic and intervention treatment tool was only attributable to Anna, her excerpts nonetheless highlight another benefit leveraged from the software.

        d)   Tutoring

Anna also described Odyssey as a, "good teacher's aide" which, "knows what it's doing in comparison to all my other aides," who, she thought, were, "great people but they don't know their math." In the same vein, Anna feels Odyssey is, "a pretty effective tutoring program," which, like a tutor or teacher's aide, "definitely helps students who really just need a little bit of a hint or help to be able to move forward instead of waiting for me to come to them ten minutes or twenty minutes down the line." As with *intervention*, use of Odyssey as a teacher's aide or for *tutoring* appeared only in the interview with Anna, so while not universal, it is nonetheless another means by which CCHS could leverage the software.

3) *Differentiation*

All eight interviewees and two of ten journal entries use Odyssey for *differentiation*. In the following sections, *differentiation* is defined by use which provides an alternative to traditional classroom work and/or textbook reading, and which, in doing so, helps to engage to students by allowing teachers to, as Aaron says, "mix it up."

The idea that Odyssey could provide a break from the regular day, and could help students to engage with the material in doing so, was particularly common because of the sample of teachers interviewed, seven had used Odyssey in the context of summer school where, as Morgan says:

> [Odyssey] was a godsend because it broke up the day, it's a five hour day and it can be brutal being in the classroom for five hours a day. So it was an opportunity to get up, walk over to the lab, and go over the material again in a different way—see another person's face talking about it, look at the material in a different format and get a chance to experience it all again but different surroundings, different variables so I thought it worked really well.

These sentiments were echoed by others as well, like Jane, who said, "I like differentiating instruction so sometimes it is nice to go to the computer lab and change things up." While teachers such as Jane and Morgan saw Odyssey as a "godsend" for providing a break in the day, others, like Brenda (who did not teach summer school), noted the pedagogical benefits of providing a different presentation of the material:

> It gave the students who needed another type of learning, other than classroom, who were more comfortable learning at home, or at a computer, because they're all gamers, you know, and it's a game, I like that. It gave them an opportunity to have another vehicle to get the information to them, or the knowledge.

The succeeding sub-sections detail two specific expressions of the theme, *differentiation*, as articulated by faculty in this study: first, differentiation for the purposes of providing a form of *alternate presentation*, and second, differentiation as a means of *engagement*.

a) *Alternate Presentation*

Odyssey not only provides a change of pace, it provides, quite literally, a change of face. The concept that hearing material from someone other than the primary teacher, as illustrated in Brenda's quote above, was valued by interviewees as a benefit of using Odyssey. Eleanor perhaps explains this best in the excerpt below:

> I think [it's helpful because it's] being presented in a different way. I say it one way in class and then the video says it in a different way—some kids might get it the way I say it, but other people might get it the way the video says it. So it's being presented in different ways. But then I have some students who will sit and watch Odyssey three or four times and keep scoring low, so you might have to come in and re-explain it to them. So I don't think Odyssey is the end-all, cure-all, but I think that's it's a different way of presenting it so the student's master it.

All eight teachers interviewed felt Odyssey provided a necessary means of differentiation, of those eight, six talked specifically about its ability to provide a useful alternate "voice" or a way to avoid, as Andrew said, "[listening] to the teacher drone on for hours upon hours." Further, Aaron, who continues to use Odyssey during the school year, Brenda, who used it during the previous school year, and Morgan, who had made her first Odyssey assignment of the year the week I interviewed her, all discussed the benefits of Odyssey in providing an alternative form of

69

presentation. For example, Morgan sees the alternate presentation as useful in facilitating students' mastery of

material:

> So I think if they hear it from another person, they'll—it'll start to make more sense or maybe they'll take it more seriously like, 'Oh, yeah that's what [Ms. Morgan] was talking about, okay now I'm starting to understand,' or, 'these are the important things, [Ms. Morgan] is pointing that out and [the Odyssey guys is] pointing that out so that must be an important point that I need to remember.'

Aaron books the computer lab in advance, to coincide with the end of each unit. He explains how he leverages

Odyssey in the following:

> For example, if we're working on chapter one in class I'll schedule a lab day where we'll go in there and we'll spend an hour doing Odyssey's chapter one which is totally different from what I'm doing but it's just different content so they get exposed to a different teacher, a different quiz, a different lesson, but it's the same thing, so it's kind of like supplementary.

The excerpt above points to Odyssey's value, simply, as something different. In fact, Aaron later elaborated, adding:

> I think Odyssey should just be a requirement because I do think that it helps. I think when it's not a requirement, teachers opt out, and they never learn it and I think it's just another tool and everybody needs as many tools as they can possibly get.

Odyssey as another tool is an idea echoed by others who see it as a way of reaching, in particular, students

who do not learn successfully in the "classroom" or from "traditional" teaching, who need that "different

voice." Brenda noting that "they're all gamers" is a perfect example. Odyssey's value as a form of

alternate presentation is a primary theme emerging from this study and one of the most significant values

articulated by faculty in answering research question one.

> b) *Engagement*

Within the idea that Odyssey provides an alternate, non-traditional way of presenting the material

is the idea that traditional classroom work, or the droning on for "hours upon hours" by a teacher may

leave segments of students disengaged. Six of eight teachers indeed described as Odyssey as a useful tool

for engaging students. For example, consider this question and response:

> PS: How would you compare teaching over the summer with Odyssey versus without Odyssey?

Eleanor: For me, it was the engagement. In summer they're there for 6 hours straight, me and the kids for 6 hours straight staring at each other, and you really need different things to engage them. So I think by having Odyssey they were engaged more because it was just another avenue for learning the information… the students, in my opinion seem to be more engaged in the information because that's what their avenue of information is—they really want to be entertained right now and so they like the fact that they can go ahead and watch the videos and be using the computers and talking and doing all that stuff.

Eleanor, who had taught summer school previously without the benefit of Odyssey, explains that students were more engaged because Odyssey delivers information through "their avenue." Similarly, Jane believes Odyssey affected student outcomes because it kept students more engaged:

PS: How, if at all, do you think it affected the outcomes in the class?

JANE: I think the students were more engaged with using Odyssey… Just because, I feel like, when we didn't use it, those 6 hours together in the classroom were really long. When we got to break it up and go into the computer lab, even if I felt like the system wasn't doing as good of a job of teaching it as I would've done, they were still learning, meeting the standards, they were still being assessed, but it just enabled them to be more engaged, I think, with the curriculum.

I provide the exchange above because while Jane specifically does *not* connect engagement and the alternate form of presentation, as Eleanor and Brenda did in previous excerpts, she nonetheless thought its ability to engage affected student outcomes in her summer course.

Both interview and journal entry data reveal Odyssey's value as a tool for *differentiation*— providing a medium for *alternate presentation* and, often related, another "tool" by which to keep students engaged.

4) Customization/Individualization

The fourth major pedagogical use as articulated by faculty in this study was leveraging Odyssey to allow for increased *customization/individualization* of instruction and assessment. By allowing teachers to set up units and parameters for sequencing, pace was determined by how quickly a student could complete a lesson and answer assessment questions correctly, as opposed to one-size-fit-all, where a teacher moved at the same pace for everyone in a classroom. Five of eight teachers therefore spoke to the utility of Odyssey in allowing them to work more closely with struggling students while allowing others to continue forward in a lesson. For example, Eleanor explains:

> While a lot of the class was engaged in that, I was able to work one-on-one or one-on-two, or one-on-three so I made sure that the kids who kept scoring low consistently, then I could go ahead and help them master the information.

Similarly, Anna talked about being able to work with individual students longer because Odyssey could be helpful to the majority of students who might need only a simple "hint" while a smaller number, perhaps one or two, "truly struggle," allowing her to focus more of her time on the latter group of students. Jane, expressed similar thoughts, but added that her assistance could not only be individualized, but also more timely: "if the kids didn't understand the prompt I could walk around to each individual student and explain it again to them personally and address any questions that they had at the moment that they needed."

Like *differentiation*, *customization/individualization* represents a larger theme of pedagogical utility, under which I also grouped a more specific sub-theme: *self-pacing/self-assessment*, discussed in more detail below.

a) *Self-Pacing/Self-Assessment*

Inherent in the idea of *customization/individualization* is the notion that instruction and assessment could be customized for the individual, rather than distributed in batch as one-size-fits-all. Four teachers—Aaron, Andrew, Anna, and Jane—extolled the benefits of using Odyssey for self-assessment. Andrew explains this particular benefit as follows:

> I like the fact that you can go at your own pace, they would take a diagnostic before each section just to go over what they knew or didn't know, and then the program would plan accordingly to whatever their skill level was.

Andrew captures both the *self-pacing* and *self-assessment* themes in the passage above, sentiments echoed by others, such as Jane: "…students [are] able to pace their own education, sometimes it's nice for them to be able to rewind when they need to rewind."

In short, Odyssey allows teachers to both *customize*—assessments and pace--and *individualize*—in particular, their attention toward students most in need of additional assistance to master material.

72

Pedagogical Use – Summary

The preceding sections detailed the four major pedagogical uses as identified by faculty in this study—*repeat exposure*, *remediation*, *differentiation*, and *customization/individualization*. All four themes have clear overlaps and connections—Odyssey allows students 1) to self-pace, or review material repeated until reaching a level of mastery, 2) to access supplemental material either as a means of making up points or credits, or to gain exposure to material unfamiliar to them (e.g. as in Ms. Morgan's mythology unit); 3) to provide a different, alternate form of presenting the material, which both affords some students an opportunity to hear from a "different voice," and perhaps understand the material better, and to "mix it up" and provide a "break" from traditional classroom work, thereby helping to keep students more engaged.

Research Question 2: Among Odyssey-users, what are faculty members' pedagogical beliefs and instructional practices?

In chapter two, I discussed the various relationships between teachers' pedagogical beliefs and instructional practices and use of technology. In part, this research aimed to explore the relationship between teachers' pedagogical beliefs and instructional practices and their use of Odyssey. The subsequent section therefore presents findings from interview data which reveals teachers' pedagogical beliefs and instructional practices.

In the next section I provide teacher-by-teacher responses to the opening interview question prompting respondents to discuss their "teaching style, or teaching philosophy." Although answers to this question did prompt patterns of responses, particularly related to instructional practices, teachers' responses were nonetheless highly variable and difficult to categorize or attribute to known pedagogical philosophies as identified in the literature (e.g. student-centered/constructivist, or teacher-centered, traditional, didactic, or direct instruction). Therefore, rather than grouping responses by theme, I provide

teacher-by-teacher responses to interview questions related to "teaching style, or teaching philosophy"

and instead highlight themes within those responses, with a synthesis to follow at the end of this section.

1) Aaron

When prompted to discuss pedagogical beliefs and practices, Aaron emphasized finding ways to

motivate students, particularly through *differentiation*. Aaron's answer to the question, "how would you

describe your teaching style or your teaching philosophy?" was as follows:

> My teaching philosophy is that I have to work on not only the content but also I have to get to the
> motivations to get them to do what I want them to do. Because it's not only their ability but it's
> also about their willingness, and so you have to kind of find that line, and that involves a lot of
> different kinds of teaching methods and teaching styles that I have to utilize daily. So every day is
> going to be different, every class is going to be different based on what the kids need.

Aaron went on to detail a variety of ways in which he provided differentiation—group work, games,

projects, some of which took students around the school's campus, Odyssey use, and even, direct

instruction, particularly in the context of introducing material. Finally, Aaron, as illustrated in the excerpt

below, also emphasized building relationships as a means of motivating students and facilitating difficult

feedback:

> First, if you want the kids to do something they don't want to do, like a quadratic equation, for
> example, at the beginning of the year, I work a lot towards building the relationships with them so
> that when I am rough on them and I'm hard on them and I'm forcing them to do something they
> understand that it's coming from…a place where they I know I care about them and want them to
> succeed, not that I'm just being a mean, hard teacher.

2) Andrew

Andrew self-identified his teaching style and practices as *traditional*. When prompted to describe

his "teaching style, or teaching philosophy," Andrew responded by saying, "I think I'm a fairly traditional

teacher that uses traditional methods." Andrew felt that in mathematics, other teachers get "too cute" and

overcomplicate lessons, and believed that he taught math in a manner very similar to the way he had been

taught as a high school student. Andrew also emphasized his organization acumen as a teacher,

explaining, "I'm very organized in my notes…so I started my new unit, chapter 12, see again, this is the

plan, you have a test two weeks from today, the 30ᵗʰ, don't ask me what homework is assigned, don't ask me what's due…here it is [in the packet]." Andrew also noted that he graded every homework assignment, and believed it was important to provide, "feedback in an orderly, timely fashion." Finally, as with all eight teachers interviewed, Andrew allowed students to work in groups going through problems, and to form study groups in preparation for assessments.

3) Anna

Analogous to Andrew, though unlike others interviewed herein, Anna unmistakably and repeatedly provided answers which could be clearly identified as *direct instruction* and *teacher-centered*. Anna responded to the question, "how would you describe your teaching style, your teaching philosophy?" as follows:

> I'm probably more of a direct teaching style… Definitely me delivering the material to my students, I'm the one who is doing the intro, I'm the one who is doing review, assessment, and I'm pretty much the one who is correcting my students any time of the day when they're in my class. So I guess direct teaching to me is that I'm the authority in the class.

