The Flipped Classroom: Cultivating Student Engagement

by

Patricia Lynn Tétreault
B.A., Simon Fraser University, 2006

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Supervisory Committee

Dr. Graham McDonough, Chair
(Department of Curriculum and Instruction)

Dr. Ruthanne Tobin, Supervisor
(Department of Curriculum and Instruction)

Dr. Jillianne Code, Committee Member
(Department of Curriculum and Instruction)

Abstract

This project examines research on the flipped classroom approach to education, which suggests that instructional media be used to introduce course content, and that class time be focused on active learning activities while mindful of authority structures that facilitate learning. Such an approach is rooted in social constructivist theories that emphasize the active role of the learner in making meaning through social interaction. Based on the research, implications for practice are considered, such as the affordances of student engagement, differentiated instruction, access to instructional media, inclusive practices, and a sense of community belonging. Finally, three case studies are examined which illustrate and serve as exemplars of the flipped classroom.

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Dedication

"The minute I heard my first love story
I started looking for you, not knowing
How blind that was.
Lovers don't finally meet somewhere.
They're in each other all along." – Rumi

Dedicated to my handsome and incredibly gifted husband, Christopher.

Chapter One: The flipped classroom

Personal background

"It's a different kind of communication between faculty and students. Websites and laptops have been around for years now, but we haven't fully thought through how to integrate them with teaching so as to conceive of courses differently." - Mazur, 2012.

My inspiration for investigating the flipped class initially came from curiosity about how to smoothly integrate technology into my collaborative classroom practice, and how to foster a good base of "21st century skills" for my students. As an educator of academic ESL and English upgrading programs for university entrance, my students are often young adult learners who feel pressure to learn English quickly, to adjust to life in a new culture smoothly, and who have the drive and ambition to take another degree in a second or further language.

I became interested in assigning listening videos for homework when I found that there was not enough time in class for students to practice. Students commented that they wanted to be able to listen to the videos several times, and review them later, rather than listen in class only one or two times. After posting videos on a forum, my students began chatting online about the videos, taking notes at home, and trying to guess what questions an in-class weekly questionnaire would ask. Students began asking me questions about the listening videos so often that I decided to dedicate an hour each day to a peer discussion of the video before handing out the questionnaire. After 3 weeks, I noticed a drastic improvement in the class' listening test scores.

The students' improvement on their listening test scores was a further catalyst for my interest in ways to integrate technology and video to best support their learning. After

my initial survey of the flipped class approach, I decided to try incorporating writing workshops in my class activities. As writing is an active process, I wondered if students would benefit more from listening to grammar instruction videos at home, and then practicing peer-supported writing activities in class. As students began writing in class, immediately I could see where each student needed to improve. I could be there to help them write thesis statements and organize the structure of their writing; and if I was with another student, their group members could chime in. As a result of seeing this change in the classroom culture (from handing in an often rough essay, to creating an essay collaboratively in stages), I decided to assign larger writing projects rather than continue to have a writing test each week. Although students had many grammar questions about the homework videos, they understood much of the grammar lesson through talking to each other about 'rules' and applying the grammar points in class writing time. By the end of the term, the English language class involved no grammar worksheets nor direct grammar lessons in class, and yet my students' writing was markedly stronger than it had been in previous semesters.

Students in my class reported that they preferred watching grammar videos to hearing a lecture in class because they needed to review and re-ask about the grammar points throughout their writing process. On my infrequent grammar tests, I began to write comments to each student in my class, such as "please review video 23: relative clauses. I see there are several mistakes here. Next writing workshop, ask your group to show you their relative clauses from their essays and help you write some." In this way, I could have a writing workshop where each student was working on their own writing skills, and also taking turns discussing my suggestions for improvement with each other.

The classroom culture clanged: I felt more like a consultant and a resource to a team of people learning, rather than a person standing talking at a group. The grammar videos and listening videos I have posted for my class are now used by students in several other classes, and other educators have let me know that they have also decided to keep direct instruction outside of the classroom as much as possible.

Defining the flipped classroom

The flipped classroom is often thought of as a cycle because students watch a video, discuss and apply that knowledge in class, and then watch another video for new content introduction, in a continuous loop (University of Texas, 2013). A flipped class combines two established elements of education: the lecture and active learning. Students have access to video lectures ahead of time along with other background material, which "frees up more face-to-face time to let students seek clarification from educators, collaborate with peers, and practice applying concepts while getting guidance and feedback directly from experts" (University of Texas, 2013). Educators who flip their class value lectures given as homework, as an aid to learning. Homework is important because it is a time where students can share their learning progress with their family, be alone with their thoughts, reflect on their learning, and review the material as well as the educator's feedback (Fulton, 10 reasons to Flip, 2012).

The flipped classroom fits into the broader category of Blended Learning. Staker & Horn (2012) define Blended Learning as "a formal education program with face-to-face instruction, in which a student learns at least in part through online delivery of content and instruction, with some element of student control over time, place, path and/or pace" (Staker & Horn, 2012, p. 13). However, the flipped classroom is different

than Distance Education or "E-Learning", as students must spend time at an educational

facility with an educator and their peers for feedback and active, face-to-face

collaboration (Staker & Horn, 2012). Staker and Horn (2012), in their taxonomy of

Blended Learning, discuss that blended learning is informed by online learning, which

they define as "education where content and instruction are delivered primarily over the

Internet" (p. 3). Although online learning models have influenced the content delivery

aspect of Blended Learning, and hence the flipped classroom, the primary focus of the

flipped classroom remains on active learning, not content delivery (Bergmann & Sams,

2012; Hamdan et al., 2013, p. 3). Research into Online Learning will be addressed

indirectly through the lens of best practices for content delivery via video lecture;

addressing the history of Online Learning and how this has informed models of Blended

Learning is outside the scope of this project.

The flipped classroom is also distinct from both Technology-Rich Instruction

(TRI) and Distance Education (independent E-Learning) in that both elements of video

lectures and peer collaboration in a classroom-like setting are not met under these other

two models. In the flipped class, the videos or lecture content must be watched outside of

class time, so classes that provide TRI are not included in the definition of the flipped

class; for TRI classes, the educator presents content in the traditional lecture model of

teaching, but with the assistance of internet devices such as SMART Blackboards or

computers with projectors (Staker & Horn, 2012). However, the educator controls the

technology themselves, and uses it only as a supplement in their direct instruction. The

main benefits of collaborative, active learning in the flipped class are lost with TRI.

Finally, the flipped class focuses on the active, face-to-face learning which takes place in

a classroom environment, unlike the focus of Distance Education or E-Learning models (Hamdan, McKnight, McKnight, & Arfstrom, 2013, p. 6).

The definition of the flipped class is itself flexible and can be tailored: Sams (2011), one of the founders of the flipped class, wrote in his blog that "there is no such thing as THE flipped classroom" because "the Flip is in flux" (Sams, 2011). Sams asserts that a class can be flipped for certain units or topics, and can have a combination of interactive lectures, workshops, and activities in class (Sams, 2011). In addition, Sams believes that active learning approaches which are supported by educational media will only continue to improve with time and further exploration/research (2011). Sams asserts that there is no one formula for flipping a class; however, the flipped class approach follows a socio-constructivist framework rooted in the idea that all active learning should be during class time, and all passive work can be done at home. The founder of Peer Instruction, Eric Mazur (2009) states, "in the standard approach to instruction, the active part of learning is left to the student on his or her own, outside of the classroom. If you think about this rationally, you have to Flip that", to put passive learning outside of the classroom, and active learning inside. Therefore, the definitions of the flipped classroom are structured around clearing class time for *active* learning, and helping students in the moment as they are learning (Bergmann & Sams, 2012, p.17).

As a value system, the flipped class is also concerned with the "generation tech" students who are now growing up surrounded by a barrage of new devices and programs; and therefore, professional educators need to be concerned with a new kind of literacy - technological literacy. Tied into the culture of technology are values of independent learning, strong research skills, savvy critical reading skills, and many other traditional

academic values and requirements (Bishop & Verleger, 2013). When a student is learning

from this new library, the internet, they need to know how to find quality content and

how to check for reliability and robustness of information (Seaboyer, 2013). These values

are "partly in response to a generation of students who have been learning all their lives

from computer screens, websites, and visual media", but also "these efforts embody a

search for alternatives to the traditional lecture", and therefore the flipped classroom is

one stage in an evolution of blended learning (Lambert, 2013).

As a stage in the evolution of blended learning, the flipped classroom approach

contributes guidelines and best practices for incorporating the elements of technology and

active learning into a curriculum (Hamdan et al., 2013). The advantage of the flipped

class is that it applies research about active and passive instructional practices to the areas

where they are most efficient and useful (Bergmann & Sams, 2012).

The history of the flipped classroom

The flipped classroom approach is rooted in socio-constructivist theories of

education and active learning, but also includes and values educational media for content

delivery. The flipped classroom approach has evolved from key educators and

researchers such as King (1993), Mazur (2009), Lage, Platt, and Treglia (2000), Baker

(2000), Tenneson and McGlasson (2006), Strayer (2007), Khan (2012), and Bergmann

and Sams (2012) who have based their flipped classes on theories of active learning,

blended learning, differentiated instruction, and community inclusion, seeking to

synthesize these theories in the flipped classroom approach (Hamdan et al., 2013).

In 1993, King published "*From sage on the stage to guide on the side*", which

advocated active learning, with the educator being a facilitator and guide, not a lecturer.

King's paper has influenced many approaches to active learning, and especially has informed the flipped class approach (Bergmann & Sams, 2012). Shortly thereafter, Mazur (2009) who is a professor at Harvard, began to write about the benefits of Peer Instruction, where students help each other learn in class. Mazur (2009) decided to remove his lectures from class time altogether, and made his recorded video lectures required preparation for students prior to class (Mazur, 2009). Mazur (2009) found that computer aided instruction gave him more time in class to act as a coach and advisor, and he reports that his students had higher achievement and were more satisfied with their courses.

In 2000, Lage et al. wrote the article "*Inverting the classroom: A gateway to creating an inclusive learning environment"*, which described the flipped classroom as a method of including more students' voices and experiences in the classroom, as well as affording more time for one-to-one instruction (Lage et al., 2000, p.12). Contemporary to Lage et al., Baker (2000) presented "*The classroom flip: Using web course management tools to become the guide by the side"* at the 11th international conference on college teaching and learning (Baker, 2000). Baker's (2000) presentation was inspired by King's (1993) work, and was intended to assist educators in choosing quality educational programs and tools in order to flip their class. Later, in 2004, Khan began to record math videos for his younger cousin, who was struggling in school (Khan, 2012). Khan did not have time to help his cousin as much as he wanted, and so he created videos which he believes are a "virtual tutor" (Khan, 2012). Currently, some educators choose to use Khan Academy videos in their flipped class, as they are professionally made.

More recently, Tenneson and McGlasson (2006) published *"The classroom Flip"*, which described the structure of the flipped class approach, explained how this approach can enhance a curriculum, and explored several programs for course management. Strayer (2007) published his dissertation *"The effects of the classroom flip on the learning environment: A comparison of learning activity in a traditional classroom and a flip classroom that used an intelligent tutoring system"*. Strayer's (2007) dissertation research concluded that the video lectures and the in-class activities of the flipped class must be smoothly progressing and tightly coordinated for the flipped class approach to be successful (pp.177-179).

Finally, Bergmann and Sams (2012) have taught flipped secondary school science classes since 2009, and are considered to be the founders of the modern flipped class model (Hamdan et al., 2013). They have recently published a book, *Flip your classroom: Reach every student in every class every day* (2013), which has been considered a strong teaching resource by the flipped Learning Network (Hamdan et al., 2013, p. 8). Bergmann and Sams (2013) find that a strength of the flipped classroom model is that it is flexible, which allows educators to tailor their curriculum and to spend more time speaking to their students and differentiating instruction (p.16). Currently, the flipped classroom approach continues to evolve as educators adopt and adapt this approach to their instructional needs (Sams, 2011).

Theoretical framework

The four pillars of flipped classroom.

The research team at The Flipped Learning Network (2013) found that four key theories comprised the framework of the flipped classroom approach and are illustrative of best practices for implementation. The flipped Learning Network (FLN) conducted a survey of the literature around the flipped class, and concluded that "The Four Pillars of the flipped class: Flexible Environment, Learning Culture, Intentional Content, and Professional Educators" were the critical theoretical framework of this approach (Hamdan, et al., 2013, pp. 4-6). This definition was chosen based on the combined research from surveys given to educators and from key expert spokespeople who self-identified that they were teaching a flipped class (p. 2).

Flexible environment.

The FLN discussed Flexible Environment as the arrangement of the physical classroom space for active learning (2013, p. 4). The space must remain flexible so that an educator can create small group work stations, individual work areas, and also places to speak to one student away from the noise of groups working (Hamdan et al., 2013, pp. 4-5). Rather than create one learning environment with desks arranged in rows, or tables which are not moved, the educator and students can create work areas as needed. In some cases, the side of the classroom can be cleared for presentations, whole class mingling, or demonstrations or labs (Bergmann & Sams, 2012).

Learning culture.

