Learning, Technology, and the Flipped Classroom

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LEARNING, TECHNOLOGY, AND THE FLIPPED CLASSROOM

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Abstract

Many educational institutions are turning toward technology to bridge an ever-growing gap between what and how students are learning inside and outside of school. In my literature review, I have documented some of the experiences and difficulties of teachers, professors, and researchers who are choosing to embrace the concept of "flipping the classroom." I have come to conclude through the research that this transition to 21st century learning requires immense preparation and learning on the part of the teachers. This difficulty, given time, proper professional development, and perseverance, however, will no doubt be overcome, and learning for both student and teacher inevitably will become relevant, deep, active, and meaningful. The education system is valuable, not to be misunderstood as unnecessary, in the wake of a digital generation with access to information at ones fingertips. Education-system-foundations have the responsibility to provide and maintain a relevant, structure system, and environment for learning. If the tools of a society have changed so drastically then, logically, the tools we use to educate should also change. I believe one of those tools is the flipped classroom.

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It is quickly becoming common knowledge that technology has, and continues to have, a growing impact on most areas of human daily life, interaction, and learning. One might say that you live in either a box or some remote area that has not caught up to the information age.

Marc Prensky (2001) has written numerous books and articles about "digital natives." Prensky defined digital natives as "Native speakers of technology, fluent in the digital language of computers, video games, and the Internet" (p. 1), and he defined digital immigrants as "those who were not born into the digital world. We the (digital immigrants) have adopted many aspects of technology, but just like those who learn another language later in life, we retain an "accent" because we still have one foot in the past.

Prensky explored the impact and differences on children growing up never knowing a world without technology. These digital natives receive daily input from information all over the world, readily available as fast as their fingers can type. It is now becoming apparent that "digital immigrants" in education are in need of a paradigm shift to catch up to a generation that has already shifted into a 21st-century world. This requires new tools and new designs for learning (Prensky, 2005). Prensky advocated changing the way education systems deliver education. He suggested that educators need to become innovators, abandoning comfort zones and instincts that come from a digital immigrant's, predigital experience. He encouraged teachers to involve students more in design and decision-making.

Vaughan (2014) discussed the teaching of the younger generation, emphasizing the work of Prensky:

Prensky discussed how the historical purpose of school was to educate students about the world outside of their own small town. Teachers opened the eyes of their students to

places they had never seen, languages they had never heard, and stories that were timeless. The students of today's higher education, as well as K-12, classrooms are "plugged in" to a wider world, full of instantaneous knowledge, communication, and collaboration. The only place where they may not be able to embrace this new and exciting world seems to be school. (p. 26)

Realistically, however, teachers must teach the curriculum that is given to them. The emphasis of this project is not to throw the whole curriculum out the window and teach whatever we think students want to learn, but it is apparent that we must start somewhere. This project is about starting somewhere, with the given curriculum, and adapting to the future needs of our students. It is about changing the tools we use in teaching them with technology, collaboration, engagement, and ultimately teaching them, how to educate themselves.

The purpose for this project is twofold. The primary purpose is to examine the current research on the concept of blended learning, the flipped classroom, and its impact on learning. Research will explore success, satisfaction, participation, motivation, and challenges.

The second purpose is to provide a basic guide for teachers who wish to embark on this much needed paradigm shift in education. The guide will provide a teacher with an introduction on how to "flip" his or her classroom, some advice on how to overcome challenges that may be encountered, and resources available to teachers to support a flipped classroom.

Technology

There is still much debate about the level of impact technology should have on education. It is clear however, that technology has already had some impact (Tamim et al., 2011).

In their second-order, meta-analysis review, Tamim, Bernard, Borokhovski, Abrami, and Schmid (2011) summarized 40 years of research surrounding the question "Does computer technology use affect student achievement in formal face-to-face classroom, as compared to classrooms that do not use technology?" (Tamim et al., 2011). They focused specifically on the impact differences of students with supplemented technology use, versus students with nontechnological traditional instruction. Tamim et al. narrowed their criteria of meta-analyses from present to no further back than 1985. They used student achievement as an outcome measure, and reported their outcome as an average effect size. Effect size is defined as "the metric introduced by Glass (1977) representing the difference between the means of an experimental group and a control group expressed in standardized units (i.e., divided by a standard deviation)" (Tamim et al., 2011, p. 11).