Viewed through the perspective of *direct instruction/teacher-centered*, other responses which might otherwise appear vague, can instead be viewed as extensions of her pedagogical philosophy. For example, in explaining her pedagogy, Anna said, "I am somebody who assigns a lot of work to my students, a lot of in-class practice, a lot of assignments." Given the context of her previous responses, assigning "a lot of work, a lot of in-class practice," is an extension of direct instruction—Anna introduces material and explains how to approach problems, the students then practice what they have been taught. As with every interviewee, Anna also discussed allowing students to work, or in this case, practice, in small groups.

4) Brenda

Brenda described her teaching style as "very personable," and, like Aaron, emphasized the importance of having a "strong relationship with each and every one of [her] kids." Also like Aaron, Brenda detailed a wide-variety of instructional activities, including research-based projects, student

presentations (posters, PowerPoints, Prezies), blogs, written assignments, and in-class practice activities, such as "three-two-ones," where pairs of students review text for key ideas and "foldables" where students create a triangular paper game for review, to name a few. Brenda also emphasized her AVID training, and was guided by Costa's questions. She also detailed many ways in which she used technology in class (Edmodo chats and blogs, iPad for videos, "flexbooks" from the website kc12.org).

5) Eleanor

Eleanor, in response to the question, "can you describe your teaching style, your teaching methods, teaching philosophy?" emphasized her belief that "everyone can learn" and in "multiple intelligences." This meant that in terms of instructional practices, she believes "that people learn in different ways" and therefore tries "to present the information in different facets so everyone can master them." Eleanor, like Aaron and Brenda, described a wide variety of different in-class activities:

> So typically in class I usually start off with a journal then we usually go into a note type situation and then we go into an activity type situation. So my class is usually structured that way, of course we do do long term projects, other things that are involved, movies occasionally…I try to take the information and put it into modern day things or apply it to their own life, and I speak a lot about my child. The kids think I'm just speaking about my child, but I try to take the stories or the vocabulary and adapt it to the child in my life, so they think I'm just telling them a story about my child but I'm actually teaching them government or economics… I do do whole class discussions, I do do pairs, I do do small group discussions also. Recently we did a small group project with students on a supply and demand project where students worked together and created a poster board to explain the concepts of supply and demand and that they need for mastering the standards. I try to assess them in different ways, so we'll do written tests, multiple choice, matching, but then I also throw a project in like every two or three chapters to make sure that they're being tested in ways that they'll excel in.

Eleanor clearly provides *differentiation* in terms of presentations, activities, and assessments. However, the excerpt above illustrates another theme to emerge from responses about pedagogy; in the fourth line, Eleanor says, "I try to take the information and put it into modern day things or apply it to their own life." Five of eight teachers, including Eleanor, articulated this strategy—trying to make content relevant to students' lives—a theme herein I call *relevance*.

6) Jane

Jane responded to the "teaching style or philosophy," question by emphasizing her desire to teach, "the whole student" and avoided being overly directed by standards. Instead, as she explained, she wanted to, "not be the type of teacher that teaches to the test." While she tried to, "keep standards in mind," her highest priority was, "to help the student learn not only the standards, but how to be a proficient student, how to be a successful student." Jane, like Aaron, Brenda, and Eleanor, also detailed an amazing variety of written assignments, in-class activities, independent, small, and large group work, and assessments. Unsurprisingly, Jane echoed Eleanor in saying, "Certainly, I try to differentiate instruction on a daily basis so that I hit all learning styles." Like Eleanor, Jane also tried to make content relevant to students lives, as evidenced in this excerpt: "So I try to make it realistic, stuff that I think they will be able to use in real life, and at the same time help them..." Like Brenda, Jane also leveraged technology in a number of different ways, having the students do on-line research, bringing in clips of movies, and, at least during summer, using Odyssey extensively.

7) Laura

Laura's responses to questions about pedagogy and practices tended to emphasize being "creative" and providing many different ways to learn the material. As evidence, she cited a project her class was working on for *Cather in the Rye* where, instead of writing a traditional analytical essay, students were, "in medical groups and medical teams diagnosing Holden with one of the five major psychological [problems]." Laura also described lots of small group work, and tried to show short movie clips where appropriate. She, like Brenda, also emphasized the "quality of thought—QOT" practice work students engaged in while evaluating their own or others' work. As with in-class work, Laura liked, "to give a variety of different types of assessments," and talked about essays, projects, and multiple choice tests.

8) Morgan

Morgan, like Eleanor, began by describing her pedagogy as, "my teaching philosophy is that I really do believe all students can learn." Morgan, unlike other teachers, also described pedagogical beliefs which align with constructivist and student-centered approaches; for example, Morgan says:

> I incorporate cooperative learning and I try to take the focus off of me as much as possible. There are times where I do short lectures, but there are times when I find myself more presenting material to them, having them explore it, come up with questions about it. I ask them questions about it to try to get them to delve deeper into it, but I'm not like the type that says, 'here's the material, and these are the right interpretations of this poem, and you'll be tested next week,' it's more like, 'what is your interpretation of the poem, how can you justify that interpretation,' and let them know that this learning is a process, and, especially in English, there's no right or wrong answers.

Morgan, as with several colleagues, tries to, "differentiate my teaching whenever possible," and provided several examples of doing so. For example, Morgan describes providing differentiated assessments:

> So I've given them a range of topics to choose from and with the students who struggle with the topic I've found myself pulling aside, meeting with them… to talk about manageable topics that they can tackle because some of the ones that are shared in class I think are more complicated than what they can really handle right now.

Additionally, Morgan tries to "avail [herself] to opportunities [to]…bring more technology into the classroom," and talks about how she's using Google docs for collaboration and iPads for videos and other multimedia uses.

Pedagogical Beliefs and Instructional Practices – Synthesis

        a) *Small Group/Paired Work*

Looking only at instructional practices, paired or small group work was an aspect of instruction which all eight interviewees had used. Teachers used small group or paired work in entirely different ways, so although this may have been the most universal aspect of pedagogy to emerge during interviews, it also among the least revealing findings I will discuss in this section.

        b) *Differentiation*

After small group/paired exercises, the most common pattern of response in relation to questions about pedagogy was *differentiation*. *Differentiation* was frequently stated directly, as with Morgan, or

Jane, but also emerged as a result of describing a wide-variety of ways in which a given teacher, like Brenda, would try to communicate material and engage students. While *differentiation* as it is described in the context of pedagogy and instructional practices in this section does not clearly relate to broader pedagogical orientations, such as student-centered/constructivist or teacher-centered/traditional/didactic, it is nonetheless an important lens through which to view CCHS teaching as it relates to Odyssey use, a point which will be discussed further in chapter five. As it is defined above, differentiation was a strategy employed by six of eight interviewees.

c) *Relevance*

As described in the section above on Eleanor, five of eight teachers interviewed described the pedagogical strategy of trying to make course information relevant to the contemporary lives of students. In three cases—Eleanor, Jane and Morgan—the teachers state directly that they try to connect material to "real life," or to the "modern day." In the other two cases—Aaron and Laura—bringing in more relevant material was discussed in the context of differentiation and motivation. Making material relevant was a way to, as Laura said, be "creative," or as Aaron said, "get to the motivations" of his students.

d) *Traditional /Direct Instruction*

Although three teachers described using "direct" or "traditional" instructional methods, one, Aaron, did so in the context of describing differentiation. Therefore, I consider just two of the three— Anna and Andrew—to be appropriately grouped together as *Traditional/Direct Instruction*. Realistically, these were self-imposed labels; Andrew identified himself immediately as "traditional," and Anna repeated described herself as "the authority" and, even more bluntly, "I'm probably more of a direct teaching style." So while, in the previous section, my classification of Morgan as *student-centered/constructivist* required a degree of subjective interpretation, grouping Anna and Andrew together as *Traditional/Direct Instruction* directly reflects language from the data.

Pedagogical Beliefs and Instructional Practices – Summary

79

While data responding to this research question was highly variable, four thematic patterns outlined above emerged. The most universal instructional practice, small or paired group work, appeared in every interview, but did not, however, serve to shed much light on broader philosophies. After *small group/paired work*, *differentiation* was a strategy employed by six of eight teachers interviewed. As described by interviewees, *differentiation* spoke to both philosophy and to practice—the belief that many different forms of instruction and assessment are required to reach many different types of learners, and the practice of providing many different types of instruction. *Differentiation* also helped to distinguish two of the eight teachers not employing this strategy as *Traditional/Direct Instruction*. Two teachers, Andrew and Anna, both math teachers, essentially self-identified in this grouping, and were distinct among other interviewees in doing so. Finally, what I call *relevancy*, or the strategy of trying to connect subject matter to issues in the "real" or "modern day" lives of students, was a practice common to five of eight teachers interviewed.

Research Question 3: Among Odyssey-using faculty, what changes, if any, to the software,
including design, features, or functionality, would increase its utility?

Much like research question 2, research question 3 could be explored fairly directly in interviews by asking, "how do you think Odyssey could be changed, or redesigned, or improved?" a question that was posed in this way, or with nearly-identical wording, to each interviewee. In answering this interview question, teachers provided two different kinds of answers; first, a group of answers that could be viewed as a wish list of concrete changes, redesigns or improvements. Those types of responses will be categorized and discussed in the sections below. The other type of response common among interviewees could be viewed as evaluative—comments which amounted more to an appraisal of the virtues and vices of the software than to concrete ideas about what could be changed. The latter grouping of responses will

be considered when I explore overall teacher and student sentiments in the analysis and discussion chapter (chapter five).

1) *Tone & Videos*

As has been touched on in previous sections of this chapter, most interviewees (seven of eight) expressed concerns about the level of maturity, or tone, of the presentations in Odyssey. Videos were frequently described as "lame," or "goofy," or "super corny," and consequently made students "feel like middle schoolers," or gave teachers the sense that the software would be more appropriate for "elementary" level learners. Andrew even worried that the immaturity of the program could affect students' engagement, saying, "the one thing that bothers me so much about the program is that I don't know how…seriously they're taking it." Because these sentiments typically emerged early in the interview, and questions about redesigns/changes/improvements were last, teachers did not necessarily express repeat this concern directly in response to interview questions about redesigns; however, as this was both one of the most universal and concrete criticisms, I have included the discussion about tone in this sub-section on redesigns/changes/improvements.

2) *Assessments*

Assessments were criticized on several fronts. Most universally, four of eight teachers were frustrated by a lack of flexibility in creating assessments, or more simply, in feeling the assessments were too short. While Anna bemoaned, "[the assessments] are not flexible," and explained, "I don't need five problems from the same category, I might need two," Eleanor had the same frustration but in an opposing direction: "I think they were like ten questions…my assessments tended to be longer." Other teachers had concerns over the level of sophistication of assessment questions/prompts. For example, Brenda felt the assessments were, "a little simplistic…it's more just regurgitating the information." Similarly, Morgan saw the writing prompts as "a little elementary for high school," and decried the fact that they focused more on comparison questions, and not enough on interpretation. While critiques of the assessment

questions could warrant a change on the manufacturer's end, critiques about their length may actually be more a reflection of training deficits in how to use Test Builder. Alternatively, it could be, as in Jane's case, that even those who knew how to use Test Builder were either unable to do so successfully, or would still have felt that assessments were too short (there are a limited number of questions available in a bank from which teachers could select in forming an assessment using Test Builder).

3) *Accuracy*

Two teachers, Brenda and Eleanor, noted problems with inaccurate information, or inaccurate assessment responses. Both teachers suggested the manufacturer should "double check the facts," or otherwise rectify these "built in" problems.

4) *Help Page/Forum*

Two teachers, Jane and Morgan, thought it would be helpful if Odyssey provided a forum for technical support and teacher-to-teacher collaboration. Such a forum, in their eyes, would teachers troubleshoot—both technically and pedagogically—using Odyssey.

5) *User/Navigational*

Aaron thought the software could be more "user-friendly," though he was unspecific about exactly how he thought it should be changed and admitted that it was user-friendly to him. Andrew, like Aaron, also thought the software could be "easier to navigate" though he also noted that he had not run into such challenges himself. Jane also thought the interface could be "a little simpler" and suggested that it be "pared down."

6) *Availability*

Three teachers, Aaron, Andrew and Brenda, explained the problem of not having Odyssey available for all classes. For Andrew, the problem was simply that Odyssey was not available for his course. However, Aaron, pointed to a larger, community-wide challenge:

> It would be lot easier if they had Odyssey for all the subjects, so that I'm not the only one pushing it on the kids. Like if they did it in their English class and their science class, and their history class, then they'd be more used to it. Whereas when I do it, it's like, 'why are you the only one making us do this?'

Not having Odyssey available for all classes meant that it was not "pushed" for all students and teachers, thus diminishing opportunity for collaboration, and making it more difficult for Odyssey-using because students were less familiar. To Aaron's point, Brenda noted that "a lot of kids didn't do it because they're not used it."

7) *Miscellaneous*

Due to varied use and experience, teachers offered suggestions for redesigns/changes/improvements that are not easily categorized, but which are nonetheless useful to consider for future audiences. I have therefore grouped the responses by teacher.