Second, the Learning Culture for the flipped class is one where the educator feels comfortable taking a back seat and assisting students who are actively learning together, instead of an educator having to 'perform' at the front of the class while lecturing (King, 1993). The Culture of a flipped class, as in other models of active learning, asks an educator to circulate the room checking students' work, providing immediate feedback, as well as giving brief periods of one-to-one instruction (Bergmann & Sams, 2012). Through individualized support, educators aim to provide differentiated instruction to help students meet their learning goals in a variety of ways (Crouch & Mazur, 2001). The educator very rarely addresses the entire class, outside of the first 5 minutes (for setting up groups and giving instructions) or the last 5 minutes (assigning homework and Q&A sessions) of class (Mazur, 2009).

In other models of active learning, the educator's role is to be a facilitator; however, the flipped class additionally advocates videos for content introduction which are used as a launching point for in-class group activities and projects (Hamdan et.al, 2013, p. 3). There are certainly many other student-centered approaches to education; however, the flipped class is a model of classroom instruction which takes advantage of the versatility of media, and which asserts that there is still a place for direct instruction and scaffolding via instructional videos (Hamdan et al., 2013; Mazur, 2009). In the flipped class approach, this shift in the learning culture, from educator-centered to student-centered, is afforded by taking content introduction out of class time, and focusing only on meaning-making and collaborative work in class (Lambert, 2013).

Intentional content.

The third pillar, Intentional Content, refers to educator's informed, good judgment about what content needs to be taught directly, and how to best introduce that content in their video lectures. A qualified educator knows what falls within the scope of their course, which points are vital, why each topic is significant, and how each relates to the course and the student's learning goals (Hamdan et al., 2013). The selection or creation of content videos is not simply a homework 'add-on' in the flipped class; videos are the core means by which students are introduced to content via direct learning, and so they need to be selected carefully within an overarching curriculum for the course (Bergmann & Sams, 2012). Using technology is not the purpose of the flipped class; using technology to support a curriculum that is based on collaborative, active learning is the goal (Bergmann & Sams, 2012). Although viewing content material is not enough for most students to construct knowledge (Bloom et. Al., 1956), it can provide a solid foundation for background knowledge for in-class activities which go deeper and ask students to apply and synthesize knowledge (Seaboyer, 2013).

Only key topics and critical information need to be introduced through video (Hamdan et al., 2013); Only content that will be used throughout the course in order to complete projects and assignments should be made into a video lecture, otherwise students may become confused and see the videos as a drawback to a course (Sainani, 2013; Strayer, 2007). Additionally, students should not be bogged down with an excessive number of videos (Hanover Research, 2013). If students are assigned videos before a class to introduce content for in-class activities, it can improve learning by

giving students a baseline of prior knowledge about a specific topic (Hamdan et al., 2013, p.4; Seaboyer, 2013).

Although it is the "twilight of the lecture" as many high schools and universities move towards active learning, there remains a need for some direct instruction for more complex and unfamiliar concepts. According to Dr. Judith Seaboyer at the University of Queensland, "the classroom is flipped so that students must be prepared before attending class, and be ready to engage in discussions to delve deeply into, and critically analyze, the literature" (Teaching & Educational Development Institute, 2012). For example, in a Humanities course, a student needs to read the primary text, but they can also listen to the educator's explanations and comments about a text before the class. This allows students to focus on having a rich dialogue during class time, rather than on understanding the basic content of a text.

Professional educators.

The final pillar of the flipped class is Professional Educators, who can design the unit progression, create the learning outcomes for projects, and provide expert guidance for students (Hamdan et al., 2013). Though the flipped class is based on a student-centered, collaborative, and interactive model, the expertise and teaching style of the educator are vital elements (Hamdan et al., 2013). In the flipped classroom, the educator's guidance and depth of knowledge are critical because the educator provides the structure and framework of the course, creates or selects relevant content videos, and designs tailored projects that require students to analyze, apply and synthesize their knowledge. The educator also points students to more creative resources and opportunities for deeper learning (Cacciamani et al., 2011, p. 875).

An educator's skill and creativity are shown in how they scaffold content and give feedback to students. As Headden (2013) from EducationNext asserts, "the question is not really whether online instruction is a superior medium in and of itself. The Department of Education's survey found that success with online-learning depended on time spent on instruction, as well as the quality of the curriculum and pedagogy. In other words, it is not just the technology that counts: it is what educators do with it" (Headden, 2013). Educators who lecture have used technology for many decades, such as power point slides of their lectures; however, the flipped classroom approach requires educators take up video content during active learning time in class (Mazur, 2009). In higher education, technology has been a part of course work when students research for writing, but many college and university professors are interested in incorporating other ways of learning through media; however, it is a difficult balance for an educator to have enough time in the course to cover necessary content, incorporate technology in a meaningful way, and also focus on in-class collaborative work (Strayer, 2007). This challenge has led to the flipped class approach, where content is introduced outside of class time (Baker, 2000).

The socio-constructivist roots.

The Theoretical Framework section of this paper will provide background and context for how the flipped classroom is rooted in research about active learning. In the area of knowledge introduction or acquisition, Vygotsky (1978) posited the theory of The Zone of Proximal Development (ZPD), which is a theory of how students' learning is dependent on their prior knowledge in the area and how they fit new knowledge into their already existing mental schema, which is an interaction between learning and

development. ZPD also refers to the ideal space for learning, where a student is challenged and engaged by new information but where that information is not so difficult to understand that the student gives up (Vygotsky, 1978). The theory of ZPD includes the assertion that students can reach some understanding of a topic area on their own, through independent learning, but they need the assistance of a capable educator to reach their full potential, specifically through educator and peer modeling, scaffolding, and specific feedback (Vygotsky, 1978). The theory of ZPD informs the flipped class because instructional media can be assigned to introduce new knowledge, but without the guidance and feedback from a qualified educator, a student may not be able to make sense of the deeper meaning of the content. Collaborative learning and peer instruction during class time adds new knowledge and understanding to their prior knowledge in a topic area.

Further, Bakhtin (1981) found that The Utterance (or a unit of spoken communication) is not created on one's own without any previous input from others; people choose their words and form their ideas as part of a continuous responding, or dialogue, with others. Therefore, it is difficult for a learner to be guided to higher level thinking in isolation. Bakhtin (1981) believed that hearing and responding to others is the only way to make meaning because our initial modest knowledge of a topic is broadened and enriched through the contributions of others. The flipped class approach facilitates dialogic learning through peer instruction and direct conversation between educator and student.

In the area of critical thinking, Dewey (1902) makes a case that education is not only about gaining content knowledge, it is also a space where students grow, develop,

learn a variety of perspectives, as well as develop a sense of ethics (Dewey, The child and the curriculum, 1902). Dewey believed that the purpose of education is not only to learn a set of skills, but is a place to become a developed thinker. Dewey discussed two major schools of thought in educational pedagogy: a focus on the content matter and the delivery of it, the major drawback of which is that a student usually remained inactive during the "delivery" of this content (Dewey, 1902, p. 42). The second school of thought was student-centered learning, where the content was presented in a way that allows a student to relate it to prior experience and knowledge, which helps a student feel connected to this knowledge (Dewey, 1902, p. 43).

However, Dewey cautioned that active learning often put too much strain and responsibility on the learner, or "too much reliance on the child", and that without some direct guidance, a student may flounder and never reach an understanding (pp. 13-14). Dewey was concerned about how un-supported learning minimized the importance of the role of the educator, and also somehow lessened the value of course content. In the end, Dewey came to the conclusion that it is what the student does, not what the educator alone does, "nor is it simply the subject-matter" which determines "both quality and quantity of learning" (Dewey, 1902, p. 44). Finally, Dewey proposed that an educational approach should try to achieve a balance between "delivering knowledge" and "taking into account the interests and actions of the student" (1902, p. 65). Therefore, it may be thought that Dewey supports the key features of the flipped classroom; specifically, the co-construction of knowledge, and a focus on developing students' critical thinking skills during class time, while affording the learner time to learn on their own, via video.

Considering the balance between content delivery and active learning while taking into account the actions and meaning-making of the learner are the goals of the flipped class. In Dewey's time, educational media was not an option for "content delivery", and so Dewey focused on trying to include both of these elements during class time. The result was that Dewey found he and many of his colleagues ran out of time to "cover the course of curriculum" and still engage the students in active discussions (1902, p. 67). Therefore, assigning content for homework via textbook reading was Dewey's solution, so that the student can begin class with some background on the subject (1902, p. 67).

In the area of active knowledge construction and higher order thinking skills, a committee of educators chaired by Bloom (1956) created a framework for learning. The resulting "Bloom's Taxonomy of Learning" has become a foundational element in the field of pedagogy. The cognitive domain of this Taxonomy is the most referenced of the three domains; it focuses on the thinking and understanding processes behind learning. The stages of the cognitive domain are: knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom et al., 1956). Bloom states that without active learning, which applies, analyses and synthesizes a student's knowledge, learning is not complete. More specifically, when students do not have a higher order understanding of a topic and are asked to critically analyze a problem they often cannot do so (Lambert, 2013).

In applying Bloom's Taxonomy to the flipped class, knowledge can be passively introduced and then applied and responded to through in-class projects and activities. Through peer instruction, students can negotiate their values and how they internalize new information. In applying Bloom's Taxonomy to the flipped class, it is important to

consider that responding to, evaluating, and rejecting information can foster critical thinking and intellectual development. A student's experience sharing their knowledge can shape their sense of self and community belonging. Applying Bloom's Taxonomy to the flipped class reveals that a further strength of the flipped classroom approach is in affording students the opportunity to develop their own voice and take a stance in relation to content knowledge.

Rationale and research questions

In this project I examine the currently known benefits and challenges in the flipped classroom model of media lectures and in-class activities with a focus on the later years of secondary education and post-secondary education. From the literature, the affordances that the flipped classroom provides are: Engagement and Active Learning (Bergmann & Sams, 2012; Mazur, 2009; November & Mull, 2012; Tenneson & McGlasson, 2006); Differentiated Instruction (Jenkins, 2012; Lage, Platt & Treglia, 2000; Tomlinson & Allan, 2000); Critical Thinking (Cacciamani, Cesareni, Martini, Ferrini, & Fujita, 2011; Hamdan et al., 2013; Lambert, 2013), Media Literacy and Independent Learning (Khan, 2011; Cacciamani et al, 2011) and Inclusive Practices and Community Belonging (Green, 2012; Saltman, 2011; Tucker, 2012).

Additionally, through an examination of three illustrative case studies, I will inquire into whether the previously considered affordances of the flipped classroom support its implementation, and what considerations must be taken into account to do so. The goal of this exploration into the flipped classroom approach is to consider best practices of and challenges to the flipped classroom approach, how the flipped class can

benefit students, and in what ways the flipped class can help educators continue to focus on personal and professional development.

When I began my research on the flipped classroom approach, I initially considered the following: How can educators best use class time and how can educators provide a framework for modelling and scaffolding techniques if class time is student-centered?

To narrow the focus of my literature review to the flipped class approach, I used four guiding questions: 1) What are the benefits and challenges of the flipped classroom approach? 2) What are the best practices for implementation, as grounded in pedagogical theories of socio-constructivism and active learning? 3) What are the student's and the educator's perceptions of the shift in authority that the flipped classroom requires? 4) In what ways does the flipped classroom approach provide a balance of content delivery and active learning?

Chapter Two: Literature review

The affordances of the flipped classroom

The following literature discusses several affordances of the flipped class. These opportunities and benefits will be connected to their foundational roots, as introduced in the Theoretical Framework section in Chapter One. Although there are aspects of the distance education literature which have informed the creation of videos and assignments for E-Learning, and therefore have contributed to the content delivery aspect of the flipped class, the area of distance education is outside of the scope of this project because the flipped classroom approach focuses on the active, face to face learning and the

engagement of students (Hamdan et al., 2013, p.5). The research into how to incorporate

the use of technology and educational media in the flipped classroom approach will be

discussed in the best practices section of Chapter Five, in the context of using videos to

free up class time for active learning.

The foundational framework of the flipped class is based on the work and theories

of socio-constructivism, including Vygotsky's (1978) Zone of Proximal Development,

Bakhtin's (1981) Dialogic Learning, and Dewey's (1902) Experiential Learning and the

agency of the learner. These foundational theories provide background and context for

both the evolution of Active Learning and the core principles behind the flipped class

approach.

As introduced in the Rationale and research questions section of Chapter One, the

key areas of benefit of the flipped class are opportunities for: Engagement and Active

Learning, Differentiated Instruction, Critical Thinking, Media Literacy and Independent

Learning, and Inclusive Practices and Community Belonging (Bergmann & Sams, 2012;

Hamdan et al., 2013; Headden, 2013). In this chapter I consider the overall strengths of

the flipped classroom in relation to some of the core tenets of a socio-constructivist

approach to education.

Engagement: traditional instruction vs. active learning

Traditional instruction, or passive learning, is defined as an educational approach

where learners quietly receive new information from an educator, and they do not

interrupt the class, except to ask occasional questions (Bonwell & Eison, 1991). Since

Bonwell and Eison (1991) first discussed the idea of Active Learning, they have claimed

that in order for students to learn, they must do more than just listen – they must construct

knowledge though activities. They connect their research into active learning to the higher order thinking skills of Bloom et al.'s Taxonomy of learning (1956). In particular, Bonwell and Eison (1991) agreed that students must engage in such higher-order thinking tasks such as analysis, synthesis, and evaluation. Therefore, the traditional 'sit and get' method of instruction is no longer advised.