The results from 25 different meta-analyses indicated that students in school environments who were supported by technology performed 12 percentile points higher than students in a traditional school environment. Furthermore, when computer technology was used as a support to instruction (Computer Assisted Instruction or CAI), it had a significantly higher average effect size than direct instruction using technology (Computer Based Instruction or CBI), which found an effect size of 0.31 (Tamim et al., 2011). The authors noted, "Taken together with the current study, there is a suggestion that one of technologies' main strengths may lie in the supporting of students' efforts to achieve rather than acting as a tool to deliver content." (p. 17).

Learning

The most influential person who has recently contributed to leaning, with his metaanalyses studies of what makes a difference on learning in the classroom, is John Hattie. Hattie is a researcher at the University of Melbourne in Education. He has written many books on his research and has synthesized more than 800 meta-analyses spanning 15 years of research. The focus of his research investigated the classroom influences that impacted student learning. This included student, teacher, and environmental influences and the magnitude of influence has been measured using a scale of effect size (Zegarac, 2013). Hattie defined effect size as "A continuum and a scale (effect size) to ascertain which of the many possible influences affect achievement." (Hattie, 2009, p. 6) Hattie synthesized 31 meta-analyses, which included 17,952 studies, and 352 effect-sizes (Hattie, 1999). He found that the average effect size of successful influences in the classroom that increased learning was an average of .40. This number represents a medium effect size.

One particular effect size that caught my interest, for the purpose of this project, was the impact of computers on learning in the classroom. The overall effect size was .31. Although this appears to be less effective than the desired .40, when he looked more deeply into the analysis and teased out differences of level of education, sex, and subject areas, he found that this .31 represented the advancement of student's achievement by three months or 15%. He also noted that 65% of the effects were positive, average student levels of achievement were 62% compared to no computer use, and that effect size decreased with age. Primary students (.48), Secondary (.32), University (.25). What this means to me is the biggest impact for achievement would be to incorporate computers at the primary levels. He also found differences between sexes at the secondary level. However there were no differences seen at the elementary level (Hattie, 1999). Below, the top teacher influences on achievement, and the related effect size are explored.

	No. of Effects	Effect-Size
OVERALL EFFECTS	165,258	.40
Reinforcement	139	1.13
Students prior cognitive ability	896	1.04
Instructional quality	22	1.00
Instructional quantity	80	.84
Direct instruction	253	.82
Acceleration	162	.72
Home factors	728	.67
Remediation/feedback	146	.65
Students disposition to learn	93	.61
Class environment	921	.56
Challenge of Goals	2703	.52
Bilingual programs	285	.51
Peer tutoring	125	.50
Mastery learning	104	.50
Teacher in-service education	3912	.49
Parent involvement	339	.46
Homework	110	.43
Questioning	134	.41

Figure 1.Teacher influences on effect size. Reprinted from *Influences on student learning*, *presented at the inaugural lecture: Professor of education* (pp. 9-10), by J. Hattie (1999, August) University of Auckland, New Zealand.

During his Inaugural lecture to his colleagues at the University of Auckland on August 2, 1999, Hattie spoke about influences on student achievement in the classroom. He pointed to the effects that have had the biggest impact; Innovation and Feedback. Innovation, because it is constant and deliberate, and it was underlying in all the other effects found. Feedback particularly, because of its singular impact. More specifically, providing feedback on the how and why a student understands or does not understand, impacts learning well beyond the average. Important also is the feedback on learning expectations. He went on to say how reducing class sizes, homework, and providing computers, does not directly relate to higher effect size, but rather, indirectly provides for more opportunities for feedback. Therefore when combined with other influences or methods in the classroom, will result in a greater than average effect size (Hattie, 1999).