Aaron:

Aaron would like the software to provide "manipulative" and other games in a cache of activities students could do, particularly if they finished a unit before their peers. Aaron was also concerned that the videos moved too fast, and therefore students, "have a hard time following along." Aaron also felt the software did not use, "student-friendly language," and as a consequence, students "can get confused easily."

Andrew:

Andrew thought the software could "look cool…it could look better on screen." Andrew also felt the individualization of the program, that students could be in different places in a lesson at different times, made it challenging to manage a group of students.

Brenda:

Brenda thought Odyssey should have a feature that allowed students to blog. She had used Edmodo in this way and while students loved the exercise, they found the site cumbersome.

Eleanor:

Eleanor is the Odyssey liaison on campus and therefore used the software in ways unique to her role. One of her suggestions, that they improve the technical process in which student data is imported, is very much a reflection of her unique role. Eleanor also believed students had trouble logging into the specific URL for Odyssey because it required the "www." in front of "thelearningodyssey.com" instead of simply allowing users to go to "thelearningodyssey.com". She suggested they create a redirect page to avoid users receiving error messages.

Jane:

Jane felt the need to have an expert point-person on campus. Though she recognized Eleanor's function in that role, she felt Eleanor was not sufficiently trained and therefore could not effectively help integrate the software. Jane also had pedagogical concerns, in particular, that the software did not provide scaffolding to students before asking recall information on assessments. As evidence, she noted that while the videos bullet pointed key information or ideas, students were not prompted to take their own notes about important concepts from the lesson.

Morgan:

Morgan had concerns about the process by which students were sequenced through the software, and found it difficult, "figuring out those little things," which could prevent students from using the software as she had intended.

Redesigns/Changes/Improvements – Summary

Faculty interviewed in this study all but universally (seven of eight) expressed concerns over the tone of presentations within Odyssey. More specifically, interviewees described the software, and videos in particular, as "goofy," "lame," and "super corny." These sentiments were corroborated in a journal entry, #9, as well, which in addition to describing the program as "lame," also said it, "makes them feel like middle schoolers." Beyond the videos, the overall sophistication and depth of inquiry from prompts and assessments was also viewed as age/grade level-inappropriate, as faculty described the assessments as "elementary," and, "not really what you're going to see in college."

Assessments also drew criticism for either being too short, or in one case, being redundant, but in both instances, teachers would like to have been able to more easily customize or build their assessments from the bank of questions available in Odyssey. Although such a feature exits, at least one teacher, Jane, had clearly encountered frustration in trying to use it, and ended up creating her own assessment by copying and pasting Odyssey questions onto a MS Word document and using a scantron answer sheet.

Beyond criticisms over tone and assessments, there were a wide-variety of other suggestions about how to improve the software. Aaron, Brenda and Jane, each had a feature they would like to see added. Andrew had concerns over the aesthetics. Eleanor, in her unique role as Odyssey liaison, had concerns over technical processes, namely importation of student information. Finally, a small number of teachers had encountered themselves, or imagined other users would encounter, difficulties interfacing with and navigating through the software, and hoped for redesigns which would provide simplification.

Research Question 4: How, if at all, do type and extent of Odyssey usage affect perceived student outcomes?

As with research questions two and three, interviewees were asked directly, "how, if at all, do you think Odyssey has affected student outcomes?" In response, teachers seldom provided answers which spoke to student academic outcomes, such as changes in passing rate or other measures of academic performance. One teacher, Anna, guessed that students performed 10% better when using Odyssey compared to the previous summer; Aaron was even less specific, saying, "I'd like to think that it helps, and I think that it does, my passing rate always improves a little bit every year, so…yeah." Andrew chose not to even venture a guess: "I don't know. I really don't know." Similarly, Laura noted, "They all passed the class, so I'm not sure what Odyssey had to do with that in particular. I don't think it was Odyssey in and of itself." Brenda, by contrast, was clear on its impact (or lack thereof), and when asked, "In your estimation, did [Odyssey] actually change how well students performed?" responded, "No, but I don't think we should abandon it."

While not providing specific academic data, teachers did speak to other 'outcome' benefits. For example, Anna believed that it helped low-performing or remedial students build confidence because they could work at their own pace and avoid embarrassment when they struggled. Similarly, Eleanor believed Odyssey has helped students be more engaged with course material, a sentiment echoed exactly by Jane. Eleanor also said she heard from other teachers using Odyssey that they believe the software provides an avenue for the "really weak students," who, "weren't getting it," to be able to "[get] it." Morgan made a similar remark, saying that although she, "really [couldn't] say," what the impact was, she did feel, "that it may have helped the lower level students grasp the information."

Brenda and Aaron both asserted that the program helped students developmentally, though neither was specific about how, other than to say (from Aaron), "having to do Odyssey adds another element to what they need to do to be a good student, being exposed to more types of learning."

Clearly, the overall sentiment of the eight interviewees was that, at best, Odyssey may have had a modestly positive influence on academic outcomes, or at worst, no impact. Interestingly, teachers

nonetheless believed the software to be useful, reiterating its ability to help "lower level" or "really weak" students "grasp the information" and, Anna would argue, therefore act as a potential self-confidence booster, and as Brenda and Aaron asserted, give students one more way in which to develop their skills as a student.

Chapter Four Summary

This chapter explored the ways in which CCHS faculty use the learning software Odyssey. Despite limited use and strong criticisms of the software from users, Odyssey, according to faculty herein, nonetheless provided significant and myriad pedagogical benefits. In exploring research question two, pedagogy and instructional practices proved difficult to determine, and no clear relationship was observed between pedagogy and Odyssey use. Interviewees were also asked about potential changes to the software and offered suggestions which could be broadly grouped into three categories: presentation, technical, and pedagogical. Primary criticisms included the perceived immaturity of presentations, ("super corny," and "lame" or "elementary") pedagogical concerns over the length and quality of assessments, as well as a wide range of technical difficulties such as login problems, and a desire for online support/collaboration forums. Finally, interviewees were asked their perceptions of how Odyssey affected student outcomes and, universally, the impact was described as imperceptible or minimal.

While chapter four presents findings from data collection and analysis in relation to research questions, the next chapter relates these findings to our broader understanding of technology use in schools. Based on data collected, in the next chapter, I also make recommendations for CCHS and other schools using Odyssey so that other institutions will be able to either maximize the benefits of the software and/or be an informed consumer when exploring other technologies for possible use in their district. I also detail the limitations of this study, and discuss implications for future research, concluding with a personal reflection about my experiences with and conclusions from this research.

CHAPTER FIVE: DISCUSSION

Data collected in this study suggests that teachers primarily use Odyssey as a supplemental resource—for review, remediation, or self-assessment/self-pacing. Very few faculty members at CCHS use Odyssey –forty-nine teachers had used at least one feature of Odyssey in the past year, thirteen faculty members self-identified as Odyssey users, and just two interviewees used the software during the school year. Further, those interviewed expressed concerns over the tone and sophistication of presentation and analytical assessment. Considering low levels of use and significant reservations among the faculty, a surprising degree of utility emerged from the data.

In this concluding chapter, I: 1) analyze results, particularly as they relate to literature reviewed in previous sections, 2) provide suggestions for CCHS and other Odyssey-using secondary schools, 3) detail the limitations of this work, 4) discuss the implications of this research for future studies and 5) provide a brief personal reflection.

Discussion and Analysis

The literature reviewed in chapter two suggests that teachers primarily use technology for communications and administrative tasks (2005 National Teacher Survey, 2005; Gray et. al., 2010). While teachers in this study reported using other technologies, such as Aeries, for administrative tasks like grading, they uniformly did not perceive Odyssey to be useful for such work. Two teachers, Jane and Laura, felt Odyssey was useful for providing immediate feedback on written work completed and submitted through Odyssey Writer, but outside of that very specific function, teachers used Odyssey exclusively for pedagogical purposes.

Pedagogically, teachers perceived Odyssey to be useful as a supplemental resource—as a tool for repeat exposure, remediation, review and self-pacing/self-assessment. Teachers were critical of the software's ability to develop deep, analytical thinking, instead labeling assessment questions "simplistic"

and characterized by "information recall." For example, Jane noted, "it was simple, like four questions multiple choice, usually it was reading comprehension, it wasn't analytical at all."

Here, Wenglinsky's (2005) findings showing that teachers rarely used technology to develop higher level thinking skills but instead to replicate didactic methods was confirmed by Odyssey use in this study. However, the data suggests that using Odyssey for replication of didactic methods related more to the software's design than to teachers' use. Further, Wenglinsky's (2005) suggestion that such technology was better used out of school when students could self-direct was a sentiment corroborated by interviewees. Partly because of infrastructural limitations, partly for pedagogical reasons, Odyssey was commonly assigned as homework or extra credit to be completed outside of school. Only two teachers in this study used Odyssey during the academic year, and of those two, one had assigned Odyssey as optional homework while another scheduled regular computer lab periods as a means of reviewing/reinforcing lessons taught over the previous weeks in the classroom (and anything not completed during lab time was then assigned as homework).

Looking at the technology itself as a predictor of use, literature reviewed in previous sections is again instructive. Across several studies, including Osguthorpe and Graham (2003), pedagogical richness within an educational technology is described as including functionality to facilitate small or large group discussions, more dynamic and engaging presentations of material, or simply the ability to shift the use of classroom time away from direct instruction and toward guided inquiry. Odyssey had the capability to host discussions through Odyssey Community, but teachers had not used that feature—some opted to use another technology, Edmodo, for online chats, blogs or discussions; one teacher, Jane, who had used Odyssey Community, called the feature "fluff." Although several teachers believed Odyssey was useful as a tool for engaging students, their sentiments seemed to indicate that it was not necessarily the software design, but rather the break Odyssey provided from long hours of monotonous classroom work during a six-hour-per-day summer class. For example, while Brenda made the argument that Odyssey meets students on their turf ("they're all gamers") and Aaron felt the colors and sounds "make it sound very

hype-y," several teachers lamented the overall tone as "corny" or "lame." As such, both teacher and student sentiments about the program were mixed. For example, Aaron, who noted that students liked that the software made it "sound very hype-y," he nonetheless added that many students, "don't like to use it," and therefore, "half-ass it." Similarly, while Andrew unapologetically called the presentations "super corny," he admitted that students gave "a lot of good feedback" and "actually liked doing" work on Odyssey. Outside of design and tone, Jane, for example, criticized the pedagogy within Odyssey as lacking "scaffolding," or means by which to help students not only learn material, but to learn scholarly habits and develop thinking, writing, and application skills. Aaron advanced another pedagogical criticism, arguing the presentations were "too fast," and failed to stop and check that students understood material at the appropriate intervals. Data from this study suggest that Odyssey falls short of meeting the standard for pedagogical richness.

Like pedagogical richness, extant literature also emphasized the importance of "access to knowledge," or the ability to provide many examples to illustrate a concept (as opposed to a single example given by a teacher or in a text book). Without question, Odyssey lacks this element of 'access to knowledge.' Instead, Odyssey provides single-video presentations of material, a fact bemoaned in interview data, where, for example, Morgan explains, "with the MLK speech, they could have incorporated that video straight into that lesson, but again they just had a guy talking about MLK's speech and then they would give you the text of the speech. So if you had the speech right there to click on and watch that would be helpful. So I guess incorporating more videos for language arts [would be helpful]." That said, Odyssey itself was seen as useful for providing an alternate presentation, a "different voice."

While authors such as Osguthorpe and Graham detail the elements of pedagogical richness and access to knowledge in relation to student outcomes, there is a logical connection between faculty use and perception of the impact on student outcomes. Using the literature as a predictor, Odyssey should have no impact or modest impact on student outcomes due to the absence of the elements such as pedagogical richness and access to knowledge. Teachers corroborate this assertion, where perceptions on its impact on

student outcomes ranged from, "none" (Brenda) to ten percent gains, as estimated by Anna—the majority believed there to be no perceptible impact on student grades or achievement. A teacher would, therefore, be unlikely to use Odyssey more broadly if he/she believes its impact to be so limited. Unsurprisingly, limited probably best describes Odyssey use at CCHS—very few teachers had ever used Odyssey, and of those who had, only two of eight interviewed continued to do so during the school year.

Data from this study did however corroborate other evidence about the benefits of integrating technology into instruction. For example, Twig's (2004) research suggested that courses blending traditional classroom work with remote or computer-based instruction had the ability to reduce dropout, failure and withdrawal rates. In a pilot interview completed prior to this study, one teacher suggested she thought having Odyssey available had reduced the failure rate in her class by a third. More directly related to this study, while teachers did not perceive a significant effect on student outcomes, Odyssey was almost universally seen as beneficial to struggling, low-performing, or remedial students. Penuel and Means (1999) suggest that high technology-integrated classes allow for increased customization or self-directed processes of learning, as through self-paced reviews and by accessing alternate examples. Four of eight teachers noted the ability of Odyssey to allow for increased customization, whether by allowing teachers to focus their time on struggling students while others worked ahead, or by allowing students to self-assess and pace themselves accordingly. Almost every teacher (seven of eight) interviewed expressed sentiments conveying their belief that Odyssey was useful as an alternate form of presenting the material—providing a new example, explanation or presentation of material covered in classroom work.