A space for traditional instruction approaches.

Many educators and researchers who have chosen the flipped class approach believe that active learning is vital; however, they assert that there is a place for direct instruction; under specific and appropriate circumstances (Bishop & Verleger, 2013; Hamdan et al., 2013). However, taking into consideration Dewey's (1902) concerns about a balance in the classroom between "delivery of content" and "active engagement in learning", it is clear that there needs to be a method to introduce students to new content, but which still affords most of the class time for student-centered learning (Bergmann & Sams, 2012). In many cases, content can be introduced through experiential learning activities, but there are some areas of higher education where direct instruction for complex concepts is recommended (Lambert, 2013; Sainani, 2013).

Further, Berrett (2012), a researcher for the Chronicle of Higher Education, asserts that content delivery should not be the main goal of what educators do; instead, educators must provide access to content, and "help unpack that content" (Berrett 2012). In helping students to think deeply about content, an educator can try both questioning methods and providing direct feedback (Berrett, 2012). Educators have long used questioning tactics in large lectures, which "compels students to study the material before class so they can turn up prepared with the basics" (Berrett, 2012). Studying material

prior to class can also help students activate prior knowledge about a topic, and better prepare them for class discussions (Berrett, 2012).

Peer instruction and project based learning.

In 1975, Eric Mazur at Harvard University was frustrated when he explained a physics concept to his students several times, and they could not understand his most basic explanation. Mazur asked them to "turn to the person beside you, and persuade one another that the answer you arrived at is correct." Mazur (2009) has found that even these short bursts of peer collaboration have led to greater student engagement and understanding of complex topics (Lambert, 2013). He called his method "Peer Instruction", and rather than the educator reading the textbook out loud to the class, Mazur asked students to read and watch videos before coming to class, so that they could spend time discussing content with each other, instead of listening to a lecture (Mazur, 2009). Mazur (2009) notes that because educators are experts in their fields, they have often forgotten which kinds of misconceptions and breakdowns in learning that students may face, and therefore, students are often in a better position to support each other (Lambert, 2013).

Further, Bergmann and Sams (2012) found that flipping the classroom was very beneficial for engaging students' interest after surveying students for their perception of the flipped class (p. 26). As reported in their surveys, students who were previously bored, restless, or unfocused became very engaged (p. 26). As educators were not "just standing and talking *at* kids, many of the classroom management problems evaporated" (Bergmann & Sams, 2012, p. 29). When students were actively engaged in class, they were encouraged to talk, participate, and express themselves; they felt like their energy

could go somewhere, and in this case, it translated into active participation. Tucker (2012), from EducationNext, also found that the flipped classroom's approach to active learning helped him with the challenge of having struggling students ask questions and become involved in class. Rather than remind students to be still and not talk, Tucker (2012) began asking his students to speak out.

Curtis-Dickenson (2012), in an Edutopia article, believes that Project Based Learning (PBL) is a beneficial element to add to active learning time because overarching projects can facilitate greater depth of learning in a topic area. Curtis-Dickenson (2012) states that "one of the hallmarks of high-quality PBL is an emphasis on collaboration and shared responsibility". Applied to the flipped class, she suggests that best practice for course design for PBL includes student choice, coaching teams to success, and having clear rubrics and measurements for success (Curtis-Dickenson, 2012).

Differentiated instruction

Differentiated instruction is defined as a method of instruction "to accommodate the different ways that students learn" that "advocates active planning for student differences in the classroom" (Tomlinson & Allan, 2000). Dewey's beliefs that the learner should be an active, critically minded member of society (1902) provides further context for the importance of differentiated instruction; as each person has their own background knowledge and methods of learning, there needs to be space for different ways for students to learn (Dewey, 1902, p. 62). The flipped classroom approach creates an opportunity for differentiated instruction because class time is dedicated to discussion; the educator can provide tailored feedback each class, students can help determine their own project requirements to show their knowledge in a variety of ways, and they can

learn content at their own pace, once again recognizing and supporting student choice and learning preferences.

In addition, Lage et al. (2000) researched differentiated instruction in the flipped classroom to see whether flipping the class would benefit more students. They found that the traditional lecture classroom does not serve many students; it appeals to "a relatively narrow and homogenous subset of students" (Lage et al., 2000). Lage et al. found that students who prefer visual and auditory learning methods, as well as experiential learners will do well in a flipped classroom structure (Lage et al., 2000, p. 42). In general, Lage et al (2000) find that "access to technology for self-paced learning creates a more inclusive class environment, where collaboration rather than competition becomes key" (p. 40). Their findings also show that a flipped classroom approach allows the educator more time with each student, allows students to customize the way they demonstrate their knowledge, and ultimately has an enormous positive impact on both student motivation and achievement of outcome goals (p. 42). Finally, Lage et al. (2000) recommend that educators do not focus on the merits of technology or educational media per se; their support of the flipped class comes from the benefits of the flexibility of the model, and fostering rapport with students (p. 42).

November and Mull (2012), from November Learning, also recommend the flipped class approach because it values differentiated instruction. They assert that in the flipped classroom structure, the educator must individualize and tailor the work for students, so they can continue learning to their best potential (November & Mull, 2012). They advocate that student-created videos may further assist those who are struggling through peer modeling and peer instruction. In their conclusion, November and Mull

(2012) have confidence that "the key to motivating and including students…is to honor the knowledge they have, challenge them to dig deeper, and not hold back their potential".

The idea that educational videos can help students support their learning with independent study is further advocated by Khan (2011). When Khan (2011) began to record math videos for his younger cousin, he felt that videos would give her better control over her own learning; she could skip the parts of the formulas which she had mastered, and re-watch other parts (Khan, 2011). Khan has since founded the Khan Academy, and his videos are sometimes used in flipped classrooms because they are often well constructed, and provide clear explanations and graduated content lessons (Sams, 2011). However, it is important to note that without active practice or "doing something", the content delivery provided by Khan's videos do not in themselves entail thorough learning, according to Bloom et al.'s (1956) taxonomy of learning. In a TED talk (2011), Khan stated that he believes videos will take the place of educators in the future, but this belief is not supported by research into active learning theories.

As a final consideration, it is a counter-intuitive result of assigning video lectures that the classroom becomes more "profoundly human" (Bergmann & Sams, 2012, p. 43). Berrett (2012) agrees that this affordance is because educators have time to build better relationships with their students through more educator–student interaction (Berrett, 2012; Bergman and Sams, 2012, p. 80). Bergmann and Sams feel that "these interactions with the students are some of the richest times we experience in our classrooms" because the flipped classroom active learning approach allows them to more frequently speak to every student (Bergmann and Sams, 2012, p. 80).

Critical thinking: towards independent learning

The flipped classroom approach values the development of critical thinking skills, believing that educators must consider how students can become more self-aware, critical learners (Hamdan et al., 2013; Mazur, 2009). Dewey (1902) defined critical thinking as "the active, persistent and careful consideration of a belief or supposed form of knowledge in light of the grounds that support it, and the further conclusions to which it tends" (p. 67). Dewey's definition highlights not only Bloom's higher order thinking skills, which are needed to analyze and synthesize knowledge, but also the idea that the learner needs to become a deep, well-rounded, and reflective thinker. Finally, the Critical Thinking Community, which is a web-based organization dedicated to developing analytical skills for the advancement of society, suggests that critical thinking requires a foundation of knowledge for a base (The Critical Thinking Community, 2013). This knowledge in a topic area can lead a learner to reasonable and reflective conclusions on their own, after careful thought and through guidance from others who model their thinking processes (The Critical Thinking Community, 2013).

Developing a knowledge base for critical thinking.

According to Bloom's Taxonomy, introduction to knowledge is only the bottom rung of learning, but it is the first step on the path to critical thinking (Bloom et al., 1956, p. 36). In the flipped classroom approach, the first stage of knowledge introduction comes through media content, comparing media with other students, and seeking several alternative sources of information (Lambert, 2013). Before the flipped classroom approach was developed, there have always been several methods to foster a base of

knowledge for students; yet today's students are "media saturated" and often prefer content be delivered through multimedia rather than other methods (Tenneson & McGlasson, 2006). In their key note presentation *The classroom Flip* (2006) on university level student's learning preferences, Tenneson and McGlasson found that to students, electronic devices represent a variety of benefits including entertainment, social networking, learning, reading, and relaxing (2006). Students reported that they were finding their own sources of information, looking up class related topics on the internet, and studying via online textbooks. Their conclusion was that a media rich environment is the new print rich environment, and that online media was the best way to introduce students to a wide selection of content and sources (Tenneson & McGlasson, 2006). The flipped class approach advocates that students watch the content videos prior to the class, which leads to a common foundation of content information as a starting point for critical discussion (Burch, 2013; Seaboyer, 2013).

To further develop a firm knowledge base for critical thinking activities, Peer Instruction and Project based learning provide the opportunity for students to learn through discussion and re-telling of content information (Mazur, 2009). When students are required to work together to discover how information can be applied to solve a problem, they are reviewing the content, applying their understanding, and negotiating meaning with others (Mazur, 2009). Lambert (2013), who is an Education researcher for Harvard Magazine, believes that the flipped classroom creates more time for activities where students can explore content by re-telling and applying information to real world problems (Lambert, 2013). In this manner, critical thinking is modeled by peers, as well as through the instructor's feedback (Lambert, 2013).

A further step in critical thinking is to re-tell or explain concepts to another person (Lambert, 2013). Lambert (2013) states that "interactive pedagogy turns passive, note-taking students into active, de facto *educators* who must explain their ideas to each other and contend for their points of view". Mazur (2013) agrees, stating that "the person who learns the most in any classroom is the educator", because the educator must explain, clarify, and think about how to prove opinions. In the flipped class approach, the authority structures are also reversed; the student becomes a peer tutor, while the educator listens and learns from their students what content and activities to introduce next (Mazur, 2009). When students are asked to take turns in the role of educator, the subject matter is more thoroughly understood and connects directly with students' experiences, projects, and goals; therefore, they are able to become better problem solvers and critical thinkers (Lambert, 2013). Re-telling and applying knowledge is necessary for students to begin to think critically and take control of their learning (Mazur, 2013).

Metacognition and independent learning.

The final stage in critical thinking is metacognition, when a student is able to continue learning with very little to no support, and is able to critically reflect on their own thoughts and conclusions (Cacciamani et al., 2011, p. 875). In the literature, a common goal of flipping the classroom is to engage students, helping them gain the most benefit from the face-to-face interaction time they have, and one of the agreed upon best uses of time is to focus the active learning environment on developing critical thinking skills (Bergmann & Sams, 2012; Berrett, 2012; Burch, 2013; Lambert, 2012; Mazur, 2012). Burch (2013), at the center for teaching and learning at Centre College, states that

a flipped classroom affords more time for student inquiry and involvement through active learning, which in turn develops problem solving techniques and critical thinking skills. When students are at home watching content videos, if they have further questions they can chat with their classmates on a forum, or seek other sources of information, leading students to become reliant on a community of practice, and not on the instructor alone (Burch, 2013; Cacciamani et al., 2011). Having access to online forums introduces students to a variety of perspectives and sources of information to consider and with which to engage. Being confronted with a variety of contrasting perspectives can lead to the development of critical thinking skills, through trying to come to a group consensus (Cacciamani et al., 2011).

The flipped class structure provides educators with the flexibility to design learning environments which value critical thinking and reflection (Cacciamani et al., 2011). When class time is dedicated to discussing content and addressing misinformation, more emphasis is placed on how students are thinking (Burch, 2013). The less controlled environment of the flipped class also encourages a more informed and self-formed act of learning, because students can lead the questions and debates about content (Cacciamani et al., 2011). Educators also have the affordance of extra time to guide students to personal reflection, and help students to question multiple perspectives, texts, and information sources (Bergmann & Sams, 2012).

The culmination of a balance of personal reflection and active engagement lead to critical thinking, and finally towards independent learning (Mazur, 2009). Researching student agency and independent learning, Cacciamani et al. (2011) conducted a study on the flipped classroom's influence on developing student's metacognition. They suggest

that students "exercise a higher level of agency", and only really begin critically thinking when they start relying on each other and their own criticism of their ideas, "rather than relying on their educator" (p. 874). In their conclusion, Cacciamani et al. (2011) advocate the flipped classroom approach, and suggest that educators slowly build student's critical thinking skills towards independent learning throughout a course. November & Mull (2012) also suggest that educators need to scaffold, or slowly support students, towards working together without an over-reliance on the educator, and that a flipped classroom approach allows an educator to step back to let students take responsibility for their learning (November & Mull, 2012). Knowing when to give students the space to learn provides them the chance to "address their misconceptions about and apply their knowledge concerning what they have learned" (November & Mull, 2012).

Finally, Mazur (2013) concludes that the most difficult but also the most crucial part of teaching is to foster critical thinking by facilitating ways for students to address their own misconceptions, so that they can become stronger thinkers (Lambert, 2013). Mazur argues that peer instruction and team-based problem solving projects, the time for which is bought by taking lecturing out of class, educate people to become leaders and innovators in society. After teaching through Peer Instruction in a flipped classroom approach for several decades, his motto is "let's turn our students into *real* problem solvers" (Lambert, 2013).

Community belonging

Sharing from student to family and community.