Hattie also spoke about his research and where it was heading for the future of learning. One of the highlights of his lecture was the acknowledgment of a tremendous amount of information that is already known about what creates student success in the classroom. He brought up a very important point that linked psychology to education. He said:

We know that students in lectures learn most in the first 8 minutes, only recall three things at most after one hour, and that if the content does not shake their prior beliefs they file away the fascinating facts in the deepest recesses of their brain, if at all. (Hattie,

1999, p. 1)

Hattie claimed that most models of learning observable in schools today are not based on evidence-based practice, but rather on what is perceived to work for individual teachers, and has some bearing on what is expected in the curriculum. He emphasized the need for evidencebased practices of statistical effect size.



Figure 2. Distribution of effect sizes across all meta-analyses. Reprinted from *Visible learning: A synthesis of over 800 meta-analyses relating to achievement* (p. 6), by J. Hattie (2009). London, England: Routledge.

In a separate interview on teaching, learning, and leading, Hattie talked about how in smaller size classrooms the teacher is the one who talks the most. This idea of talking more provides more opportunity to impart knowledge to the students. What they found to be effective is that the less teachers talk and allow more time the students to process their learning, the greater the effect size (Zagerac, 2013).

One of the biggest ideas emphasized in that interview, and that has recently become a buzzword in the community of education, was "facilitator." Behind this word is the idea that the role of teachers is changing. We are encouraged to move away from the directed front-of-the room instruction, to becoming more of a guide to students through their self-directed learning. Hattie suggested that we need to work with the prior-knowledge of the students, and implement this into our lessons and guidance. This contributes to what Hattie defines as the difference between an experienced teacher and an expert teacher (Zagarac, 2013).

Another idea, focused on how contributions from the home was an important key to the success of the students. Connecting the home with school, teaching the parents what the students are learning and the language around that. This increased the engagement of parents, which in turn increased the engagement of students in their own success (Zagarac, 2013).

I attended a conference this year held in February, 2015, organized by the LCEEQ (The Leadership Committee for English Education in Quebec), at which John Hattie was the keynote speaker. What stood out for me most was how he emphasized that we should not keep implementing new "trendy" ideas and programs for teaching. We should be expanding and emphasizing what already works, and make it work better.

Although this idea of a flipped classroom is new, the idea behind it is not. In order to discuss the idea of a flipped classroom, I must first address the concept of blended learning, in

which flipped classroom makes its foundation.

Blended Learning

The Innosight Institute, a nonprofit think tank, devoted to research in education and harnessing new technologies (disruptive innovation), offered this definition of blended learning:

Blended learning is...

and



a formal education program 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

at least in part at a supervised brick-and-mortar location away from home.

Figure 3. Definition of blended learning. Reprinted from *Classifying K–12 blended learning* (p. 3), by H. Staker & M. B. Horn, 2012. Mountain View, CA: Innosight Institute.

The first component of the definition emphasizes that education should be done over the internet (online learning, virtual learning, cyber learning, and e-learning). The second portion specifies that learning must be supervised by someone in the profession of teaching (Staker & Horn, 2012).

Graham (2013), in his handbook on blended learning, has said that blended learning has increased in popularity, a 2011 search had revealed hundreds of journals on the topic. Although the concept of blended learning has existed more so in higher education in previous years, it is more recently being developed at the K-12 level (Graham, 2013).

Staker and Horn (2012) went further to identify four models of blended learning,

encompassing programs that are emerging across the K-12 domain we are seeing today.



Figure 4. Definition of blended learning. Reprinted from *Classifying K–12 blended learning* (p. 2), by H. Staker & M. B. Horn, 2012. Mountain View, CA: Innosight Institute.