The literature also suggested a relationship between technology use and teacher pedagogy. From the literature (Becker, 1994; Becker & Riel, 1999), we would expect suggests that low-level users of Odyssey are associated with didactic, teacher-centered instructional practices, whereas higher-level users would be associated with student-centered, constructivist practices. Alternatively, Niederhauser and Stoddart (2001) find that teachers use technology in ways closely related to their pedagogical beliefs. Data in this study revealed no clear relationships between pedagogy and Odyssey use. Teachers such as

Morgan, who articulated a constructivist approach, or Anna and Andrew, who were more clearly traditional/direct instruction, used Odyssey in roughly the same ways. Aaron, who emphasized differentiation, used Odyssey primarily as a means of differentiating--providing an alternate presentation, providing an additional resource. Nonetheless, because of the overall limits of Odyssey use, and the variety and ambiguity of teacher pedagogy, no clear conclusions can be drawn regarding the relationship between teacher pedagogy and Odyssey use.

However, several authors (Becker, 1994; Schofield, 1997; Penuel and Means, 1999) suggested that using educational technology allows teachers to shift from didactic, direct instructional methods, to more student-centered, constructivist methods. When asked whether and how Odyssey had changed their teaching, interviewees offered examples of how Odyssey had changed their ability to focus attention on those most in need while other students could move forward. So while learning was shifted from a locus around the teacher to a locus around the student, pedagogically, Odyssey was didactic, and the shifts experienced by teachers were limited to instances when students were in the computer lab.

Over the summer, lab time was set aside for every class during a set-time each day. Faculty in the instant-polls and in interviews identified access to computers/lab time as a primary impediment to Odyssey use. Not surprisingly, when asked about changes, every interviewee suggested increased computer access and faster internet would help facilitate use (a point which will be revisited in subsequent sections). Other changes suggested related either to navigational challenges (using Test Builder, or other technical problems), tone ("super corny," and "lame"), or to assessments (length, analytical depth, customizability).

Between technical limitations, pedagogical limitations, and infrastructural limitations, data from this study suggests that Odyssey use was, first and foremost, limited. Despite the limitations described above and in previous sections, teachers interviewed nonetheless detailed myriad ways in which the

technology was and could be useful, almost all of which centered around its value as a supplemental resource—for review, remediation, repeat exposure, and for self-pacing/self-assessment.

Recommendations for CCHS

Increase Computer Access and Internet Bandwidth

Infrastructural limitations were identified as a primary impediment to Odyssey use. Instant poll and survey results, as well as journal entries and interviewee data all highlighted an inability to access computers, computer lab time and high-speed internet. For example, instant poll results showed 23% identified "insufficient access to computers" as a primary impediment to Odyssey use while an additional 10% indicated "internet on campus too slow." Cobra City High School has already used initial findings such as those described above to apply for district and grant funding to increase bandwidth and purchase new mobile computing devices. In fact, CCHS administrators report having doubled internet bandwidth at the school and having purchased forty-eight new netbook computers, forty of which will be available by cart and can be reserved for use in a classroom and eight of which will be available to school administrators. Additionally, Eleanor reports that she has applied for several new classroom sets of such devices so that each academic department could have its own cart of forty netbooks. Clearly, the school responded to one of the most clear findings from this study—that infrastructural resources were identified as a primary impediment to Odyssey use.

Chat Forums and Odyssey Working Groups

As indicated by both interviewees and instant poll results, training and support were viewed as limited and insufficient. Instant poll results indicated that 15% of respondents identified "insufficient time to learn how to implement Odyssey" as a primary impediment to use, while another 12% indicated "insufficient training on Odyssey." Taken together, that 25% would represent the most significant barrier to Odyssey use (as compared to 23% who indicated "insufficient access to computers"). Similarly, interviewees reported having had just "one day" of training. Data revealed other indications of training

deficiencies, perhaps most notably in teachers' desire to customize assessments—a feature which, when properly trained, teachers have the ability to do via Test Builder. Two teachers, Jane and Morgan, also expressed an interest in having a forum where teachers could collaborate, share ideas, and dialogue about best practices for Odyssey. The data, therefore, suggest that additional training and forums, whether virtually through Odyssey, in person at CCHS, or both, could help teachers share utility, troubleshoot challenges, and better understand how to use and navigate Odyssey. Jane also suggested having a "point person" who was a site-expert, noting that the current point person, Eleanor, had only limited training and was unable to help troubleshoot beyond basic questions.

Design Changes – Tone, Assessments, and Customization

Because of the research questions framing this study, and in particular, interview questions prompting teachers to provide suggestions for improvements and redesigns, recommendations emerged organically from data collection. Three criticisms emerged most universally from the data—first that the tone of Odyssey was not appropriate for high school students, second that videos and assessments were both limited, and related, third, that overall, Odyssey's pedagogy was considered secondary in value to classroom instruction. In terms of tone, there are specific changes CompassLearning could make to address such concerns. The introductory videos that Morgan criticized as "loud and like, 'Ahh!'" could be redesigned so that students who had previously logged in could skip through the intro. More generally, most of Odyssey's video lessons are "super corny," or "lame" in the sense that they use actors and costumes as gimmicks to make, as Aaron said, the material "hype-y," and (seemingly) to cater to an immature audience. While such videos could be appropriate for elementary and perhaps middle school level learners, faculty perceived students found such presentations to be beneath them. Odyssey could overhaul the videos and overall tone of the presentation to be more appropriate for a high school audience.

In revising their videos and presentations, CompassLearning could address other specific recommendations articulated by interviewees. For example, Morgan and Brenda both wanted the ability to either upload or have embedded other videos, perhaps non-Odyssey videos (e.g. MLK's "Dream" speech), related to a lesson. Morgan, and others (Brenda, Jane, Laura, Aaron), would have liked to see more examples and more activities which help communicate material and build skills. Though somewhat unspecific, data suggest that teachers viewed Odyssey's built-in resources as limited.

Assessments were also criticized as lacking analytical depth, instead focusing on "information recall." Information recall questions typically have clear right or wrong answers, whereas analytical questions require a human eye for evaluation. Requiring the latter would interfere with Odyssey's use for automation, but as an alternative, CompassLearning could build a bank of more analytical questions from which teachers could select those they feel are most appropriate for a particular individual or group of students (and presumably teachers would then be required to manually evaluate/grade such responses as with Odyssey Writer prompts).

Policy and School Culture

> I think Odyssey should just be a requirement because I do think that it helps. I think when it's not a requirement, teachers opt out, and they never learn it and I think it's just another tool and everybody needs as many tools as they can possibly get. I would be more on top of it if I were required to use Odyssey. I think that it's better than nothing. I don't know if that's a positive or negative statement, but I know for a fact that most teachers don't do anything extra. So being that the school provides this, do this, instead of nothing

Perhaps no quote better captures the essence of the findings in this study than the quote above from Aaron. Though limited, Odyssey's value was nonetheless "better than nothing." Particularly because CCHS administrators have responded to initial findings by improving infrastructural resources, there is an opportunity to ask teachers to respond in kind. Even with very limited Odyssey utilization, all teachers interviewed in this study believed that Odyssey provided some utility, particularly for low-performing or severely struggling students—arguably those most in need of additional resources. It would be hyperbolic

to suggest that providing Odyssey as an additional resource requires very little effort. Beyond the one-day training from CompassLearning, teachers spent a range of time learning Odyssey through trial and error. While Eleanor estimated having spent ten hours, Jane said she spent an hour a day for the entire spring semester. Either way, data suggest a non-trivial time commitment associated with learning how to use Odyssey. However, once comfortable, a teacher needs to dedicate very little time or effort to providing Odyssey as a supplemental resource. Non-written assessments are graded automatically and immediately, and teachers need only invest a small amount of set up time (making videos available, selecting assessments, and, adjusting sequencing and passing rate settings) to make the software accessible to students as a self-guided, supplemental resource. Should teachers choose to integrate the software into class time, they could do so, and would have fewer impediments in doing so greater computer availability and increased internet bandwidth. Whether or not Odyssey should be a "requirement" as Aaron suggested, is something that CCHS could decide on its own. The data do suggest that having Odyssey available for more classes and having more teachers using the software would make it easier for students in the sense that 1) teachers like Aaron would not be pioneers who have a disproportionate share in the duty of teaching students how to use the software and 2) would help to normalize using the software at the school. Data also suggest that it would make using Odyssey easier for teachers in that they could look to their peers for ideas about best practices, for collaboration, and to troubleshoot.

CCHS administrators could decide how best to encourage increased use, but one suggestion might be to form Odyssey working groups, a model which exists for select teachers piloting iPad use at the school. If CCHS administrators decide it is a priority, perhaps additional training sessions, particularly within specific departments, could help facilitate use. Either way, administrators share a role in facilitating Odyssey use--ultimately, I believe faculty will need to be accountable rather than simply encouraged to use Odyssey or adequately trained but not required. Exactly how accountability is achieved should be developed by the site (to be discussed further in the *Implications for Further Research* section).

Shop for Other Technologies

During her interview, Anna said, "we shop for textbooks, can we shop for software too?" While CCHS can and is taking steps in facilitate Odyssey use, the utility of such software, even under ideal conditions, still appears to be quite limited. I would therefore recommend that CCHS continue to, as Anna suggested, shop for other software which might provide more utility. It should not be overlooked that among non-users participating in the instant-poll, the second most common impediment to Odyssey use was "software not an effective teaching tool." Because I did not interview non-users, I cannot draw conclusions about exactly why those who do not use the software nonetheless believe it to be ineffective—perhaps teachers came to such a conclusion after a training session, perhaps they explored the software enough to justify that response, or maybe teachers using Odyssey spread a negative impression—data collected in this study does not lead to clear conclusions. However, it is clear that even among those who use Odyssey the most (e.g. Aaron), the perception is that its value is just "better than nothing." I would therefore recommend CCHS continue shopping for other programs which might provide more utility.

Recommendations Summary

Data collected in this study suggests a limited utility for Odyssey, perhaps best captured by Aaron, who called it "better than nothing." Therefore, even with increased internet bandwidth and better computer accessibility, no recommendation offered above suggests that teachers should take significant steps to integrate the software into daily instruction or classroom time. However, as long as CCHS continues to have Odyssey as a resource, there are steps that can be taken to maximize its value. First, infrastructure can and is being improved—namely by increasing internet bandwidth and by making faster, more up-to-date computers more widely accessible. Second, the school can work with CompassLearning

to provide more training and troubleshooting resources. Third, CompassLearning should take into consideration the most common criticisms of its software—in particular, the tone of presentations, the breadth of available questions and depth of analytical inquiry on assessments, and overall breadth of resources—particularly additional videos, activities, and games. Fourth, CCHS can take steps to increase the pervasiveness of Odyssey at the school. Finally, because the data collected herein suggest the value of Odyssey to be so limited, I would also recommend that CCHS and other schools shop and compare Odyssey with other LMS technologies. As discussed in previous sections, Odyssey lacks key elements of successful educational technologies—if possible, schools should consider elements such as pedagogical richness, access to knowledge, and social integration when selecting a LMS technology.

Limitations

In this section I review the major limitations of this study. First, I detail limitations specific to the research design, considering, in particular, survey and interview questions, journal entries, document analysis, and the instant poll. Next, I review limitations specific to my data analysis, and finally, I provide broad limitations related the data which emerged from this study.

1) Surveys

By design, the survey itself was limited to eleven questions. While I distributed the survey to roughly four-fifths of the faculty at CCHS, I had been advised that of the roughly fifty teachers present between the two department meetings, only a handful, perhaps five to ten, would be using Odyssey. Therefore, I wrote the survey to solicit basic levels and patterns of Odyssey use among the faculty. Although results depicting both levels and patterns of Odyssey use were corroborated from other data collection sources and therefore largely successful, there was one question in particular which was flawed. The question "I set up Odyssey modules for my course(s)" like other questions, prompts teachers to respond based on frequency (never, once per year, once per month, once per week or more). However, theoretically a teacher could set up all the modules once at the beginning of the year, and therefore

respond "once per year" while actually using Odyssey consistently throughout the year. This would therefore imply an inaccurately low level of use. For that reason, I eliminated this question when analyzing results illustrating frequency of use. Another flaw, in this case potentially affecting all questions, was the use of "course(s)" with each question. This could have been problematic because those who teach different courses and potentially use Odyssey in entirely different ways per course would have been forced to lump all Odyssey together, or otherwise answer this question according to their judgment—which introduces a degree of variability not originally anticipated. Finally, although the survey solicited information about educational background, no other demographic or other background information was solicited, and I therefore could not consider results of the survey against other, potentially spurious variables such as demographic, educational, or professional background.

2) Interviews

I used a semi-structured interview protocol as a way of providing flexibility to delve more deeply into responses which I felt warranted more depth. However, as a consequence, not every faculty member was asked the same set of questions (see Appendices E-L). I could not provide frequencies or other patterns from each coding group, or when I did, I had to add a qualifier such as "the two interviewees who were prompted to respond to…" There were benefits to this method, for example, when an interviewee such as Brenda or Eleanor said they would use Odyssey more if X; I could follow and ask specific questions about how they would use Odyssey more if X were satisfied, questions not originally in my protocol. On the other hand, there were clear limitations of this method as well; for example, not every faculty member interviewed was asked, "How, if at all, has Odyssey changed your teaching?" Those who were asked this question provided useful data.