One way to include and honour student's experience is to help involve their family in their education. Bergmann and Sams (2012) found that flipping the class changed the way that educators talked with parents. Parents of students in flipped classes became familiar with the unit topics that were being covered in class, as family members watched them for homework. During their parent-educator meetings, "the conversation can move beyond issues like, 'is my child behaving in class' to a more meaningful discussion about gaps in learning, and ways of improving." (Bergmann & Sams, 2012). As a result, educators have more opportunity to specifically explain in what areas a student is succeeding and where they are struggling (Bergmann & Sams, 2012).

In addition, students are beginning to share their videos with others around them, which has a side effect of the student educating their parents and families (Hamdan et al, 2013). As students in Bergmann & Sams' (2012) class have reported in a survey, many of the students' parents were watching videos "right alongside their children and learning", and that watching videos together lead to interesting discussions about the content of the lessons (p. 32). In another unrelated study, focusing on how ESL students respond to the flipped class, Bergmann and Sams (2012) discuss cases where ESL students have reported "stories of educating their parents" (p. 31). A class of ESL students reported that they found watching videos for homework the most useful of several types of assignment (p. 30). Later that year, when there were parent educator interviews, a mother of one ESL student mentioned that not only did she watch the videos with her son, but the "grandmother, the aunt, and the whole extended family" were listening together in the

evenings (p. 31). Bergmann and Sams came to the conclusion that their video lessons were "educating many more people" than was expected (2012, p. 31). Flipping the classroom allows families to follow, or even partake in, the student's education.

A further way to include students in their own act of learning is through supporting student agency in online social networks (Cacciamani et al., 2001). From their study on student collaboration and resulting communities of practice, Code and Zaparyniuk (2009) believe that educators have a responsibility to "engage the use of social software to encourage student's development of agency and responsible social action" (Code & Zaparyniuk, 2009, p. 118). Code and Zaparyniuk assert that "a shift in authority structure" from the educator to the student, as the agent of their own learning, is required for "knowledge construction, meaning making, and building community within the classroom" (p. 118). Otherwise, the student is dependent on the educator to learn, and cannot act on their own (p. 118). Furthermore, educators should encourage learner agency through social networks by "establishing contexts for meaning making, collective inquiry, and knowledge building that develop a community of practice" (p. 118). The flipped classroom approach can provide a framework for the student to move towards agency through online learning by utilizing social media as a platform for peer feedback and support. Collective inquiry can occur when students look together to find media resources, and share their opinions while analyzing the quality of those resources. Finally, a community of practice can develop as a group of students with the same goals move forward and collaborate both face-to-face and online.

Student perceptions of the affordances of the flipped classroom

Student perceptions of the flipped class range from enthusiastically interested in active collaboration (Fulton, 2012) and excited about including media in course work (Green, 2012) to feeling concerned that the educator is asking them to take too much responsibility (Strayer, 2007) and the educator is not teaching enough content directly (Pettigrew, 2012). In an effort to provide specific examples of feedback from learners about the benefits of the flipped class, the following section will explore two studies: Marcey and Brint's (2012) study on a comparison of a flipped class to a course which used a traditional method of instruction, and Fulton's (2012) student interviews.

Marcey and Brint (2012) attempted to conduct a study where they would compare the achievement on final exams from two sections at the same university of an introductory Biology course; one which was flipped and one which was a traditional lecture. However, their study was confounded part-way when approximately 75% of the students in the traditional lecture discovered the content videos and the forum of the flipped course, and began using them (Marcey & Brint, 2012, pp. 6-7). They report that when these students learned the other class had flipped, they decided to create their own flipped class, without their educator's guidance (Marcey & Brint, 2012, p. 3). The students were not asked, and were under no pressure to add an online component to their learning, but chose to self-flip their course anyway (p. 3). Students in both sections began studying together and discussing the videos in large groups, outside of class time. The students in the flipped class reported on the in-class discussions they had that day, while the students from the other class asked questions (p. 4). Students in the traditional course were later surveyed, and reported that when they had learned about the "cinelectures",

they added these to their daily study habits because they felt this method was a more interesting and efficient way to study (p. 6). Marcey and Brint (2012) were surprised at the results, and interested in why the students in the other course had been so willing to add the cinelectures to their study practice.

Significantly, compared to previous semesters, both sections of the course had higher achievement on exams (p. 6). In addition, there was a "noteworthy disappearance of the differences in learning outcomes" between the students in the traditional lecture and the flipped course when the traditional-class students began to watch the video lectures (Marcey & Brint, 2012, p. 6). Their data show that there was a gap in achievement prior to the midterm exams, but after students from the other class began to watch the video lectures, the achievement for both classes was similar on their final exams, and higher than in previous semesters (p. 6). Marcey and Brint conclude that it was "the cinelectures and not the in-class, active learning exercises which were primarily responsible for the discrepancy in test performance" (p. 6). Finally, they found this result surprising, given "the large body of literature that reports significant gains in student learning outcomes as a result of active learning participation in the classroom" and not from online media alone (Marcey & Brint, 2012, p. 7). In summary, they found that students from both courses preferred a flipped class over a traditional lecture, even with no pressure from their educator to change their study habits. In addition, the students in both courses achieved similarly on exams, even though one section of the course did not the element of active learning in class (p. 7). However, they note that the peer supported learning in the daily after class study groups could have made up for that lack (p. 7).

In a further study focusing on the student's perspectives of the flipped class, Fulton (2012) interviewed students in flipped classes at Byron High School in Illinois. Students reported that they appreciated the extra educator support in class, liked to work on lessons at their own pace, preferred to contribute to class discussions than listen to a lesson, and felt like they had learned more than in other classes (Fulton, 10 reasons to Flip, 2012, p. 24). Students also preferred a flipped class when the videos were filmed by their teacher, as students liked to watch their teacher at home (p. 22). A student reported "I liked this approach a lot because when we work on homework in the classroom, the teacher is here to help us. Otherwise, I would be lost at home and wouldn't be able to finish my homework" (p. 24). Another student replied "I personally like that I can get through the lessons quicker than when we have an in class lecture. Then, when I do the homework in class, I can have help right away, which means I ask more questions" (Fulton, 2012). A final student's comment was "I liked how I could rewind and pause the lectures in case I didn't understand something" (Fulton, 2012). At Byron High, 97% of students have access to high speed internet at home, and were able to do their homework at their house (p. 21). Moreover, 84% of the student's parents who were surveyed reported that they believe the flipped classroom was the best method of instruction (p. 23). Fulton's conclusion was that the flipped classroom approach allowed dedicated educators to create their own curriculum together with their students, and this was the main reason students responses were so positive (p. 24).

The response from many students is they have vastly preferred flipped classes to traditional instruction methods (Green, 2012; Hamdan et al., 2013). It seems that providing students the opportunity to flip their class should be a decision which is a

negotiated partnership between an educator and their students (Fulton, 2012). However, regardless of the educator's instigation, some students are independently adding media study to their traditional classrooms, creating social networks of learning and communities of practice (Marcey & Brint, 2012).

Chapter Three: Literature review: Challenges

Challenges of the flipped classroom approach

According to recent research about the flipped class, there are three main categories of challenges: Access (to technology, to time), Skill (professional development, media literacy), and Approach (preference for traditional instruction, non-aligned course design, preference to not include media). In the literature, the greatest concern is regarding the amount of preparation time the flipped classroom takes compared to traditional methods of instruction (Bishop & Verleger, 2013; Hamdan et al., 2013; Hanover Research, 2013; Sainani, 2013). The following chapter will consider whether these are limitations of the flipped classroom approach itself or in the manner it is implemented. Finally, students' perceptions of the challenges of the flipped class will be explored. Surveys reported that students sometimes preferred traditional learning methods because they are more familiar, students may dislike group work, and there may be a mismatch between their preferred study methods and the flipped classroom's media homework assignments.

Challenges of access

Lack of access to technology.

"How do we make sure every student has equal access to the resources that are required?" - Tucker, 2012.

The concern over access to personal electronic devices for all students is a recurring one throughout the literature (Hanover Research, 2013; Jenkins, 2012; Green, 2012; Socol, 2012; Tucker, 2012). On the LectureTools blog, a forum for educators who use educational videos, Jenkins (2012) expresses concern that "students from lower income areas and lower income families may not have access to the computers and internet technologies that the flipped classroom requires. The structure really hinges on every student having personal access to his or her own personal device". Jenkins (2012) is troubled that some students will be forced to use public computers at the library or in school computer labs, thus undermining their ability to watch educational media at their convenience and share it with their families. Jenkins believes that what makes having lecture videos as homework a strength of the flipped class is that "students can do it on their own time and in their own way" (Jenkins, 2012). Waiting in line for a library computer for hours, away from home, is inconsistent with the values of the flipped classroom of creating a flexible learning environment and inclusive community practice. In this way, a student may become more distant from their family, and may feel that their entire day is consumed by school work, with no break or opportunity to relax at home before studying (Jenkins, 2012).

Socol (2012), an educator and researcher with Michigan's Integrated Technology Initiative, raises the issue of students in poverty lacking access to devices, through their

schools or otherwise, and who may not even have a quiet study space at home to watch videos if they did have access. Socol (2012) points to some areas of America with high rates of homeless students in the public high school system, and that assigning homework that requires technical hardware comes from a non-reflective and privileged position which may not be respectful of all students and their families. In the worst case, Socol (2012) believes that the flipped classroom is just another version of reading for homework "but with videos instead of text". She believes that although watching videos might be better than reading textbooks for some students, there remains "no more choice, no more explanation, no more interaction" than in traditional models of instruction. Socol states that "the parts of education which require the most care, the most individualization, and the most interaction between educator and learner" are when content is introduced.

Regardless of the socio-economic background of students, it is still the educator's responsibility to ensure that all students have access to an electronic device before the start of the course (November & Mull, 2012). By not addressing the issue of access to technology, educators are not acting in the best interests of the students (November & Mull, 2012). The researchers suggest that after discovering that some students do not have the requisite devices available via a quick written survey, educators can prepare alternate delivery methods such as placing "audio and video material" onto CDs or DVDs "which are more easily accessed on students' home DVD players". It is important that students have access to their homework content at home, not only at school or at a location away from home, and that the educator ensures that this is the case before assigning videos or media for that semester or term. November & Mull (2012) add that "schools might work with local libraries and community centers to make access to this

material very easy for students. We can agree that it will be quite important for educators and school leaders to understand their communities and think creatively about ways to create equitable environments for learning."

Indeed, Socol (2012) and others, such as Jenkins (2012) and Neilson (2012), have questioned the ethics of assigning any homework at all. Neilson believes that homework is not a valuable way to support learning compared to in-class content delivery (Nielsen, Why the Flip's a Flop, 2012), and Socol claims that it takes time away from family life (Socol, 2012). Fulton makes the case that a student's time after school is better spent on hobbies or sports (Fulton, 2012). In addition, Fulton (2012) argues that "too much time and importance are placed on homework. If students do not do their homework, they cannot often catch up". Although it may be quicker for students to catch up on their homework in a flipped classroom approach, Fulton contends that educational videos are still an imposition to a student's life. These four researchers believe that school is the place to do school work, and after school is the time to support and learn from one's family, play, and develop hobbies or other interests.

Lack of preparation time.

Even the most enthusiastic supporters of the flipped classroom are concerned about the extra time educators must spend preparing for a course. Stanford University (2013) hosts a webpage entitled "What are the main things an educator needs to do to teach an online class?" In putting together a 6-week course, Stanford asserts that an educator needs to determine course and unit outcome goals, record lecture content for all 6 weeks, identify ways students will engage with the content, create quizzes for video lectures (1-2 quizzes per 15-minute video is suggested), create machine-gradable

(standardized) tests for each video's content, and design grading rubrics for the projects

that the students will complete (Stanford University, 2013). The website suggests that

although a flipped class is a good course design model, it requires almost twice the

amount of work for the educator in preparation of the course, which should not be

undertaken lightly. Murphy (2011) states that the flipped class is "a pile more work. I've

spent several days in the past few weeks restructuring my entire course, recording and

editing a bunch of videos, posting them to YouTube, setting up a blog, scheduling the

posts, tweaking my presentations, and integrating everything to the BlackBoard LMS".

Although she believes the flipped class is worth it, she suggests that educators consider

their schedules and the real value the flipped class holds for them and their students,

before making the time commitment (Murphy, 2011). In many cases, designing projects

and assessments in collaboration with students is more time consuming and effortful than

lecturing during class (Murphy, 2011).

Additionally, McCallum (2013), states that this time investment will happen every

new semester (Friedrich, 2013). She believes that educators should not simply recycle

course content and projects, so that instruction is tailored to their current students' needs.

McCallum (2013) identifies the main challenge for her is creating lecture videos, and re-

making them according to student feedback and course changes. She reports that the

flipped class requires "a lot of effort, care and personal energy on the part of the

educator", noting that educators often underestimate the time it takes to monitor and reply

to students' comments every evening on the class chat board. She agrees with Stanford

University that the preparation time may actually double, as educators plan out how to

condense their lectures, engage students in class, and design projects which apply course

content (Friedrich, 2013). However, she has chosen to continue to run a flipped class because she believes it provides the best model of instruction for her students.

Skills Required

Professional development skills.