Because my interview protocol was semi-structured, I was able to improve and refine questions as I conducted more interviews. However, despite trying to phrase the question in a number of different ways and ask a variety of follow up questions, I was rarely able to solicit satisfying information about

teachers' pedagogical methods and philosophy. This limitation was compounded by the fact that I had originally intended to include document analysis in this study, and asked teachers to come to interviews with documents/educational artifacts available for my review, but just one teacher (Brenda) complied. Therefore, I was unable to corroborate information about pedagogy against documents, and was unable to use document analysis at all in this study. As evidenced in chapter four, my ability to understand and therefore compare teacher pedagogy against Odyssey use was highly limited.

   3) Instant Poll and Journals

   I was pleasantly surprised with how smoothly the instant poll process ran. I was very worried about technical problems, or that faculty, who had been instructed to bring a cell phone, would not do so. Given these concerns, the instant poll was, in my view, overwhelmingly a success. However, there was one unanticipated limitation—faculty were able to respond to up to five different impediments/reasons why "I don't use Odyssey because…" As a consequence, I cannot be sure exactly how many different individuals participated, and some individuals may have had more influence over the survey than others. If, for example, one person only responded once while another person responded five times, the latter would have more statistical influence over the poll results. On the other hand, it is also possible that respondents were unduly constrained by being limited to five responses. The ability to respond up to five times therefore introduced yet another unanticipated degree of variability.

   Odyssey users were instructed to watch the results being displayed on screen from the instant poll and then, in a journal, write down their responses to those impediments. However, it's clear from entries that how respondents used journals varied widely. For example, just two entries strictly followed instructions, writing their responses to the five most common barriers as displayed on the instant poll. Within the other eight entries, data varied. One author wrote about his/her problems with Odyssey, another wrote about why it was useful. Although this did not provide the data I hoped it would, it did provide an unexpected benefit. Eight of the ten authors essentially used the journals as an open forum to

tell me what they wanted me to know about their experience with Odyssey. I was therefore able to use journals in an unexpected way—not as a stand-along set of responses to the instant poll, but rather as a data sources which be compared against other sources of data.

4) Data Analysis

To analyze interview data, I coded transcripts for broad and sub-themes. I was the only coder in this project, and my categorizations and interpretati0ns were subjective, and influenced by my background knowledge and involvement in this study.

5) Sample and Overall Project Limitations

The major unanticipated limitation of this study relates to the interview sample. Of the eight teachers interviewed, seven had used Odyssey during the summer for remedial students. Of those seven, only two continued to use Odyssey during the school year. One of the major findings of this study is that Odyssey is particularly useful for low-performing, seriously struggling or remedial students; similarly, faculty perceived Odyssey to be most useful as a supplemental resource for repeat exposure to material, for providing an alternate form of presentation, and for review/remediation. Results would therefore seem to be highly skewed by the context in which the majority of my interviewees had used Odyssey. Interestingly, when prompted about Odyssey's usefulness, Brenda, the only teacher who had not used Odyssey over the summer, suggested that it could help her teach content with which she was, in her words, "weak." That said, she also felt Odyssey was useful for providing a non-traditional means of presentation ("they're all gamers"). Further the sentiment that she hoped Odyssey could help support her pedagogical weaknesses was echoed by Jane, who said she hoped to use Odyssey to teach grammar, where she felt she was weak.

Additionally, while thirteen faculty members provided their email addresses as potential interviewees and Odyssey users, only eight were interviewed. Among those not interviewed was one teacher several other interviewees had been identified as an important source for information about

101

Odyssey. I later discovered that this particular faculty member teaches an Odyssey-based course during the academic year. Therefore, even at this single site, a limit unto itself, I did not capture the range of contexts in which Odyssey was used, and therefore, I likely did not capture the full range of its utility. Overall, I believe the results do provide a foundation for further inquiry, but cannot provide definitive, generalizable data on Odyssey's utility.

The major anticipated limitation of this study is that no student data, either related to academic outcomes or qualitative information related to student perceptions benefits, utility, or sentiments, was collected. Although I could corroborate teacher sentiments and opinions from one source against other faculty-level data sources (such as surveys or journal entries), I cannot corroborate those sentiments, experiences, opinions, etc., against other users, most notably, students. In the next section, I discuss the implications of this research on future research; primary among such implications will be the need to collect student-level data.

Implications for Further Research

In his section I discuss the implications of this research for future areas of study. This section builds off the limitations outlined previously and discusses how future inquiries could help address the limitations of this study and enhance our understanding of both Odyssey specifically and other LMS technologies more generally.

1) Student Data

As indicated in the previous section, generalizability of the results from this study is limited by the inability to triangulate teacher perceptions of and experiences with Odyssey against other users, particularly students. In fact, the results of this study did suggest perceptions and experiences may be significantly different. For example, Andrew repeated several times throughout his interview that both he and students thought Odyssey was "super corny" and "lame," but he nonetheless admitted that he got good feedback from students. In fact, other than complaints over the tone of Odyssey ("really do we need

to watch a cartoon, we're fifteen years old, right?"), teachers believed students enjoyed using Odyssey. Nonetheless, all data from this study is teacher generated, meaning there is a clear need for a study considering the student experience with Odyssey.

2) Context

In the previous section, I outlined the limitations imposed by interviewing faculty who had primarily used Odyssey for summer/remedial students. While the value perceived by such faculty could be similar had they used Odyssey in other contexts, for example, during the school year, future studies would be needed to better illuminate potential differences in value as they relate to context of use.

Similarly, this project was limited to just one site, Cobra City High School, and eight faculty members (for interviews). Additionally studies looking at other schools, including elementary and middle schools, where, as data herein suggest, Odyssey could hold significantly more utility.

3) Longitudinal or Follow Up Studies

Among the contextual limitations of this study is the fact that CCHS faculty are in the early stages of adopting and using (or not using) Odyssey. As predicted in the literature, early stages of adoption are often characterized by negative sentiments and limited use. Future studies are needed to see how experiences with and perceptions of Odyssey—its value, utility, and impact on student outcomes— change over time, either with longitudinal studies, or with follow up work to this research.

4) Comparison

This study examined just one LMS technology, Odyssey. As discussed earlier in this chapter, Wenglinsky's (2005) work illustrates the importance of the quality of a technology, in terms of pedagogical richness, access to knowledge, and social integration, in impacting student outcomes. Other inquiries are needed to begin to compile a body of knowledge around LMS technologies, and, more

specifically, other studies are needed, both on Odyssey, but on other similarly pervasive software programs as well.

5) Software Selection and Implementation

In the *Recommendations* section, I suggested that, given the apparent limits on Odyssey's utility, CCHS should shop for other software programs. However, it is reasonable to conclude that if the same processes by which CCHS selected Odyssey were used in selecting a new software, the same problems related to low use and perceived low utility would ensue. I therefore recommend that CCHS develop a working group of constituents—teachers, administrators, and students who could work with a principal investigator to conduct an action research study to both select and implement new software. Such a study could provide 1) an agreed upon method based on the utility for each constituent by which to select new software, 2) data to support the software's utility, and 3) foundations for processes to implement and, just as importantly, support the initial and continued use of the software. Coupled with other recommendations, particularly holding teachers accountable to using the software, I believe CCHS or other sites could select, implement, and use software like Odyssey successfully.

Personal Reflection

After I completed my last interview, I began to think about the major themes and patterns which had emerged from interview data. As I approached the coding process, I thought it would be simple— there were three or four major uses which almost every interviewee articulated—or so I thought. Ultimately, that instinct was both right and wrong. Looking broadly, Odyssey was useful primarily as a supplemental resource—for review, remediation, repeat exposure, and self-pacing/self-assessment. One could argue review, remediation and repeat exposure all imply the same fundamental utility. In that light, Odyssey value could be understood as limited, and without question, I presented its value as such— limited, better than nothing, corny, lame, and useful.

However, that initial, simplistic view of Odyssey's value proved just that, overly simplistic. Within the context of review/remediation/repeat exposure, I was surprised at how many nuanced but significant variations and uses emerged. For example, under the umbrella of "How is Odyssey Useful?" I created fifteen different sub themes. Granted, at least a few of those subthemes were supported by just one or two quotes and/or respondents. Nonetheless, I was pleasantly surprised by how many different uses, and in a sense, how much utility had been leveraged by a relatively small number of faculty using Odyssey in a very limited context.

In essence, that, to me, is the real story behind the data. Odyssey, which to both my own and teacher perceptions, does in fact look "super corny," and "lame," still holds a surprising degree of utility. Even when used in a very limited context, with software which, to the eyes of the faculty and this researcher, could be vastly improved, Odyssey has proved useful. It compels the imagination—what could we achieve if teachers, students and technology came together in more powerful ways? What could students achieve with better tools? How could teachers accomplish their goals, improve student outcomes, and be better teachers with more effective technology at their disposal? To me, these are the questions raised by this research, questions which are both cause for optimism and action for the future. A surprising amount appeared to be extracted from a very limited resource, Odyssey—what could we do with something better?

APPENDIX A - Survey

Odyssey Use at CCHS

Introduction

Thank you for your participation in this research project! This very brief survey aims to measure faculty knowledge and use of Odyssey software. Your participation is completely voluntary and your answers will not be shared. I will not, nor will anyone at CCHS, have access to individual responses. At the end, you will be prompted as to whether or not you would be willing to participate in a follow-up interview; your participation in such an interview is also completely voluntary. Data from this survey will be presented in aggregate form only, so that no single respondent may be identified. Please answer carefully and honestly. Thank you for your participation!

Part I: Respondent Information:

Name of course(s) you teach:_____

1. Highest level of education (to date)

☐ Bachelors   ☐ Masters   ☐ Doctorate   ☐ Other Graduate Degree

Part II: Odyssey Use

2. I **know how to login to Odyssey** with my account credentials

☐ True   ☐ False

3. Over the past **three months**, how often have you **logged into** Odyssey?

☐ Never   ☐ 1-4 Times   ☐ 5-8 Times   ☐ 9-12 Times   ☐   13   times or more

4. I use Odyssey **Writer** in my course(s):

☐ Never   ☐ Once per year   ☐ Once per month   ☐ Once per week or more

5. I **set up Odyssey modules** for my course(s):

_____

☐ Never ☐ Once per year ☐ Once per month ☐ Once per week or more

6. I use Odyssey **Community** in my course(s):

_____

☐ Never ☐ Once per year ☐ Once per month ☐ Once per week or more

7. I use the Odyssey **Test Builder** feature to create an assessment in my course(s):

_____

☐ Never ☐ Once per year ☐ Once per month ☐ Once per week or more

8. I use Odyssey **Gradebook** in my course(s):

_____

☐ Never ☐ Once per year ☐ Once per month ☐ Once per week or more

9. I use pre-made Odyssey **assessments** in my course(s):

_____

☐ Never ☐ Once per year ☐ Once per month ☐ Once per week or more

10. I use Odyssey **Videos for instruction** in my course(s):

_____

☐ Never ☐ Once per year ☐ Once per month ☐ Once per week or more

11. If you use Odyssey in ways not reflected in the questions above, please describe how you use Odyssey in the space provided below:

_____
_____
_____
_____
_____
_____
_____
_____
_____

If you use Odyssey in any way and would be willing to participate in a follow up interview, please provide your email address in the space below:

Email address: _____

Thank you very much for taking the time to complete this survey. Your feedback is valued and very much appreciated!

APPENDIX B. Email to faculty who, when surveyed, agreed to participate in interviews:

Dear X,

My name is Peter Silberman, I am a doctoral student in education at UCLA conducting a research project about Odyssey. This past Wednesday at your faculty meeting I distributed a survey asking CCHS teachers about their use of Odyssey. At the end of the survey, you kindly agreed to be contacted for a follow-up interview. Thank you very much for agreeing to participate in my research project. I am writing to find a date and time that would work for our interview.

As a reminder, your participation is completely voluntary, interviews are 100% confidential, and your responses will be aggregated so that no single individual can be identified. If you would still like to participate in such interviews, please email me back and let me know a few dates and times that could work for you.

 Thank you for your help, and I hope to hear from you soon.

Warm regards,

Peter Silberman

Peter Silberman
Candidate for Doctorate in Education (Ed.D.)
UCLA Educational Leadership Program
petersucla@ucla.edu
818-487-6533

APPENDIX C: Interview Protocol

Interview Protocol

Thank you for agreeing to participate in the interview portion of this research. This interview in intended to follow up on results from the previously administered survey. Your responses to this interview will not be matched to your survey responses. This interview aims to understand more about your teaching philosophy and practice, how and why you use Odyssey, how, according to your perceptions, Odyssey use has affected student outcomes, and finally how, if at all, you would change Odyssey to better suit your needs. Your own views and opinions are critical to the success of this project, and both positive and negative opinions are welcome.

To ensure accuracy, this interview will be recorded. However, your answers are confidential, and data resulting from this and all interviews will only be presented in aggregate so as to safeguard against identifying respondents. You will not be quoted and your answers will not be shared with anyone at CCHS. Does that make sense?

To begin, please introduce yourself, including your subject area or area(s), and the name or names of the course or courses you teach.

Part I: Your Teaching Philosophy

First, I'd like to know about your beliefs about teaching.

1. Please describe your teaching philosophy
2. Could you give me an example of an instructional activity that you feel illustrates this philosophy?
3. Could you give me an example of an assessment that illustrates your philosophy?

Part II: Odyssey use in your course or courses

Now, I'd like to hear about how you use Odyssey in your courses or courses.

4. What utility do you see for Odyssey in your course(s)?
5. Specifically, what features of Odyssey do you find most useful? Why?
6. How, if at all, has Odyssey changed your approach to teaching this class?
7. How could Odyssey be redesigned to better suit your needs?

Part III: Student Outcomes

I'd also like to know what impact Odyssey has had on student outcomes in your course

8. How, if at all, do you think Odyssey has affected student outcomes in your course(s)?
9. Can you give me an example of where you think Odyssey has affected a student outcome?
10. Compared to outcomes in your course prior to the availability of Odyssey, where, if anywhere, do you see the greatest changes in student outcomes?

11. Is there anything I've missed or that I should have asked?

APPENDIX D: Description of Odyssey Features

Grade book

Odyssey includes a gradebook, which allows for inputting, tracking, calculating, and reporting grades. This tool pools completion of grades as they are entered and allows teachers to assign weights to different grades. Teachers can also use four 'open' categories to drop in grades from outside Odyssey, and/or revise grades retroactively if needed. Teachers can also export the grades into excel format if needed for reporting or other purposes.

Odyssey Community

Odyssey Community is a threaded discussion forum. For each course, there are built-in, pre-made discussion questions available for teachers. Teachers are also able to input their own questions and start their own threaded discussion. Teachers within Odyssey can also have a threaded discussion among faculty members. Teachers can define the population parameters of who is included in threaded discussions—for example, including students only in one section of a course versus including students in all sections of a course.

111

Assessments

Odyssey includes several levels of built-in assessments. Activity quizzes are small, usually five question quizzes, and are designed to cover one concept from one learning activity; lesson quizzes are ten questions, combining multiple concepts from multiple learning activities. The lesson quizzes are ten questions, but are pooled from a bank of twenty quizzes, meaning students can be given several different versions of a lesson quiz. This also allows students to repeat a quiz without retaking the exact same assessment. Chapter Tests take all the concepts from a given chapter, combining several concepts, and synthesize them into a ten-to-fifteen question assessment, which are pooled from a bank of twenty or a bank of thirty available questions.

Adapted from *Sanitary Ramblings, Being Sketches and Illustrations of Bethnal Green* by Hector Gavin

Which perspective do both the passage and the photograph stress?

○ A. The poor and hungry need rations to survive.

○ B. Only love can change the world for the better.

○ C. Everyone needs special help at some point in life.

⬤ D. We have a responsibility to care for those around us.

Close

Test Builder:

Test Builder is a feature which allows the teacher or school to tailor an Odyssey built assessment to state- common core- or end-of-course- standard(s). Within this feature, there is also a diagnostic tool which is meant to help determine which areas have reached sufficient levels of mastery (as decided upon by the teacher/school) and which need more focus, and will even recommend learning activities within Odyssey to address those areas. Some schools use this as a starting point to help devise a student's learning path to master standards. (*No image available*)

Odyssey Writer:

Odyssey Writer is a built-in writing tool which is very similar to Microsoft Word, or other common word processing applications. This feature allows teachers to create their own discussion prompts or use pre-made prompts from Odyssey.
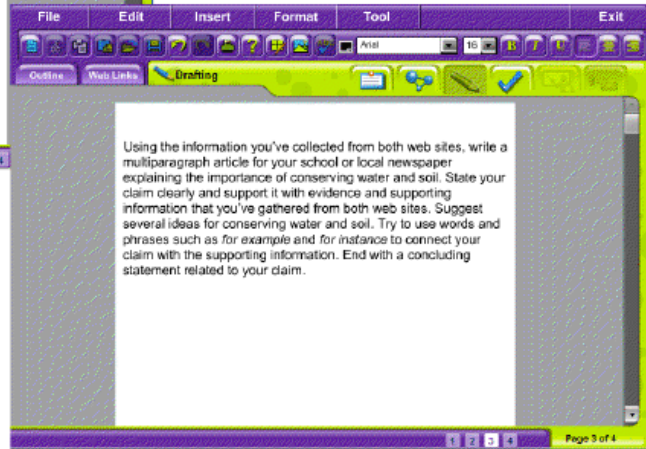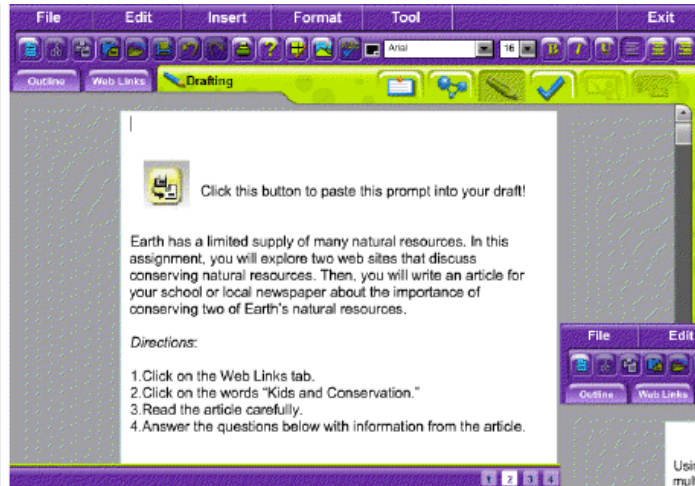
Instruction:

Odyssey uses videos, animations, text passages, and activities called 'manipulatives,' to provide direct instruction. A few examples are provided in the images below (also, see Figures 5 and 6 in Chapter Two).

How would you describe your teaching style or your teaching philosophy?

Can you give some examples of different methods?

In class you introduce stuff with direct instruction and you do more one-on-one out of class?

Can you tell me some of the cool activities you mentioned?

When [the students are] doing things like measuring slopes, [or] throwing balls, is that typically as a class, in pairs, or in small groups?

[Is the game you're describing] like Taboo?

Have you had trouble scheduling the tech lab?

[Is using the tech lab on a] first-come, first-served [basis]?

Are there certain kinds of students that you notice benefit from 'hearing that other voice?'

What kind of grade [do you mean] like pass [ing], or get[ting] an A?

Can you describe what level your students are?

You mentioned that [Odyssey is] 'okay to good.' Tell me what you mean by that.

When you say it's different from the way you teach, are you talking about pace and way it's explained or is there another pedagogical difference?

When [you have] some concerns about the pace, [and] the way [it's explained]?

Have you had any technical problems with it?

Can you tell me what [Galileo] is?

You make them [the tests] or they're premade?

Have you ever used [the Test Builder feature on Odyssey]?

What's your reaction to, or how happy are you with the assessments?

I want to ask you about a few other specific features. When I aggregated the data from the surveys, videos and assessments [that] were most popular, is that consistent with (your use)?

Why do you think those are the two most popular features?

Then there were several other features that were not used or very lightly used. Do you use Aeries?

Do you use Odyssey's gradebook?

[Do you use] Odyssey Writer?

[Do you use] Odyssey Community?

Do you use Edmodo at all?

Does having Odyssey change the way you teach in any way?

Tell me about how it has [changed the grading system]?

Can you tell me how many kids fell into that category [of not passing the first semester, and instead of repeating it the second semester, attending an afterschool program that goes uses Odyssey instead]?

How many were able to move on [having completed their credit]?

What do you think Odyssey's role in [helping the kids move on] was?

Did the [13 or 14 students] who did not move on end up in a summer class?

[So] you said that Odyssey counts as part of their homework….

Are they working on it just in school in the lab or are they working on it out of school?

How many kids would you say take advantage of that [opportunity to make up credits by doing homework for make-up credit on Odyssey]?

Have you seen that it changes how prepared they are for final exams?

How would you say Odyssey has affected student outcomes?

Explain to me [how Odyssey trains students].

How do you think Odyssey could be changed, or redesigned, or improved?

Do you think that there are things that could be changed about Odyssey that would make people more likely to use it?

Do you have kids that wanted to make up the credit and approached you about not having [access to] Odyssey…

You've mentioned some policy or infrastructure changes—internet, making [Odyssey] a requirement—are there things about the software itself that you think could be changed?

And you do that in class [play games like Manipulatives]?

What's the educational component to that [manipulative]?

How do the students react to using Odyssey?

Why do you think they don't like using [Odyssey]?

What do you think about the video and animations?

[Are the videos or animations for] teaching 11th graders lame or…?

[Is] anything else that you wanted to say about Odyssey, anything else that I should've asked, that I've missed?

 You think you're the only one making them [use Odyssey]…

If you had more access to the computer lab would you use it more or do you think once a month is about right?

Ideally, how often would you like to use it?

Anything else?

APPENDIX F – Interview Questions: Andrew

Can you begin by introducing yourself and the subjects you teach?

Can you describe your teaching style, or your teaching philosophy?

Are there opportunities where students are working in pairs or small groups?

How is Odyssey helpful to you, if at all?

Who trained you [on Odyssey]?

Do you know why they liked [Odyssey]?

Do you think it would be appropriate for students beyond that very remedial summer school level?

[Do kids like it] because there's something you couldn't get in the lecture?

Were there particular features that you found more or less useful?

What makes you think [the students are] not [taking it seriously]?

Had you taught summer school the year before Odyssey?

Was [that your first time] teaching summer school?

Was it similar level student trying to make up a credit?

What's your sense of how Odyssey affects student outcomes?

Do you use [Odyssey] during the year?

How would you use it [if there was material for the level of class you teach]?

Were there particular features that you would like to keep using during the school year?

Have you ever used some of those [Kham Academy] videos?

Even though [the students] thought it was corny, they had good feedback? Why?

Did you have [the students] for 6 hours straight?

Did you have a set computer lab time?

How do you think Odyssey could be changed or redesigned or improved?

I've aggregated the survey results from last week and videos and assessments. Those particular features were most popular. Is that consistent with [your experience]?

 [Do you use] Gradebook?

Do you use Aeries?

[Do you use] Test Builder?

[Do you use] Odyssey Writer?

[Do you use] Odyssey community?

Is there anything that I should've asked, anything that I've missed?

APPENDIX G – Interview Questions: Anna

How would you describe your teaching style, your teaching philosophy?

Tell me some methods you use to communicate material to the students.

Are there opportunities for small group work, or pairs?

When you assign practice, [are students] allowed to work in a group, or by themselves?

Do you let them pick their own groups?

Are there certain kinds of questions, assessment questions particularly, that you think illustrate your teaching philosophy?

Are there certain kinds of assessment questions that you gravitate toward that might help me understand your teaching style?

[Is there] anything else you think I need to know to get a sense of your teaching style, your teaching philosophy?

How, if at all, is Odyssey useful?

Can you tell me what you mean by [an alternative method of teaching]?

Why do you think [Odyssey is] powerful or how do you think it reaches them?

Do you think it's more appropriate for students at some ability levels and less appropriate for students at other ability levels?

Why do you think it would be less appropriate after [the first semester of Algebra 2]?

How do you think [Odyssey] would be useful if you had access to it during the year?

What specifically would [you want] them use in terms of the videos or the assessments?

Do you ever use videos [other than those in Odyssey]?

Is it consistent with your experience [that the videos and the assessments] are the most popular features?

Tell me what you don't like about some of the assessments?

Is [Odyssey Gradebook] something you've ever used?

Do you use Aeries?

[Do you ever use the] Test Builder feature?

[Do you use] Odyssey writer?

[Have you used] Odyssey Community?

Have you ever seen a need for something like [Odyssey Community] in your class?

Did you teach in summer school before Odyssey was available?

How did Odyssey change your teaching?

Is it fair to say that if Odyssey were more available to you, your teaching style would be more customized, more one-on-one?

During the year, without Odyssey it's more one-size-fits-all?

[Why do] you think it wouldn't be effective after the first semester of Algebra?

What about previewing for more advanced students? Would that be valuable for more advanced students?

How could Odyssey be changed, or redesigned or improved to better suit your needs?

Can you give me an example of a state standard assessment question that is not well taught by Odyssey, that students wouldn't be prepared for?

[Is there] anything else in terms of redesigns, improvements, things that could be changed?

How many of [the summer school students] were able to earn their credit?

Do you think that was any different you didn't have Odyssey?

How do you think Odyssey affects student outcomes?

Does anything else in terms of student outcomes come to mind?

[Is there] anything that I've missed, anything that I should've asked?

Why do you ask [how expensive the program is]?

[Is there] anything else that you wanted to add or that I haven't asked you about?

APPENDIX H – Interview Questions: Brenda

How you would describe your teaching style?

Are there any specific activities or instructional methods that you think illustrate your style or your philosophy about teaching?

Are there different ways that you try to communicate the material to the students?

Are there particular kinds of questions that you gravitate toward on assessments?

Can you give me some examples of the kinds of questions students come up with [when they use the Costa system of questions]?

Is there anything else about your teaching style or teaching methods that hasn't been well represented yet?

How would you use something like this [foldables for vocabulary]? Would they study this on their own?

[Do students] use [these foldables] during class?