Although most educators who have flipped their class say that "it's not about the videos!" an educator must be able to use technology to create educational media (Bergmann & Sams, 2012). Many educators use professionally-made videos, such as those by the Khan Academy or TechSmith; however, choosing one's own content in the lecture videos and modifying it for a specific group of students is considered to be best practice for the flipped classroom (Friedrich, 2013). In the current research, there is a notable emphasis on professional development and how to use educational media to record lecture videos (Bergmann & Sams, Flip Your Classroom: Reach Every Student in Every Class Every Day, 2012). However, a need for professional development is certainly not unique to the flipped classroom; it is ongoing and necessary for every educator.

For many approaches to education, including the flipped classroom, educators need to change their teaching routines to include technology; including recording videos, creating online forums, and adding quiz generators. Daniels (2013), an education technology integration specialist who trains educators, writes that "one of the challenges of traditional professional development is that everyone comes with a different set of experiences and skills", as in any classroom (Daniels, 2013). In Daniels' (2013) workshops on teaching educators how to use flipped classroom technologies, she focuses

on the key point that educators must know the educational programs thoroughly before implementing them in the classroom and teaching students to use them (Daniels, 2013). For instance, she reports that if she is working "with a group of educators on how to use Google Docs with their students, and half of them have never used Google Docs, then there are two very different experiences that need to be addressed in the delivery of new information" (Daniels, 2013). One task is to teach educators how to use Google Docs, and then teach them how to show students their use. Often, students already know how to use popular programs and media; however, an educator should still be prepared to teach this if necessary (Daniels, 2013). She notes that video setup and recording takes strong technical skills on the part of the educator and that poor quality videos are often not helpful in communicating content or engaging students.

There are several concerns regarding video recordings, many of which involve the educator reflecting on the quality of the educational videos. The videos may be too long (Tucker, 2012), the devices and programs may be too complicated or glitchy to use (Bergmann, Overmyer, & Wilie, 2011), and there may be a sense that the program is still under development (Daniels, 2013). To address these concerns, and the need for educators to become familiar with educational media tools, Baker (2000) gave a presentation on how educators can use online web tools and web course management programs to present instruction online" (Baker, 2000). Baker, a communications professor at Cedarville University, Ohio, reported on specific technology and implementation strategies that educators could use, acknowledging that he had to spend a lot of time learning how to use the programs he now advocates.

Finally, the flipped classroom approach takes significant professional development time for most educators as they learn how to use new media. Although these skills will likely be useful in an educator's personal and professional development, this may be an unreasonable amount to learn in one semester. McCallum (2013) suggests that educators "take it slow", learning to use the media over a few semesters before implementing a flipped class for their students (Friedrich, 2013).

Concerns about learning from media.

There is some apprehension that if students in the flipped classroom approach have low media literacy skills, they will not be successful. The flipped classroom relies on the fact that students have adequate knowledge of how to use media, or have a foundation in media literacy; therefore, before flipping a class, it is an educator's responsibility to make sure that students can locate and access videos, and participate in online assignments and groups. UCLA's Kellner and Share (2007) have researched in the area of critical media literacy and have concluded that "educators need to move the discourse beyond the stage of debating whether or not critical media literacy should be taught, and instead focus energy and resources on exploring the best ways for implementing it" (Kellner & Share, 2007, p. 41). They have found that ensuring students have a base of media literacy is necessary and relevant, regardless of background or circumstances, in order to be prepared for the demands of life and work that they may encounter (p. 42). They suggest that an educator spend time during the first week of a course to not only introduce themselves to students, but to also teach a basic workshop on media literacy, focusing on the skills and knowledge a student must have to succeed in their course (p. 42).

A further concern about the flipped classroom approach is that neither mastery learning of video content, nor actively participating in class, is enough to learn critical thinking skills (Burk, 2011). In fact, several researchers have found that mastery learning via media does not facilitate critical thinking skills (Gelder, 2005; Burk, 2011). Gelder (2005), a cognitive scientist at the University of Melbourne, describes that humans are not naturally critical thinkers; we are "pattern seeking, storytelling" learners, who need to be taught critical thinking skills. He found that when students master a content area, they tend to understand it deeply, can retell it, can reorganize the information, but they cannot necessarily apply that knowledge to new areas, in order to solve problems (p. 42-43). Instead, students need to be presented with simple problems to solve that require synthesizing information, and then work up to more complex problems, and need to learn how to reflect on and question information before they will do this naturally on their own (p. 44). In his conclusion, Gelder (2005) finds that people learn critical thinking skills best through encouragement and modeling, and not through mastery learning of a content area (p. 45); therefore, for the flipped classroom, it is necessary for students to learn to think critically through active learning, by practicing critical thinking themselves.

Cacciamani et al. (2011) found that in developing critical thinking skills, it is not enough to have students simply participate in class, and that "high numbers of student contributions is not always correlated to their learning performance", nor to their ability to solve related problems (p. 875). This study of 67 undergraduate students, regarding participation, performance, and critical thinking, found that "those who write fewer messages, but participate in the discussion regarding a wider number of topics, achieve better results" than those "who write more but are limited to only one topic of discussion"

(Cacciamani et al., 2011, p. 875). These results show it is not the depth of knowledge in one topic area, but participating in a wide number of topics that helps students' performance and critical thinking (p. 882). Students may be exposed to content knowledge by listening, reading, and watching, but it is not until they experience and do something with that knowledge that they have truly learned it (Dewey, The School and Society, 1907).

Challenges of implementation

In exploring the challenges to implementation of the flipped classroom, it is important to review the definition and goals of the flipped classroom. Chapter One of this paper introduced the goals of the flipped class as including active learning during class time, allowing for flexible and active project assignments, assigning shareable content through educational media, fostering a desire for self-knowledge and independent learning, and fostering community belonging. The definition of the flipped class is that it is a form of blended learning which differs from both E-Learning, in that it must include active learning, and Technology Rich Instruction (TRI), in that it does not advocate traditional instruction during class time. Finally, the flipped classroom approach is based on the theoretical framework of a Flexible Environment, active Learning Culture, Intentional Content, and Professional Educators (Hamdan et al., 2013, p. 6).

With this framework in mind, this section will focus on challenges or criticisms of implementing the flipped classroom approach, including concerns that educators may prefer traditional instruction methods, may wish to introduce content to learners in class, may assign video lectures without active learning elements in class, and may object to the perceived commercialization of learning. Of these challenges, the first three are due to

the fact that educators find the flipped classroom approach is not their preference, and do not want to implement it. The final two challenges occur after the flipped class has been implemented, and are issues of course alignment and concern with best sources of content.

Video lectures vs. experiential learning.

Proponents of experiential learning methods, who are unsupportive of any form of direct instruction, object to the use of video lectures (Jenkins, 2012). Theorists of experiential learning believe that students should explore content, be curious, and find what they are passionate about without being directly told by an educator what content to study (Fulton, 2012). They argue that education should have no passive learning component whatsoever; video or otherwise.

Further to this point, some educators believe that learning occurs best through student exploration and non-guided learning models (Sams, 2011). Although Sams is one of the founders of the flipped class, he has slowly moved away from relying on content videos to introduce information to his students. Currently, he advocates a mixed method of peer instruction, experiential learning, and project-based learning, with optional video lectures for extra support (Sams, 2011). Jenkins (2012) also supports experiential learning without the aid of any type of passive learning. According to Jenkins (2012), homework videos are "just another form of passive learning under the old 'sit and get' method of learning", and posits that the flipped class approach has improved very little over traditional methods of instruction. Jenkins also objects to the fact that when core concepts are introduced for the first time in videos, students cannot ask questions or interact with the educator or their peers in the moment (Jenkins, 2012). She believes that

this time lapse between viewing a video and being able to ask questions "negates the idea that technology is 'instant' or 'faster'" because having to wait to ask questions "slows down the learning process" (Jenkins, 2012).

Neilson (2012), who also believes that there should be no passive learning aspect to a course, agrees that the use of video lectures to introduce content may be novel, but without support the complex content in videos can confuse students and leave them feeling lost (Nielsen, Why the Flip's a Flop, 2012). As a public school educator, Neilson believes that "relating any kind of class content to the real world" requires hands-on care and passion, not "sitting in front of a screen". Regarding the flipped class approach, she says, "I see homework being done in class, which is better than at home, sure, but it's still not real-life work" (Neilson, 2012). She believes it is the educator and the students who should direct the learning, not a video (Nielsen, Why I will no longer work to differentiate instruction!, 2011).

Of course, an educator can set up chat boards, or other ways for students to be able to ask questions while watching videos at home. Sams (2011) acknowledges that "some educators are critical of any kind of direct instruction" but he asserts that "they must critique the video aspect directly, otherwise the criticism of passive learning in general is too broad" (Sams, 2011). Yet in the flipped classroom approach, an educator must be interested in providing intentional content via media for students (Hamdan et al., 2013, p. 6).

Video lectures vs. educator supported learning.

Miller (2012) argues against unsupported learning approaches, including experiential learning without educator feedback and video lectures for homework. He

believes that the educator's role is to provide guidance as a facilitator during the entire learning process from beginning to end. He posits that the independent learning that is required when students watch videos is not reasonable to expect. Miller (2012) asserts that if he allows students complete freedom over what they learn, or expects them to just watch and learn from a video, this does not mean that "he/she will know what to do next, nor how to do it effectively" (Miller, 2012). Miller believes that content can be conveyed through either video or exploratory learning, but that the educator must be present to support and guide the students in either case. Miller claims that educators are not fulfilling their role if they expect students to learn content completely independently through video lectures (Miller, 2012).

Kihlstrom (2011) argues that an educator should be present to provide context and support for students as they encounter new information. In *How Students Learn and How We Can Help Them*, he explains how memory storage works, and concludes that in order to remember information, a learner needs background information and context to make semantic connections (understanding) in order to recall that information later. Thus, if students do not understand a lecture video, viewing it repeatedly will not enhance their understanding of its content. Kihlstrom (2011) supports active learning theories, and believes that without being introduced to content in a meaningful way, students will be unlikely to understand its significance or be able to relate it to similar mental associations later. He emphasizes the time-sensitive aspect to remembering new information, and that if context or a semantic connection is lacking at the outset, the potential for future learning on that topic will be affected (Kihlstrom, 2011). The implication is that whether a student watches videos or not could be irrelevant, because the time when they

internalize and contextualize content is during in-class learning, not when viewing the videos. It is worth considering that content videos are often not viewed as a detached resource on a topic, but are usually scaffolded in a series. If videos are too truncated and do not provide enough background information, students often cannot understand them (Sams, 2011). Finally, the goals of the flipped classroom approach require that an educator provide key course content through media, and is willing to step back to allow students to continue to learn on their own, outside of class, in order to become an agent of their learning (Dewey, 1902, p. 67).

Preference for traditional instruction.

Pettigrew (2012) believes that the flipped classroom is just a fad in education. He asserts that because educators are excited to break out of their own teaching routines, they allow themselves to believe that it will also be better pedagogy for their students. Pettigrew asserts that there is no conclusive research on the "superiority" of the flipped class when compared to the traditional lecture model, and that there are good reasons why the field of education has preferred the lecture model for so long (Pettigrew, 2012). He concedes that "dry boring lectures in which a professor drones un-contextualized facts for hours is not a good way to teach"; however, he claims that good lecturing provides "information but also context and perspective" for students (Pettigrew, 2012).

Pettigrew also argues that good lecturing allows for "asking questions and considering answers—things that are best done live and in person" (Pettigrew, 2012). He believes that the textbook should introduce a base of content knowledge, which the educator then must put in context during a lecture, then take questions from students. Pettigrew (2012) also explains that in the humanities, professors have long expected

students to pre-read the course novel or text and then "come to class ready to analyze and discuss that material". He believes that video lectures are unnecessary because the purpose of a lecture is to introduce the content, in a non-abridged, dynamic manner. In closing, Pettigrew states "the lecture is not a tyrant. It's a tool – and its virtue, as with all tools, lies in how skillfully it is used". Furthermore, he posits that the lecture is often a better tool for instruction than educational media, if the educator is an experienced and passionate lecturer (Pettigrew, 2012).

Strauss (2012), agrees that the lecture is a valuable tool in the hands of an experienced professor. Although she believes that the flipped classroom approach has potential, she is concerned that "the lecture is portrayed as the educator speaking and the students listening" (Strauss, 2012). She argues that this is not the way that most educators lecture; instead, they use an "interactive lecture", where there is a dialogue between the educator and the students. She adds the objection that, in many educational institutions, there are not enough educators, nor enough rooms, to have students work "in small groups on a project", concluding that the flipped classroom could be a good approach to education for some courses under certain ideal circumstances, which are not realistic in most universities (Strauss, 2012). As applied to the definition and goals of the flipped class, these challenges go against the goal of keeping most class time for active learning, with an infrequent use of direct instruction. In order for the flipped class to be an option, educators must want to create a flexible learning environment, including a focus on active learning methods.

Video lectures without active learning.

Bergmann and Sams (2012) warn that there are wrong reasons to flip a class, such as flipping simply "for the sake of using technology", so that the educator can let the videos teach the course (p. 21). If educators believe that flipping the class will "make their job easier" as they ask students to sit and watch videos during class time, they have undermined the values and benefits of a flipped class (p. 22). Bergmann and Sams (2012) state that at the core of the flipped class approach is the belief that "pedagogy should always drive technology, not the other way around" (p. 21). Further, Bennett (2012) is also concerned that "educators are going to turn these amazing resources into pop-and-play video lessons just to say they use them. I'm afraid that the power of the videos will be lost by just handing out an accompanying worksheet", thus perpetuating a passive learning approach. Bennett warns that if educators have students do "activities" on individual laptops in class, they are not creating a communicative, collaborative environment; students are developing neither critical thinking skills nor independent learning skills (Bennett, 2012). He advises that creating a "flipped class" where "students watch Khan videos in class while the educator drinks coffee" is "directly opposed to what the flipped class stands for", which is more in-class time for collaborative learning (Bennett, 2012). Bennett remains concerned that educators will abuse videos as content delivery, and emphasizes the need for educators to focus on project-based learning and peer instruction during class.

Finally, the flipped classroom values active learning, and even though educators are no longer "front and center", speaking to the whole class, under this approach, their feedback and support are necessary for students to find success (Bergmann & Sams,

2012, p. 22). Changing the learning culture of the flipped classroom means that the educator's guidance and wisdom are more valuable than ever, as educators themselves must be engaged in creating a differentiated, flexible, and passionate learning environment (Hamdan et al., 2013, p. 5).

The commercialization of learning

A last challenge to the implementation of the flipped class concerns the reasons that an educator has for selecting and assigning content videos. Recently, there has been sensationalism regarding which technology and videos should be chosen for a flipped class, and some educators have reservations about the for-profit nature of organizations which create video content for educators (Hertz, 2012). Groups such as The flipped Learning Network, TechSmith, and Khan Academy have received a lot of funding and sponsorship for the purpose of creating quality videos for learning; however, Hertz (2012) has concerns about the commercialization of learning, where students and educators no longer create their own tailored and unique resources, but instead purchase access to standardized, brand-name videos. Educational media for profit has been criticized as being self-serving, in that companies rely on sales, rather than serving students (Hertz, 2012). Hertz, an education technology educator in Philadelphia, comments in her Edutopia article that she frequently hears accolades for Kahn Academy and other videos "in discussions around the flipped classroom". For Hertz, this is so recurrent that when she thinks of the flipped class, she "can almost hear a vendor saying, 'with our amazing display quality, your students can watch videos in crisp detail'", associating the flipped class with new, but not necessarily useful, flashy content videos. Hertz (2012) would like to remind educators that tailoring content through making one's

own videos, and also selecting videos from a wide array of brands, will likely be more suited to student's needs than purchasing or using a set video series, where the content is not necessarily matched to the learner's needs, even if it is matched to the course (Hertz, 2012). Although this may be an advantage in some cases, (Strayer, 2007) has found that students often prefer "professional quality videos" to ones made by their educator (p. 11).

A related concern is that in an effort to motivate students to watch their assigned homework videos, some educators have "gamified" learning by giving students points leading to a prize, or by rewarding them by announcing their accomplishments at the start of each class. The "gamification of learning" is a movement which tries to motivate students to learn by giving them stars, points, prizes, and other rewards for completing their work (Wees, 2011). Wees (2011), who is a math formative assessment specialist with New Visions for Public Schools in New York, criticizes gamifying learning in his article *Flipped Classrooms: Let's Change the Discussion*, because it teaches extrinsic, rather than intrinsic, values of learning. Wees has seen gamifying learning through rewards systems compromise a student's love of learning and reduce them to having simple goals of "finishing this level" or other "completion goals" rather than helping them to develop goals based on valuing knowledge and enjoying learning. When Wees (2011) flipped his high school math class and gave students points and rewards incentives, he found that "some students chose, despite repeated requests from me, to only watch videos and do exercises that were really easy for them, instead of advancing their knowledge" (Wees, 2011). He found that students only considered external incentives, and focused on speed and shallow learning in order to complete their videos and receive their prize. In the end, Wees decided to stop assigning Khan Academy videos

for his class to watch because he believes that the students were not benefiting from the built-in points systems, which are a part of the Khan Academy program. The flipped classroom approach does not need or rely on commercially produced videos or content of any kind, and it is an individual educator's choice whether to include branded videos in their curriculum. Indeed, the flipped Learning Network advocates that an instructor create their own videos, or allow students to create and select videos with guidance, rather than to use a particular brand or series of videos (Hamdan et al., 2013, p. 6).

Student perceptions of the challenges of the flipped classroom

Overwhelmingly, student perceptions of the flipped class have been positive, according to several key reviews of the literature regarding the flipped class (Bishop & Verleger, 2013; Hamdan et al., 2013; Hanover Research, 2013). Yet there are some students who have not been accepting of the flipped classroom, and their opinions and comments are valuable in assessing the flipped classroom as an approach. From student surveys, course feedback forms, and interviews, students generally feel that the main drawback to the flipped class is that it feels unfamiliar; that is, students may have been educated in a system where they could sit and passively attend to an educator during class time, which may take less effort than active learning methods (Fulton, 2012). Specifically, students' concerns about the flipped classroom are that videos do not provide enough context for understanding content, preferring to listen during class and work at home, and choosing to work independently rather than in a group.

In Jeremy Strayer's (2007) doctoral dissertation, entitled *The Effects Of The Classroom Flip on the Learning Environment: A Comparison of Learning Activity in a Traditional Classroom and Flip classroom that Used an Intelligent Tutoring System*, he

explores the benefits of a flipped class compared to traditional lectures in a university

setting (Strayer, 2009). Strayer made video recordings of his introductory lessons for

undergraduate level Statistics and Maths, which he gave to students for homework. In his

conclusion, Strayer received mixed student feedback from his study: overall, students

wanted more direct instruction during class time to support the activities, and they did not

always understand how the video content was connected to the in-class activities.

By and large, rather than focusing on collaboration, students have preferred more

of a mix between direct instruction and collaborative learning during class time. This

could be due to the fact that students also reported that they felt the content videos were

too short and did not provide enough background of the content/concept being introduced

(Strayer, 2007; Fulton, 2012). These findings are interesting because Strayer had tried to

keep his videos to one or two per week, at 10 minutes each, to reduce the amount of time

students were spending on homework. Yet students self-reported that they preferred

more, and longer, lecture videos in addition to some direct instruction in class.

The flipped classroom approach can be disruptive to how students have "learned

to learn" (Fulton, 2012). Students' expectations of the structure of courses have been

developed over years of experience and practice, resulting in students having their own

entrenched study routines. Flipping the class can upset students who expect and want

traditional instruction. One student reported: "The thing I have with [the classroom flip]

really is that it didn't fit my study habits. I'm used to doing my homework later at night

with either a movie on or music playing. And with all of those people talking, especially

some certain groups in the class that – it was just really distracting." (Strayer, 2007).

Some students seemed to struggle with where they fit into this new way of learning, as

they were "forced to adjust personal learning strategies they had relied on for years to fit this new classroom structure, and it appeared this adjustment was something students had difficulty doing in a short period of time." (Strayer, 2007, p. 10). Using technology to introduce students to new content may make students "feel less connected to the professor in the classroom" (Strayer, 2007, p. 11). The professor as a facilitator can make students feel like they are learning less – whether that is true or not, it is perceived that way because the students do not hear the professor lecturing (Strayer, 2007).

In their research for their doctoral dissertation, Johnson and Renner (2012) report that their students' perceptions of the flipped class were mixed (p. 73). The students, who attended two sections of an introductory level Computer Applications course, reported several expectations and considerations for educators to be aware of before they flip. Their criticisms included: the expectation that homework is mandatory should be made clear at the beginning of the course; students do not automatically prefer cooperative group work; educators should choose quality videos from elsewhere rather than making their own unprofessional ones; and students prefer a mixture of lecturing, active learning, and independent work during class time (Johnson & Renner, 2012, pp. 73-74). Johnson and Renner (2012) report that their students' "open-ended responses and observations provided multiple opportunities to see glimpses of promising student perceptions" of the flipped classroom (p. 74). Their students' responses reveal that they may prefer a more mixed approach to instruction, rather than active learning alone.

Finally, November & Mull (2012), from November Learning, recognize that some educators have objected to the flipped classroom because "kids do not want to sit at home watching boring video lectures on the Web. At least in the classroom, they get some kind

of interaction with me and with their peers". Based on their experiences as classroom educators, November & Mull (2012) report that it is "educators, more often than students, who object to the use of media, particularly video, as part of course work". In their final comments, they assert that under any instructional approach, when educators give students a voice and control over their own education, as well as how to use class time, students will respond favorably (November & Mull, 2012).

Chapter Four: Illustrative case studies

The literature review in Chapters Two and Three consider the affordances and challenges of the flipped classroom approach. Chapter Four will highlight three case studies which show how the flipped classroom has been implemented in three distinct contexts. According to the Commonwealth Association for Public Administration and Management, an illustrative case study is "a story about how something exists within a real world context that is created by carefully examining an instance. It recounts real life situations that present individuals with a dilemma or uncertain outcome" (Commonwealth Association for Public Administration and Management, 2010, p. 2). In the following case studies, the educators are often involved in action research, as they are the primary educator and are responsible for recording data, reporting their own perceptions, and discussing the impressions of their students. As a result, these case studies are anecdotal and involve critical reflection on the part of the educator. In all three case studies, the educators report that they observed improvements to student engagement and other important dimensions of student learning.

Greg Green (2012): Clintondale High School

In the first case, a research team at Pearson Education conducted a case study of Clintondale High School, comparing the pass/fail rates from previous years, then interviewing both educators and students to glean their perceptions of the flipped class approach (Pearson Education, 2013). Comparing pass rates from the school year of 2009-2010 to the school year of 2010-2011, Pearson Education was able to assess how the flipped classroom approach may have impacted student achievement. From educator and student interviews, they discovered that educator satisfaction with teaching a flipped class was high, and that students preferred this model of instruction to their previous classes (Pearson Education, 2013, pp. 1-2).

Clintondale Community School serves grades 8-12, and is in a low socio-economic region of rural Michigan where the community is undergoing an economic depression (Green, 2012), and was noted for ranking as one of the fifth "worst schools" in America in 2010, based on a measurement of student pass rates, achievement levels on state assessments, and on rates of students who continue on to post-secondary education (Pearson Education, 2013, p. 2). Aaccording to Michigan School district statistics, Clintondale had been considered a school for troubled youth, with an average graduation rate of 54% from 2007-2009, (Pearson Education, 2013, p. 2). The principal at Clintondale, Green (2012) reported that his school faced several major challenges: students came from all skill levels, generally had low socio-economic backgrounds, lived far away from the school without reliable transportation, and did not have family support for homework completion (Green, 2012). Additionally, over 60% of students at

Clintondale were identified as being "at risk" of dropping out of school, or otherwise not completing their secondary education (Pearson Education, 2013, p. 2).

Clintondale had several serious challenges to overcome; in 2010, Clintondale did not receive the funding required for new textbooks or other classroom resources. As a result, Clintondale educators decided to create their own curriculum and flip their classes (Pearson Education, 2013, p. 1). Green states that the teachers, confronted with low student attendance, engagement, and achievement, wanted to help their students in any way they could (Green, 2012). As Green (2013) described it, "to watch this happen every day, where it is your responsibility to try to provide the very best you can for the students, is beyond frustrating. It's heartbreaking" (Green, 2012).

From Pearson Education's interviews, Clintondale educators reported that their goals for flipping their classes included helping students improve their achievement rates on state tests, supporting students while they are doing work in class, and assigning less work to do at home (Pearson Education, 2013, p. 2). Teachers also reported that they wanted to give students the opportunity to struggle together in class, instead of feeling alone while working at home (Green, 2012)**.** A student in grade 12, Luwayne Harris, commented in an interview "whenever I had a problem on the homework, I couldn't do anything about it at home" (Green, 2012). Harris' comment was a common feeling among Clintondale students, before the school transitioned to an active learning model (Clintondale Community Schools, 2012).

A major concern at Clintondale High School is the lack of access to technology and personal devices (Pearson Education, 2013). Green (2012) was asked "if students from at-risk populations really have access to smartphones" (Green, 2012). Before

Clintondale flipped their classes in 2011, through anonymous student surveys, educators at Clintondale found that 82% of their students had access to a personal device during the 2011-2012 school year (Green 2012). Furthermore, all students at Clintondale were invited to view and discuss the videos with their educator a half-hour before class, at lunch, or for up to an hour after each class, since the educators agreed that access to the videos was vital (Green, 2012). Finally, although some educators made their own videos, others used freely available videos from educational websites (Clintondale Community Schools, 2012).

In an interview with The National Education Association, Townsend (2011), who is a physical science educator at Clintondale, reported that the flipped classroom approach has included educators outside of Clintondale in their practice, as well as students' families, through online forums for educators (Álvarez, 2011). Townsend suggests that educators should share their strengths with the educational community, and creating videos in their area of expertise is one way to accomplish this (Álvarez, 2011). Townsend states that educators from other subject areas, parents, and families enjoyed watching educational videos and learning together (Álvarez, 2011). Green (2012) also believes in a philosophy of community access to education, as his teaching philosophy is to empower "our students, partners and guardians, and even community members, to learn by giving them unlimited access to information" (Green, 2012).