 [Do you] bring [materials from Dr. Simmons] into class?

[With Dr. Simmons' system that you've adapted, how do students earn points]?

[Is there] anything else [about your teaching methods] before we talk about Odyssey?

How many people are in that group [who use iPads]?

Are [the articles dealing with] different departments?

How is Odyssey helpful to you?

What would you use it [Odyssey] for if you had more time?

Would [you use] the videos or other features?

The two most popular [Odyssey features] were videos and assessments. Would that be the case for you as well?

In what sense [is time the issue]?

[Do] the videos or assessments save you time?

In what class [did students love the Odyssey assessments]?

How were you using [Odyssey assessments]?

What did [the students] love about it?

Do you think they loved having the opportunity to make up work or do you think they liked using the software?

Do you use the assessments at all?

Have you ever used [Test Builder]?

Does Culver City use [any of these Odyssey features] Gradebook, test builder, Odyssey writer feature, Odyssey community feature or something else for grading?

Were you aware of the test builder feature?

[Do you use] Odyssey Writer? Is that something that you could see any utility for in your class?

What kinds of activities might the students use word for?

Would you ever see any utility for that [explains Odyssey community]?

Do you have students do threaded discussions through Edmodo?

Are some of these features [Odyssey] are replicated in other places?

How, if at all, do you think [Odyssey] affected student outcomes in the classes where you used it?

In your estimation, did [Odyssey] actually change how well students actually performed?

How do you think the software could be changed, or redesigned or improved?

Can you describe some of the ways you find technology to be useful in the classroom?

Did you do that [show a video about DaVinci] with the iPad?

How could Odyssey be better?

[Do you agree] that the Odyssey videos were [slow] and a little bit juvenile?

Can you tell me what you mean by ['tightening up' the assessments]?

[Is there] anything else that I haven't asked or that you wanted to add?

APPENDIX I – Interview Questions: Eleanor

Can you describe your teaching style, your teaching methods, teaching philosophy?

To confirm, you work a lot with ESL [or EL] students?

What are some of the different ways that you try to communicate material to your students?

Is there a mix of whole class discussion, or small group, or pairs?

[Are there other] specific activities or warm-ups, [that would] help me get a sense of how you teach?

What kinds of activities to you do with Edmodo?

How do you think Odyssey is useful?

How many people were in the Global Issues class over the summer?

Had you taught that class without Odyssey previous summers?

How would you compare teaching over the summer with Odyssey versus without Odyssey?

Can you talk about why [you used Odyssey during the summer but not during the year]?

If you had the time to set [Odyssey] up for the year how do you think you would use it?

Is that [videos and assessments are the most popular features] consistent with your experience with the program?

Can you talk about how you used the assessments?

Did you ever use the Odyssey gradebook?

[Do you use] Aeries?

How do the Odyssey assessments compare to the assessments [you created and administered] during the school year?

Were the types of [assessment] questions similar, or different?

[Did you ever use] test builder?

Is [Odyssey Writer] something that you've ever used?

[Did you use] the Odyssey Community feature?

Have you used Edmodo in that way [like Odyssey Community]?

Has it [Odyssey] changed the way you teach at all?

[Did you say that] 27 of the 42 [students] were able to earn the credit over the summer?

How does that compare to other years when you didn't have Odyssey?

[Do you have] any other observations about how Odyssey has affected student outcomes?

Could [you] distinguish between your own views [about how Odyssey affects student outcomes] versus what you've heard from teachers?

[Are you] the point person for Odyssey [at this school]?

Do you have any sense of that [what makes the difference in student outcomes]?   [Is it seeing the material again? Is it seeing a virtual presentation rather than listening to the teacher again? Or is it related to the different presentation method]?

Have you heard [about] problems or concerns about how to supervise [the classroom when using Odyssey]?

[Did I understand you to say] that the bandwidth at the school was quadrupled?

[How do you type Odyssey] into a web browser?

How could Odyssey be changed or redesigned or otherwise improved?

Can you tell me what you mean by higher level videos?

I've heard other teachers describe the videos as 'corny' or 'lame. Is that what you mean?
[Is there] anything else in terms of changes, or redesigns, improvements?
[Is there] anything else that I need to know? [Is there] anything else that you want to add?
How much training [with Odyssey] did you have?
Were you part of that group that had one day [of training]?
How many hours do you think you spent trying to learn it [Odyssey] before you felt ready to use it in the classroom?
[Is there] anything else?

APPENDIX J – Interview Questions: Jane

How would you describe your teaching style or philosophy?

Can you describe some different ways that you like to communicate material?

Can you describe different kinds of warm-ups activities that you use?

Can you talk about some of the projects that the students do that involve both project-based learning and writing?

How has Odyssey been useful to you, if at all?

Did you have a set time in the lab every day?

Can you describe that unit [of Odyssey writer that you used]?

[How did your summer school students respond] to the pre-made prompts?

What would you say about Odyssey's writing prompts compared to one you might give to similar level learners?

Can you tell me what scaffolding you used?

Can you describe the kind of student that was in the summer school?

Do you think Odyssey would be appropriate for higher-level learners?

Can you describe that [the kind of scaffolding that exists on Odyssey?

Can you [tell me] what you mean by a "long time" [to learn how to manipulate Odyssey]?

When you contacted Odyssey [with questions were they helpful]?

Do you use Odyssey during the year?

How did you hope to use [Odyssey]?

How did the kids in the summer respond to [Odyssey]?

How do survey results compare to your experience with it [Odyssey]?

Can you tell me about [other] things [on Odyssey] you'd like to see changed or redesigned?

Did you teach summer school without Odyssey, the year before?

Do you think it affected the outcomes in the class?

[Is there anything that I missed?

APPENDIX K – Interview Questions: Leona

Can you begin by introducing yourself and classes or class that you teach?

Can you tell me a little bit of your teaching styles or you teaching methods?

Are there ways in which they [the students] do smaller group work or large class discussions?

Are bell work questions worked on in pairs?

Can you describe different types of assessment questions?

Have you decided on an essay for *Catcher in the Rye*?

How is Odyssey useful to you?

[Are you saying that the kids didn't respond well to the] videos?

Can you tell me why it's really inappropriate for the Honors and AP kid?

Is there a reason why it was more useful during the summer versus during the year?

Is it fair to infer that Odyssey is not good for facilitating discussion or small group work?

Can you speak to why [Odyssey feature Grade Book] is something that's not useful?

[Do you use test builder, another Odyssey feature] that is lightly used here?

Are you familiar with that feature [Odyssey writer]?

[Did you say that] when the class size gets too big [it is a burden to use Odyssey writer]?

How do you provide feedback during the school year?

[Do you use] Odyssey Community?

So you do threaded discussion or online discussions [using Edmodo}?

Do you teach kids during the summer [who are] comparable to kids [during the regular school year]?

kids during the school year that you do over the summer?

[Is there less time during the regular school year for using Odyssey]?

How do you think Odyssey could be redesigned or changed or improved?

How do you think students reacted to [you would like to change or redesign]?

On how it can be changed or redesigned?

Are there any prompts or handouts that we can look at that illustrate your [teaching methods]?

Are they [the students] doing this in groups? [Or] by themselves?

Which class [were these materials used for]?

[Are] discussions about questions like "what is evil" for group discussion?

Are the 11 AP students in pods, like the 10 Honor students?

What effect did [Odyssey] have [on] student outcomes?

[Is there] anything that I haven't asked or that you would like to add?

How would you use it [Odyssey] more [if you had more computer time]?

[Is there] anything else [you'd like to say]?

APPENDIX L – Interview Questions: Morgan

Can you tell me a little bit about your teaching style, your teaching philosophy?
Can you give some examples of [differentiation]?
PS: Can you tell me [about this software you mentioned]?
Were you having students [use the software to] make these as a project, or show them in class?
How is Odyssey useful to you?
So did you assign [the unit on Greek mythology] in Odyssey?
Why do you think the students didn't like the [videos]?
Do you think the students think it's corny?
[Is that true of] honors and regular students?
[Did you] assign Odyssey during the school year?
Is it assigned as homework or [for] extra credit?
[Why do you think that] not all students needed to use it?
Is the [use of videos and assessments] consistent with how you've used [Odyssey]?
Have you used the assessments?
Have you used the Odyssey gradebook at all?
[Have you] used Test Builder, which lets you pick and choose questions from a bank of questions?
[Have] you ever used Odyssey Community?
How, if at all, do you think Odyssey has affected student outcomes?
Can you differentiate between the summer and during the year?
How many students did you have in the summer class?
How many [of the 35 summer students] were able to make up the credit?
Had you taught summer school before Odyssey was available?
Can you compare [using Odyssey one summer and not using it in an earlier summer]?
How do you think Odyssey could be in some way changed, or redesigned or improved?
[Are you taking about the video] with the spaceship?
What kind of training have you had on Odyssey?
Do you feel like you need more training or just more time to play around with [Odyssey]?
What do you think needs to change to get people to use [Odyssey] more?
So you weren't concerned with internet speed?
[Is there] anything else I should know about Odyssey? Is there anything I didn't ask but should have? [Is there] anything that I missed?

References

2005 National Teacher Survey. (2005). This independent national survey was commissioned by CDW-G.

  Retrieved June 15, 2006 from website: http://newsroom.cdwg.com/features/2005NatlTeacherSurvey.pdf

Adelman, N., Donnelly, M. B., Dove, T., Tiffany-Morales, J., Wayne, A., & Zucker, A. (2002). The integrated

  studies of educational technology: Professional development and teachers' use of technology. *Arlington,*

  VA: SRI International. Retrieved September, *9*, 2006.

Alfaro, F. E. (2008). *The relationship of teacher perceptions of the impact of technology integration on Texas*

  assessment of knowledge and skills (TAKS) of 9th-11th grade students at Alamo Heights Independent

  School District, San Antonio, Texas. Texas A&M University.

Alspaugh, J. W. (1999). The relationship between the number of students per computer and educational

  outcomes. *Journal of educational computing research*, *21*(2), 141–150.

Baddeley, A. D. *Working Memory.* New York: Oxford University Press, 1986.

Baddeley, A. D. *Human Memory.* Needham Heights, Mass.: Allyn & Bacon, 1999.

Barron, A. E., Kemker, K., Harmes, C., & Kalaydjian, K. (2003). Large-scale research study on technology in

  K-12 schools: Technology integration as it relates to the national technology standards. *Journal of*

  Research on Technology in Education, *35*, 4.

Bayraktar, S. (2002). A meta-analysis of the effectiveness of Computer-Assisted Instruction in science

  education. *Journal of Research on Technology in Education*, *34*(2), 173–88.

Becker, H. (1994) How exemplary computer-using teachers differ from other teachers: implications for

  realizing the potential of computers *Journal of Educational Computing Research* 19, 2, 127–148.

Becker, H. J. (1999). *Internet use by teachers: Conditions of professional use and teacher-directed student use*

  (Vol. 1). Center for Research on Information Technology and Organizations, the University of California,

  Irvine and the University of Minnesota. Retrieved from

  http://www.cyberbullyingprevention.com/teachers/internet-used-by-teachers.pdf

Becker, H. J. (2000a). Findings from the Teaching, Learning, and Computing survey: Is Larry Cuban right? *Education Policy Analysis Archives*, *8*(51), n51.

Becker, H. J. (2000b). How exemplary computer-using teachers differ from other teachers: Implications for realizing the potential of computers in schools. *Contemporary Issues in Technology and Teacher Education*, *1*(2), 274–293.

Becker, H. J., & Riel, M. M. (1999). Teacher professionalism and the emergence of constructivist-compatible pedagogies. *Retrieved September*, *9*, 2010.

Becker, H. J., & Riel, M. M. (2000). Teacher professional engagement and constructivist-compatible computer use. *Irvine: University of California, Centre for Research on Information Technologies and Organizations*. Retrieved from http://www.crito.uci.edu/papers/TLC/findings/report_7/report7.pdf

Bersin, J. (2004). *The blended learning book: best practices, proven methodologies, and lessons learned*. Pfeiffer & Co.

Birman, B. F., Desimone, L., Porter, A. C., & Garet, M. S. (2000). Designing professional development that works. *Educational leadership*, *57*(8), 28–33.

Blouin, R. A., Riffee, W. H., Robinson, E. T., Beck, D. E., Green, C., Joyner, P. U., Pollack, G. M. (2009). Roles of innovation in education delivery. *American journal of pharmaceutical education*, *73*(8).

Bonk, C. J. (2002). Online training in an online world. *Bloomington, IN: CourseShare. com*.

Bonk, C. J., Graham, C. R., Cross, J., & Moore, M. G. (2006). *The handbook of blended learning: Global perspectives, local designs*. Pfeiffer San Francisco, CA.

Bonk, C. J., Olson, T. M., Wisher, R. A., & Orvis, K. L. (2002). Learning from focus groups: An examination of blended learning. *Journal of Distance Education*, *17*(3), 97–118.

Brown, D. G. (2001). Hybrid Courses Are Best. *Syllabus*, *15*, n1.

Calderhead, J. (1996). Teachers: Beliefs and knowledge. Retrieved from http://psycnet.apa.org/psycinfo/1996-98614-020

California Department of Education, Educational Demographics Unit. 2008-09 High School Graduates' College Enrollment (Estimated) - State Fiscal Stabilization Fund Postsecondary Indicator C11. (n.d.).