In the perspective of many of the educators and students of Clintondale, the results of their journey in flipping their school have been very positive (Pearson Education, 2013, p. 3). Student engagement has improved dramatically, as self-reported by many students and their educators (Pearson Education, 2013, p. 3). Both the students

and the educators feel empowered by this approach to teaching, and students feel more in control of their educational outcomes (Pearson Education, 2013, p. 3). However, Green (2012) and his teaching staff admit that some further changes are needed. Green (2012) reports that if Clintondale could repeat their flip, he would take the flip more slowly, so educators and students could be more informed about and prepared for the changes in classroom routines (Rosenberg, 2013). Finally, Green (2012) advises flipped schools to make sure that computer labs and libraries have extended hours, both before and after school, so that students who do not own personal devices can view videos privately. In his final comments in an interview, Green believes that the flipped approach has been "a great equalizer", giving his at-risk students the best support for their education (Clintondale Community Schools, 2012).

Regarding outside metrics of Clintondale's case study, the initial grade 9 Science flipped class every student pass, in the school year of 2010-2011, compared to the previous year where only 54% of students in the grade 9 Science class passed (Pearson Education, 2013). In 2010, all of Clintondale High School flipped their classes (Green, 2012). In June of 2010, 54% of students passed, which increased to a 71% pass rate in June 2011, "representing an increase of 9 to 19 percentage points across the subjects" (Pearson Education, 2013, p. 2). In addition, in 2010-2011 after the school flipped their classes, discipline referrals declined by 66% compared to the previous school year (Pearson Education, 2013).

In their white paper assessing flipped learning, the research committee at the Flipped Learning Network (FLN) report that Clintondale High School saw very significant achievement increases on the Michigan State Merit Exam, compared to the

previous four years (Hamdan et al., 2013, p.8). The FLN reports that there were 10-25%

increases in achievement across all subjects after the school flipped (p. 8). Further, the

white paper supports Clintondale's statement that parents in the catchment area of

Clintondale prefer the flipped class, stating that "parent complaints also dropped after the

change in instructional models, from two hundred down to seven" in the school year

2010-2011 (Hamdan et al., 2013, p. 8). In 2012, 80% of grade 12 students at Clintondale

were admitted to a college or university (Pearson Education, 2013, p. 2). Finally, in a

school-wide survey in 2012, students at Clintondale self-reported they were more

interested in school and felt that they could be more successful learning in the flipped

classroom approach (Clintondale Community Schools, 2012), and over 85% of students

surveyed have reported that they prefer the flipped classroom approach to previous

methods of instruction (Pearson Education, 2013). The Flipped Learning Network

research team conclude that Clintondale is one of the most successful implementations of

the flipped classroom approach to date, illustrating the potential benefits of active

engagement, differentiated instruction and community inclusion which the flipped

classroom approach may provide (Hamdan et al., 2013, p. 8).

Seaboyer (2012): University of Queensland

The second case is at the University of Queensland in Australia, where Judith

Seaboyer, a professor in the department of English literature, decided to try flipping both

of her first year lectures, and her fourth year honors tutorials (Seaboyer, 2013). It became

clear to Seaboyer (2013) that students were not thinking critically about the texts, and so

she decided to flip her courses, even though student pass rates and student satisfaction

with the courses were high (Seaboyer, 2013, p.2). The case study of Seaboyer's courses is

prepared, and peer reviewed, by the Teaching and Educational Development Institute
(TEDI), for the purpose of guiding other instructors who wish to flip a large first year
lecture course (TEDI, 2012). Seaboyer (2013) identifies that the challenge her students
often face is that they tend to set low-level, completion-based reading goals for
themselves (Seaboyer, 2013). Among the reasons to flip her lectures, she lists increasing
student engagement and critical thinking skills, helping students learn to read deeply, and
collaborating with other professors (Seaboyer, 2013). The catalyst for flipping her classes
was "the need for well-designed solutions that encourage students to read complex and
sometimes confrontational literary texts effectively and be prepared for class discussions"
(TEDI, 2012).

Researching ways to help students read critically and mindfully, Seaboyer found
that the poor quality of student reading ability is a global problem, and specifically in
first-year university courses (Seaboyer, 2013). Preparation for Seaboyer's flipped courses
was funded by the *"Reading Resilience Program: A skills based approach to literary
studies"*; a program provided by the Australian Learning and Teaching Council
(Austalian National University, 2012). The goal of the Reading Resilience Program is to
"help course coordinators, lecturers and tutors in developing teaching approaches that
enhance students' engagement with the primary texts" (Austalian National University,
2012). Seaboyer (2013) hoped to better prepare her students by assigning for homework a
combination of readings, videos, and online quizzes so that they were ready to engage in
meaningful discussions in class (Austalian National University, 2012). To encourage
critical thinking, debates, and peer scaffolding, she introduced lecture videos that
provided commentary/gloss and historical information about the texts (Seaboyer, 2013, p.

2). Seaboyer (2013) implemented the flipped class approach by assigning reading tasks and questions during class, using online quizzes to track student's progress, and assigning participation marks to the online quizzes to ensure students are prepared for class. (Seaboyer, 2013). In addition, Seaboyer provided online tools for her literature courses, such as grammar and syntax resources, style guides, reading guides to "help students look more critically at the text", and forums for students to post and answer questions about the readings (Seaboyer, 2013).

In TEDI's case study of Seaboyer's courses, which was peer reviewed by the Australian National University, Seaboyer (2013) reports that the primary benefit of flipping her lectures was the high level of student engagement through "lively discussions and debates" (TEDI, 2012). Her perception is that the learning environment became a "happier as well as much more productive place to be" (Seaboyer, 2013). Seaboyer (2013) found that flipping her lectures provided her students affordances to build a community of practice and to collaborate with each other in versatile ways (Tedi EdTech, 2013). She concludes that the largest impact on changing the classroom dynamic came from the process of asking students to read, to think, and to take a quiz before coming to the lecture (Tedi EdTech, 2013). Further, Seaboyer is a strong advocate of formative assessment, and feels that the online quizzes and peer comments aid student progress directly (2013). In an interview with TEDI, Seaboyer reports that "my quantitative data reveals not only more, but also better reading, and qualitative evidence points to deeper, engaged learning" (Seaboyer, 2013).

Seaboyer states that she will certainly continue flipping her courses in the future; however, she will seek to improve the implementation of the flipped classroom approach

(2013). For instance, she would advise students at the start of the semester that homework is essential, because the in-class time is strictly for collaboration and discussion of the material (Seaboyer, 2013). Also, from the beginning of the course, she would encourage students to post comments on each other's online writing reflections, instead of adding this requirement halfway through the semester. Finally, she would assign "commenters" to make suggestions and give peer feedback about the online writing, so that more student's voices would be represented online (Seaboyer, 2013).

As a final consideration, Seaboyer was also interested in "the practical aspects of developing research communities among and between students, and staff members" (Seaboyer, 2013). She felt that through online communities of practice, she has been able to share her instructional resources and media with not only students, but also other faculty (Seaboyer, 2013). She advises that educators who are considering the flipped class approach should discuss strategies with other instructors who have previously flipped their classes (Seaboyer, 2013). In this way, she seeks to involve the larger academic community in her class's learning journey, and is amassing resources in order to support other English educators who wish to flip their lectures (Seaboyer, 2013). Finally, this case study is distinctive because the majority of flipped classes at the university level are in Sciences and Math; there are very few reports on flipped classrooms in large English literature courses (Bishop & Verleger, 2013).

Sainani (2012): Stanford University

The final case study is at Stanford University, where Sainani (2013) decided to try flipping her undergraduate course, "Writing for the Sciences". Sainani felt that her students were not receiving enough formative feedback or personal instruction, and she

wanted to explore whether a flipped class approach would provide these affordances (Sainani, 2103). Stanford Teaching Commons (2013) conducted a case study of Sainani's writing course to ascertain the effectiveness of the flipped class, compared to her previous semesters lecturing, as well as to report on the student's perceptions and satisfaction with the flipped course (Stanford Teaching Commons, 2013).

According to the Stanford Teaching Commons case study, Sainani's course redesign for her flipped writing class was driven by her goal to raise awareness of the importance of quality writing, and to improve the writing of every student in her courses (Sainani, 2013). Previously, Sainani felt that she did not have enough time in class to focus on modeling how to edit and organize writing (Sainani, 2013). Further goals for flipping her course included helping her students develop the ability to clearly communicate in writing, regardless of their educational background or area of study (Stanford Teaching Commons, 2013). Researching educational theories on peer collaboration and engagement, Sainani decided to focus on active writing exercises during class time, including peer editing and feedback workshops (Sainani, 2013). In 2012, she received a seed grant for the purpose of creating video lectures for her course (Stanford VPOL, 2013).

Over the summer of 2012, Sainani recorded 6 weeks of lecture videos, in which she focused on teaching syntax and talking through her thought process as she edited writing samples (Stanford Teaching Commons, 2013). Students were required to watch short lecture videos (up to 6 per week), take online quizzes, and "complete interactive editing exercises" before attending class (Sainani, 2013). During class time, Sainani (2013) focused on active writing strategies, prompting students "to write in class to give

them practice writing 'on the spot'", where they could receive feedback via peer instruction (Sainani, 2013). Sainani asked students to evaluate their peers' writing according to rubrics, and gave several examples of well-written paragraphs for students to analyze and discuss in class (STC, 2013). Sainani (2013) saw that students became much more engaged and felt less frustrated when they accepted the idea that writing is a process, and that editing and revisions are necessary (Stanford Teaching Commons, 2013). She found the peer grading activities in class particularly useful, saying that they were "much more valuable than a take-home editing assignment" (Stanford Teaching Commons, 2013).

Stanford Teaching Commons, through a combination of interviews with Sainani, end of term data on student outcomes, as well as end of term surveys completed by the students, decided that her approach to flipping her courses was successful (Stanford Teaching Commons, 2013). At the end of term, in a course survey administered by Stanford University, "77% of students agreed or strongly agreed with the statement 'I think that watching the lectures outside of class and then using class-time for in-class activities helped me to learn this topic better than a traditional lecture-based course would have'" (Stanford Teaching Commons, 2013). Students who did not prefer the flipped class reported that they believed it required too many writing assignments and was more work than similar writing courses that were not flipped (Stanford Teaching Commons, 2013). Sainani (2013) has found that bringing together students from diverse scientific backgrounds and writing abilities strengthens the in-class peer editing activities. Sainani has taught writing in the sciences for 10 years at Stanford, and sees it as a challenging course due to the dry content which is often outside of her student's subject area;

however, she believes the flipped course to be more engaging and effective than any other method of delivery (Stanford Teaching Commons, 2013).

The student body's response to Sainani's flipped class has been overwhelmingly positive, as reported on Stanford's end of term survey, with many students offering accolades and suggesting the course to other students (Stanford Teaching Commons, 2013). Sainani (2013) noted that with her flipped classes there was more time for a professor to speak with students and help them make corrections, and there are more opportunities to see students learning and improving, which is rewarding for her (Stanford Teaching Commons, 2013). Sainani reports that many students have told her that they enjoy the flexible pacing afforded by the flipped course, and that they are enthusiastic about the online components of the course (Stanford Teaching Commons, 2013). This case study is also noteworthy because Stanford has requested Sainani convert her flipped course to an open access online course, and provide it free to the public, in keeping with Stanford's goal of providing global education.

Educator perceptions of the flipped classroom

From these illustrative case studies, educators' perceptions of the flipped classroom approach are that it provides flexibility and affordances of engagement to demographics with at-risk students; encourages students to read deeply and critically; enables them to come prepared for class discussions and debates; and allows for more educator modelling and peer feedback (Green, 2012; Seaboyer, 2013; Sainani, 2013). These three educators have reported higher student satisfaction and engagement; more time for educators to advise and correct students; and more student achievement, measured by both their grades and their cumulative course knowledge (Seaboyer, 2012;

Sainani, 2013). In addition, these educators have found the flipped classroom approach to be more interesting and engaging for educators themselves (Pearson Education, 2013; Seaboyer, 2013; Stanford Teaching Commons, 2013).

The most noteworthy challenge of the flipped classroom approach in these three case studies has been the amount of preparation time that the flipped class requires, as well as the extra time for marking and tracking online comments (Sainani, 2013; Seaboyer, 2013). Concern over the quality and length of lecture videos has resulted in a general consensus at Stanford that not every educator is suited to making their own videos, and that videos should be kept to 6-10 minutes each (Stanford Teaching Commons, 2013). Due to the fact that video lectures are content-rich and concise, Sainani (2013) believes that 10-minute videos convey enough information for students to take in at one time (Sainani, 2013). Despite the shorter videos, students in these three case studies still reported that the flipped class is more work compared to other course formats (Pearson Education, 2013; Sainani, 2013, Seaboyer, 2013; Stanford Teaching Commons, 2013). Furthermore, in each case, the provision of extra funding and/or a sponsor for educational media tools were needed. This means that without a framework of financial and administrative support, it is very difficult to prepare a flipped class (Stanford Teaching Commons, 2013). In conclusion, the strengths of the flipped classroom approach, as evidenced in these case studies, include: increasing engagement and personalization of education, advocating critical thinking skills, sharing resources between educators in a global community of practice, and providing free public education that supports learning worldwide.

Chapter Five: Discussion and best practices

Discussion of research questions

The literature review and the discussion of case studies in this project have been guided by my four research questions, as introduced in Chapter One: 1) What are the benefits and challenges of the flipped classroom approach? 2) What are the best practices for implementation, as grounded in pedagogical theories of socio-constructivism and active learning? 3) What are the student's and the educator's perceptions of the shift in authority that the flipped classroom requires? 4) In what ways does the flipped classroom approach provide a balance of content delivery and active learning?

In the previous four chapters, I have discussed the literature surrounding the flipped classroom approach, including: the definition of the flipped classroom approach, theoretical framework, affordances, challenges, case studies highlighting personal responses and data regarding student achievement, and both the students' and the educator's perspectives. This chapter will summarize and synthesize the conclusions from the literature reviewed in Chapters Two and Three, address some of the concerns and challenges, review best practices for implementation, and consider future directions of the flipped classroom approach.

Discussion of the concerns

In revisiting the goals of the flipped classroom approach, educators who have chosen to flip their class do so because they want to create an active and engaged classroom environment. The flipped classroom approach provides affordances for one-on-one instruction, differentiated instruction, critical thinking, and community

involvement. In Chapter Three, some concerns about access to time and technology, professional development and media literacy, as well as a balance between content delivery and experiential learning were raised.

Regarding access to technology, some solutions presented in the literature have been to survey students to discover how many have personal devices, consider whether libraries and computer labs have extended hours and enough machines, and inform students if the school has a device loaning program (Green, 2012; Hamdan et al., 2013; Hanover Research, 2013). In the literature reviewed, access to technology was a concern in some demographics (Socol, 2012); however, low socio-economic status did not indicate a lack of access to devices, as was evidenced by the Clintondale case study, among others (Green, 2012; Hamdan et al., 2013; Sams, 2011). However, it is a consensus that it is in an educator's responsibility to ensure that every student has access to the internet before flipping their class; and it may be the case that in areas with low access, the flipped class is not a reasonable option (Bishop and Verleger, 2013; Hanover Research, 2013; November & Mull, 2012). The fact remains that media literacy is an important transferable skill for students to develop, and that not including media in one's course could actually increase the "digital divide" (Hanover Research, 2013). Green (2012) posits that including educational media in his school and having educators help students with their work in class allowed students a more "equal education" (Green, 2012).

The challenge of access to time, or the large amount of preparation that the flipped classroom approach requires, is a major consideration. Many people reported that flipping a course takes many hundreds of hours of extra time (Bennett, 2012; Bergmann

& Sams, 2012; Curtis-Dickenson, 2012; Fulton, 2012; Seaboyer, 2013; Sainani, 2013).

Educators can save time by having a dedicated IT team (Sainani, 2013), flipping a course

slowly over a period of several semesters (Sams, 2012), and including student sourced

and generated content (Sainani, 2013).

The flipped classroom approach may not be welcomed by some educators as this

approach requires a baseline of technological knowledge as well as specific knowledge

about educational media programs and video recording (Sams, 2011). Sams (2011)

comments that when it comes to educational media programs, an educator should keep it

simple. The flipped classroom should implement "simple, accessible, familiar

technology" for the sake of both the educator and the students (Hanover Research, 2013).

There is a continuing debate in the literature as to whether educators and students should

create their own videos (Wees, 2011; Sams, 2011) or to use professionally made videos

in a series, for reasons of quality (Hanover Research, 2012; Strayer, 2007). If an educator

feels comfortable making their own videos or using students' videos, this is preferable;

however, if personality and quality are a concern, then professional videos are a better

choice (Sainani, 2013; Strayer, 2007).

Seaboyer (2013) has found that it is difficult to incorporate active learning and

project-based learning in huge lectures, although Mazur (2012) advocates peer instruction

in this case. In addition, some courses are more suited to the flipped classroom approach

than others; courses with large amounts of complex content, or where student attendance

is low are not recommended for flipping (Stanford Teaching Commons, 2013). Further,

some educators prefer no direct presentation of content, either through in-person lecture

or videos (Jenkins, 2012), sometimes for the reason that it intrudes on students' personal

and family time (Neilson, 2012; Socol, 2012). Other educators insist on being present at the time students are first introduced to content so that they can provide support (Kihlstrom, 2011; Pettigrew, 2012). Indeed, some professors do not trust students to watch the videos for homework, so they advocate lecturing in class (Pettigrew, 2012; Strauss, 2012). However, it is an important value of the flipped classroom approach that students learn not only media literacy skills, but also personal study skills with the goal of independent and lifelong learning (Seaboyer, 2013; Sainani, 2013). In entirely removing responsibility to complete work on their own, educators could be preventing students from learning accountability and independent study skills (Bergmann & Sams, 2012; Green, 2012, Seaboyer, 2013).

Finally, the concern that the flipped classroom approach could commercialize learning is prevented by the educator's good judgment. Wees (2011) and Hertz (2012) object to educators choosing to use professional video series, as they are concerned that the educator will become disconnected from their students' needs and may become unable to tailor their course content. Whether an educator is choosing a textbook, a video series, or a novel, the selection of content must be mindful and suited to the course learning outcomes (Bergmann & Sams, 2012). Students have reported that they generally prefer professionally made videos except in cases where they are asked to create content as a course project, where they prefer their own videos (Johnson & Renner, 2012). In addressing the concerns and challenges of the flipped classroom approach, Sams (2011) has stated that no approach to education can supersede the expertise of a qualified educator and that no educational model can be implemented successfully without passion and energy on the part of the instructor (Sams, 2011).

Best practices and conclusions

Best practices for course preparation.

Most of the literature on the flipped classroom approach is at the secondary and post-secondary level, and research into implementing the flipped classroom approach at elementary and middle-years classes is not well-researched nor represented (Bergmann & Sams, 2012). Hamdan et al. (2013) state that flipped learning might be appropriate for certain lessons or units in elementary school classes, but not for entire classes; younger learners may need more support and context at the time of content introduction (p. 12). However, more research in this area is needed before any conclusions can be reached about the benefits of the flipped classroom for primary education (Bergmann & Sams, 2012).

Before choosing the flipped classroom approach for their course, educators need to reflect on several questions: 1) Will the students be receptive to change? 2) Will the content translate well into a new format? 3) Is technology accessible? 4) Is this approach to education equitable for all students in my course? (Hanover Research, 2013).

When preparing to flip a class, educators should next make sure they have enough time to set student learning outcomes, prepare video lectures, select a class forum, and design flexible projects and activities (Bergmann & Sams, 2012). On the first day of a course, the educator should survey the students on media literacy and access to technology. These survey responses should inform their decisions on how to implement the course (Camel, 2011, p. 34).

In addition, the educator should communicate the goals and rationale of the flipped classroom approach to students directly (Schell, 2013). They should discuss the

affordances and the challenges to the flipped classroom approach openly, so that students can understand the value of this approach (Strayer, 2007). Educators should emphasize that watching homework videos is mandatory for the course, so that students are introduced to the content and are ready to participate in class (Seaboyer, 2013). As the course progresses, an educator should be mindful of student feedback; students should be encouraged to rate videos, post comments and questions, as well as contribute to projects and activity designs (Sainani, 2013). As a final point for consideration, during the first week of a course an educator or the school library can offer a workshop series on how to use the educational media tools and "how to learn online" (Hanover Research, 2013).

Best practices for course structure.

Best practices for a flipped classroom structure involve considering Dewey's (1902) assertion that there should be a balance between content delivery and active engagement (p. 56). Some of the best practices for media content delivery as homework include: video lectures, historical and contextual resources, interactive video assignments, quizzes, forum assignments, online peer feedback, educator glosses and think-alouds, auto-graded assignments, editable wikis, and student sourced/created videos (Bergmann, J. & Sams, 2012; Hamdan et al., 2013; Marcey & Brint, 2012; Miller, 2012; November & Mull, 2012).

Lastly, a high amount of formative educator feedback and guidance is an important consideration of the flipped classroom approach. Educator support and facilitation methods include: 'just in time' teaching, one-to-one coaching, written/verbal formative feedback, differentiated video and project assignment requirements, pacing adjustment, and analyses of online data such as students' quiz scores and comments

(Fulton, 2012; Hamdan et al., 2013; Mazur, 2009; Sams, 2011; Sainani, 2013; Seaboyer, 2013; Tucker, 2012).

Best practices for accountability and assessment.

Schell (2013), who is an educational writer for The Peer Instruction Network (PIN), asserts that educators should not "teach in a new way and assess in an old way". She believes that providing rapid formative assessment can help students keep accountable for their work, actively engage in class, and assess where they are in the learning process (Schell, 2013). When an educator views and comments on students' work more frequently, it can "encourage students to actively engage in video lectures and increase educator's responsiveness to student's needs" (Hanover Research, 2013). In addition, frequent low-stakes assessments can provide feedback, encourage responsible study habits, and prevent students from having to cram for final exams (Sainani, 2013). Schell (2013) states that the summative assessment for a flipped classroom approach should be conducted in accordance with current research in pedagogy regarding: assessing projects and group work, as well as creating reflective questions and writing rubrics (Schell, 2013).

Further, engaging students and keeping them on task as the course progresses often means asking students to complete assignments prior to class. Educators can require students to take short quizzes, complete reading questions, or post questions and comments on forums regarding the video content (Seaboyer, 2013). Some research has found that students who tend not to complete homework in a traditional model of instruction also do not complete their video homework in a flipped classroom approach (Hanover Research, 2013). However, the above strategies for student accountability may

help students become involved and keep up their learning momentum (Hanover Research, 2013). Educators can also begin the class with a short recap of a video, or ask students to discuss questions about the videos, which can provide encouragement to do the work (Green, 2012; Sainani, 2013). A flipped course should be structured so that participation for in-class activities requires that students be familiar with the video course content, which creates a demonstrated need for students to watch the videos (Seaboyer, 2013).

Flipping the classroom can also assist administration with assessing and adjusting course content, facilitating the course review process. Hosting course content online "opens the doors to our classrooms and allows the public in" (Bergmann & Sams, 2012, p. 31). A part of this public audience could be other educators, department heads, and administration. The accessibility of content videos means administration can access content to look deeper into program alignment and curriculum development (Saltman, 2011). In his article *Flipping for Beginners,* published by Harvard Online, Saltman (2011) states that the online data from a flipped class can allow a professor to improve their course, gather student feedback, and keep permanent records of student achievement. An educator can continually review and revise a course toward better integration of video content and in-class activities by comparing course data. By analyzing data from online quizzes and forums, and asking for student feedback, an educator has the advantage of concrete data on which to suggest curriculum changes (Saltman, 2011). In this way, data from a flipped course can help strengthen future iterations of the course, and if this data is shared, it can benefit the educational community as a whole (Saltman, 2011).

Directions for future research

Wright (2012) believes that although the use of video as content delivery may fade, the value of one-to-one instruction and active learning will not. She believes that the flexibility of the flipped classroom approach will offer students more choice in both content delivery and open project work, and that content can and should be delivered in a variety of ways. She suggests that there is a need to train all educators in EdTech, and in how to use educational technology, media, and programs, as many models of instruction require the use of educational media tools (Wright, 2012).

In their literature review of more than 30 case studies, Bishop and Verleger (2013) state that qualitative evidence suggests "student learning is improved for the flipped compared to traditional classroom" (p. 12). However, they call for more in-depth and quantitative research into thorough assessment of whether student learning outcomes are met, how the flipped classroom approach may change student's learning styles, and how this change in learning style may impact student's future educational outcomes (Bishop & Verleger, 2013). They also recommend that researchers "consider the theoretical framework used to guide the design of in-class activities" in order to best incorporate video recording and active learning project design (p. 12).

In their white paper discussing current research on the flipped classroom approach, Hamdan et al., (2013) find that more "qualitative and quantitative research needs to be done to identify how the potential of the model can be maximized" (p.6). Hamdan et al. (2013) discuss that the flipped approach can be one way to create a learner-centered environment, yet they note that there are many other ways to provide collaborative and engaging activities in the classroom, suggesting that research

comparing the flipped class to other classes which provide active learning is needed (p. 7).

Herreid and Schiller (2013), in their article reviewing thirty flipped class case studies, state that there is a need for "direction, standardization, and sharing of cases and videos" among educators (Herreid & Schiller, 2013, p. 64). While some educators object to standardizing course content (Hertz, 2012; Wees, 2011), and do not accept the lack of flexibility that standardization implies, others wish to share content and resources for the benefit of both educators and students, arguing that sharing is not standardizing (Mazur, 2009; Sainani, 2013). As the world becomes more connected, and educational resources are more widely shared, educators will gain valuable insight into other instructor's teaching practice. Beyond the scope of research into the flipped classroom approach, research is in progress regarding the ways in which educational media will impact the future of education, and is the source of many current longitudinal studies (Crouch & Mazur, 2001; Sainani, 2013; Stanford Teaching Commons, 2013).

To conclude, when reviewing the literature on the flipped classroom approach, several areas of research are missing. It may be valuable to assess how the flipped classroom could benefit hands-on courses in the trades, as more class time could be used for experiential learning. In addition, several issues have not been addressed, such as the long-term requirements of video content improvement, keeping videos current, and whether the initial time investment of the flipped class affords less prep time in the future. Finally, questions about video content ownership and negotiation of content rights between an institution and an educator may be a future issue of concern. As the flipped

classroom approach to education advances, best practices for integrating educational

technology and engaging practice will continue to emerge.

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