Retrieved December 5, 2011, from

http://dq.cde.ca.gov/dataquest/sfsf/PostsecondaryIndicatorC11.aspx?cSelect=CULVER%5ECITY%5EHIGH--CULVER%5ECITY%5EUNI--1964444-1932201&cChoice=C11Sch&cYear=2008-09&cLevel=School&cTopic=C11&myTimeFrame=S&submit1=Submit

Campbell, N.J., & Williams, J.E. (1990). Relation of computer attitudes and computer attributions to enrollment in high school computer courses and self-perceived computer proficiency. *Journal of Research on Computing in Education, 22(3),* 276-289.

Christensen, C., Johnson, C. W., & Horn, M. B. (2008). *Disrupting class: How disruptive innovation will change the way the world learns* (1st ed.). McGraw-Hill.

Christensen, R. (2002). Effects of technology integration education on the attitudes of teachers and students. *Journal of Research on Technology in Education*, *34*(4), 411–434.

Clark, C. & Lampert, M. (1986). The study of teacher thinking: Implications for teacher education. *Journal of Teacher Education*, *37*(5), 27-31.

CompassLearning (2011) Innovative educational software and services for pre-k/elementary, middle, and high school curriculums from CompassLearning. Retrieved December 5, 2011, from http://www.compasslearning.com/Default.aspx

Creswell, J. W. (2008). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). Sage Publications, Inc.

Cuban, L.K., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal*, *38*(4), 813–834. doi:10.3102/00028312038004813

Culver City High School. (n.d.). Retrieved December 5, 2011, from http://cchs.ccusd.org/about/school_profile.jsp

Cuthell, J. P. (2006). Steering the supertanker. *Computers in the Schools*, *23*(1-2), 99–110.

129

Darling-Hammond, L. (1995). Changing conceptions of teaching and teacher development. *Teacher Education Quarterly*.

Dean, P., Stahl, M., Sylwester, D., & Pear, J. (2001). Effectiveness of combined delivery modalities for distance learning and resident learning. *Quarterly Review of Distance Education*, *2*(3), 247–254.

DiLeo, J. T. G. (2007). *A study of a specific language arts and mathematics software program: Is there a correlation between usage levels and achievement?* Indiana University of Pennsylvania.

Driscoll, M. (2002). Blended learning: Let's get beyond the hype. *E-learning*, *1*(4).

Dupagne, M., & Krendl, K. A. (1992). Teachers' attitudes toward computers: A review of the literature. *Journal of Research on Computing in Education*, *24*(3), 420-29.

Karpyn, A. E.-K. (2003). *School technology use and achievement on statewide assessment: Is there a relationship?* (Ph.D.). University of Pennsylvania, United States -- Pennsylvania. Retrieved from http://search.proquest.com/docview/305306114/abstract?accountid=14512

Ely, D. P. (1990). Conditions that facilitate the implementation of educational technology innovations. *Journal of research on computing in education*, *23*(2), 298–305.

Ely, D. P. (1999a). Conditions that facilitate the implementation of educational technology innovations. *Educational Technology*, *39*(6), 23–27.

Ely, D. P. (1999b). New perspectives on the implementation of educational technology innovations.

Ely, D. (1999c). Toward a philosophy of instructional technology: thirty years on. *British Journal of Educational Technology*, *30*(4), 305–310. doi:10.1111/1467-8535.00120

Ely, D. P., & Atkinson, H. C. (1978). Creating the conditions for change.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development*, *53*(4), 25–39.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, *42*(3), 255–284.

Baldwin, D. (2011) personal communication, December 1, 2011.

FCC - E-Rate. (n.d.). Retrieved December 1, 2011, from http://transition.fcc.gov/learnnet/

Fisher, T. (2006). Educational transformation: Is it, like "beauty", in the eye of the beholder, or will we know it when we see it? *Education and Information Technologies*, *11*(3), 293–303.

FitzPatrick, S. B. (2001). *An exploratory study of the implementation of an educational technology in two eighth grade mathematics classes*. The Pennsylvania State University.

Fletcher-Flinn, C. M., & Gravatt, B. (1995). The efficacy of computer assisted instruction (CAI): A meta-analysis. *Journal of Educational Computing Research*, *12*(3), 219–241.

Fullan, M. (1991). Curriculum implementation. *The international encyclopedia of curriculum. New York: Pergamon*.

Galagan, P. A. (2000). The E-Learning revolution. *Training & development*, *54*(12), 24-30.

Govindasamy, T. (2001). Successful implementation of e-learning: Pedagogical considerations. *The Internet and Higher Education*, *4*(3-4), 287–299.

Gray, L., Thomas, N., & Lewis, L. (2010). Teachers' use of educational technology in US public schools: 2009. First Look. NCES 2010-040. *National Center for Education Statistics*. Retrieved from http://www.eric.ed.gov/ERICWebPortal/recordDetail?accno=ED509514

Guskey, T. R. (2003). Professional development that works: What makes professional development effective. *Phi Delta Kappan*, *84*(10).

Harris, J. (2005). Our agenda for technology integration: It's time to choose. *Contemporary Issues in Technology and Teacher Education*, *5*(2), 116–122.

Harvey-Buschel, P. (2010). *A quantitative examination of factors that impact technology integration in urban public secondary mathematics classrooms*. Bowie State University.

Hoic-Bozic, N., Mornar, V., & Boticki, I. (2009). A blended learning approach to course design and implementation. *Education, IEEE Transactions on*, *52*(1), 19–30.

Hooper, S., & Rieber, L. P. (1995). Teaching with technology. *Teaching: Theory into practice*, 154–170.

Johnson, K. A. (2000). Do computers in the classroom boost academic achievement? A report of the Heritage Center for Data Analysis. Retrieved from http://www.eric.ed.gov/ERICWebPortal/recordDetail?accno=ED442915

Kadel, R. (2005). How teacher attitudes affect technology integration. *Learning & Leading with Technology*, *32*(5), 34-35.

Kane, R., Sandretto, S., & Heath, C. (2002). Telling half the story: A critical review of research on the teaching beliefs and practices of university academics. *Review of Educational Research*, 72(2), 177–228.

Kubitskey, B., Fishman, B., & Marx, R. (2003). The relationship between professional development and student learning: Exploring the link through design research. In *Annual Meeting of the American Educational Research Association, Chicago, IL. Retrieved November* (Vol. 12, p. 2003).

Lim, D. H., Morris, M. L., & Kupritz, V. W. (2006). Online vs. blended learning: Differences in instructional outcomes and learner satisfaction. *University of Tennessee*.

Little, J. W., & McLaughlin, M. W. (1993). *Teachers' work*. Teachers College Press.

Liu, M., & Reed, W. M. (1992). Teacher education students and computers: Gender, major, prior computer experience, occurrence. *Journal of Research on Computing in Education*, *24*(4), 457-466.

Major, H. T. (2001). A "Blended-Technology" approach to distance education course delivery. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2001, No. 1, pp. 2393-2398).

Marcinkiewicz, H. R. (1994). Computers and teachers: Factors influencing computer use in the classroom. *Journal of research on computing in education*, *26*(2), 220–37.

Mayer, R. E. *The Promise of Educational Psychology.* Upper Saddle River, N.J.: Prentice Hall, 1999.

Mayer, R. E. *Multimedia Learning.* Cambridge: Cambridge University Press, 2001.

Mayer, R. E. (2002). Cognitive theory and the design of multimedia instruction: An example of the two-way street between cognition and instruction. *New directions for teaching and learning*, *2002*(89), 55–71.

Mendels, P. (1999). Survey finds teachers unprepared for computer use. *Cybertimes, September*.

Merriam, S. B. (2009). *Qualitative Research: A Guide to Design and Implementation* (3rd ed.). Jossey-Bass.

Milbrath, Y. C. L., & Kinzie, M. B. (2000). Computer technology training for prospective teachers: Computer attitudes and perceived self-efficacy. *Journal of Technology and Teacher Education*, *8*(4), 373–396.

National Center for Education Statistics (199) "Barriers to technology use: Teachers' tools for the 21st Century: A report on teachers' use of technology. Retrieved March 3, 2012, from http://nces.ed.gov/surveys/frss/publications/2000102/index.asp?sectionid=7

Newman, H. (2002). Computers used more to learn than teach. *Detroit Free Press. Retrieved, April*, *29*, 2002.

Ngo, T. K. (2007). *Effectiveness of computer-assisted instruction (CAI) using Odyssey (c) in the high school chemistry classroom*. California State University, Long Beach.

Niederhauser, D. S., & Stoddart, T. (2001). Teachers' instructional perspectives and use of educational software. *Teaching and teacher education*, *17*(1), 15–31.

Osguthorpe, R. T., & Graham, C. R. (2003). Blended learning environments: Definitions and directions. *Quarterly Review of Distance Education*, *4*(3), 227–33.

Ottenbreit-Leftwich, A. T. (2010). Teacher technology professional development and policy in the United States. Retrieved from http://www.fga.it/uploads/media/A._T._Ottenbreit-Leftwich__Teacher_Technology_Professional_Development_-_FGA_WP20.pdf

Paivio, A. *Mental representations: A dual coding approach.* New York: Oxford University Press, 1986.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of educational research*, *62*(3), 307–332.

.

Penuel, W. R., & Means, B. (1999). Observing classroom processes in project-based learning using multimedia: A tool for evaluators.

Perie, M., Moran, R., & Lutkus, A. D. (2005). *NAEP 2004 trends in academic progress: Three decades of student performance in reading and mathematics*. National Center for Education Statistics, US Department of Education, Institute of Education Sciences.

Picciano, A. G., & Seaman, J. (2009). K-12 online learning: A 2008 follow-up of the survey of US school district administrators.

Picciano, A. G., Seaman, J., Shea, P., & Swan, K. (2012). Examining the extent and nature of online learning in American K-12 Education: The research initiatives of the Alfred P. Sloan Foundation. *The Internet and Higher Education*, *15*(2), 127–135.

Rogers, E. M. (1995). *Diffusion of innovations*. Free Press.

Rovai, A. P., & Jordan, H. (2004). Blended learning and sense of community: A comparative analysis with traditional and fully online graduate courses. *The International Review of Research in Open and Distance Learning*, *5*(2), Article–5.

Sandholtz, J. H. (1997). *Teaching with technology: Creating student-centered classrooms*. Teachers College Press, Teachers College, Columbia University, 1234 Amsterdam Ave., New York, NY 10027.

Schofield, J. (1997). Review of technology education in the classroom: Understanding the designed world. *The Teachers College Record*, *99*(1), 220-222.

Singh, H. (2003). Building effective blended learning programs. *Educational Technology* Saddle Brook Then Englewood Cliffs, NJ, *43*(6), 51–54.

Soe, K., Koki, S., & Chang, J. M. (2000). Effect of Computer-Assisted Instruction (CAI) on reading achievement: A meta-analysis. Retrieved from http://www.eric.ed.gov/ERICWebPortal/recordDetail?accno=ED443079

Sparks, D., & Loucks-Horsley, S. (1989). Five models of staff development for teachers. *Journal of staff development*, *10*(4), 40-57.

Stacker, D. (2012) personal communication, March 6, 2012

Sweller, J. *Instructional design in technical areas.* Camberwell, Australia: ACER Press, 1999.

Twigg, C. A. (1999). Improving learning and reducing costs: Redesigning large-enrollment courses.

Twigg, C. A. (2004). Using asynchronous learning in redesign: Reaching and retaining the at-risk student. *Journal of Asynchronous Learning Networks*, *8*(1), 2–12.

Vannatta, R. A., & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology

.Watson, G. (2006). Technology professional development: Long-term effects on teacher self-efficacy. *Journal of Technology and Teacher Education*, *14*(1), 151.

Wenglinsky, H. (2005). Technology and achievement: The bottom line. *Educational Leadership*, *63*(4), 29.

Wittrock, M. C. "Generative Processes of Comprehension." *Educational Psychologist,*

1989, *24,* 345–376.

Wolk, S. (2007). Why Go to School? *Phi Delta Kappan*, *88*(9), 648.

Wright, V. H., & Wilson, E. K. (2007). A partnership of educators to promote technology integration:

Designing a master technology teacher program. *Education*, *128*(1), 7.

U. S. Census Bureau, D. I. S. (2009). Computer and internet use in the United States: October 2009. Retrieved

December 3, 2011, from http://www.census.gov/hhes/computer/publications/2009.html

U.S. Department of Education. (2003). *Federal funding for educational technology and how it is used in the*

classroom: A summary of findings from the Integrated Studies of Educational Technology. Office of the

Under Secretary, Policy and Program Studies Service: Washington, D.C. Retrieved November 13, 2009,

from www.ed.gov/rschstat/eval/tech/iset/summary2003.pdf

Yin, R. K. (2008). *Case Study Research: Design and Methods* (4th ed.). Sage Publications, Inc.

Young, J. R. (2002). "Hybrid" teaching seeks to end the divide between traditional and online instruction.

Chronicle of Higher Education.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. (2002). Conditions for classroom technology innovations. *The*

Teachers College Record, *104*(3), 482–515.