For the purpose of this report, I will limit the exploration to the rotation model, defined

as:

A program in which within a given course or subject (e.g., math), students rotate on a fixed schedule or at the teacher's discretion between learning modalities, at least one of which is online learning. Other modalities might include activities such as small-group of full-class instruction, group projects, individual tutoring, and pencil-and-paper assignments. (Staker & Horn, 2012, p. 8)

More specifically, I will focus on a subset of the rotation model, the flipped-classroom model defined as:

A rotation-model implementation in which within a given course or subject (e.g., math), students rotate on a fixed schedule between face-to-face teacher-guided practice (or projects) on campus during the standard school day and online delivery of content and instruction of the same subject from a remote location (often home) after school. The primary delivery of content and instruction is online, which differentiates a Flipped classroom from students who are merely doing homework practice online at night. (Staker & Horn, 2012, p. 10)

Flipped Classrooms

The term flipped classroom has also been defined as:

Inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa. The use of learning technologies, particularly multimedia, provides new opportunities for students to learn, opportunities that are not possible with other media. (Kim et al., 2014, p. 82)

The term flipped teaching has been defined as:

a pedagogical approach to blended learning in which the typical activities of classroom lectures followed by homework in traditional teaching procedures are reversed in order, and often supplemented or integrated with instructional videos. (Hung, 2015, p. 39)

The definitions are used describe a paradigm shift in the methods of teaching and learning that have existed in the traditional classroom setting. Other terms that exist to describe the method over the past decade are "Flat classrooms," "Blended learning classrooms," "inverted learning," "inverted classrooms," and "just-in-time teaching (JiTT)," to emphasize the students preparation before class. The purpose of this method is its potential value. It promotes studentcentered learning, and addresses challenges faced in the daily traditional classrooms. This is done by providing more class time for active learning and providing accessibility to technology to support a blended learning approach. It also provides students with the ability to allocate their time and pacing of online learning outside the structured class time (Kim et al., 2014).

An Example of Flipped Classroom Innovation

In Byron Independent School District 531, in Minnesota, the school mathematics department was trying to re-order their textbooks for the new year. They agreed that the textbooks available did not cover the curriculum in its entirety. They also knew that there were no funds to order new promising textbooks. They were in the third bottom level for state funding, and were facing budget cuts of 1.2 million dollars. The mathematics department proposed an innovative solution, committing to a textbook-free curriculum (Fulton, 2013).

They first sat down every week to tease apart the math curriculum and rebuild it. The second step was to create lesson plans, keeping in mind what was most challenging for the students. Together, they created video lessons on topics with the classroom Smart Board and subsequently posted them to YouTube. Classroom lessons were then assigned for homework. In class, the teachers spent time helping the students and providing follow up problems (Fulton, 2013).

The school applied for a grant over the summer for software to create worksheets and tests. They further created a free site for each class from Moodle. Upon return to school in September 2010, the teachers piloted their innovative method of instruction that proved to be challenging while they were still working out the kinks (Fulton, 2013).

After the first year they noted the student's enthusiasm and improved mathematics results. They continued to grow their curriculum based on the flipped classroom model. Concerns arose over the online availability and the unblocking of YouTube. However, it was agreed that students needed to work responsibly with the technology that was available to them in order to be adequately prepared for their future. As a result, the district lifted its ban on cell phones and YouTube (Fulton, 2013).

The contributing factor to Byron's success however, was not just about the technology. The teachers were given the opportunity to be innovative and explore new ways of demonstrating their success in practice. They were given time, focused on the collaboration of their peers, adjusted school schedules, and grants to work through the summer. Some of the money saved from having digital instruction was invested in teacher's professional improvement related to learning new techniques for using technology (Fulton, 2013).

After two and a half years, the results were promising. Byron's flipped classroom students out-scored other traditional learning students in almost every case. Students were surveyed on their satisfaction, and all results were positive. There is now a waiting list for students from other districts wanting to enroll in these classrooms (Fulton, 2013).

Current Research on Flipped Classrooms

We will look at the most recent research that has been conducted using the flipped classroom. Beginning with higher education, the following studies looked at flipped classrooms in a variety of settings with a variety of purpose.

A gap between education and the university level exists in the way we theoretically train individuals for their future professions (Missildine, Fountain, Summers, & Gosselin, 2013). Missildine et al. proposed a paradigm shift. Their focus was in the nursing profession. They noted that students are generally comfortable and familiar with traditional lecture methods. They suggest implementing new innovative methods that would supplement lectures and would meet the needs of integrated clinical reasoning, teaching in context, and teaching for a sense of salience.

A quasi-experimental design was used in two health courses running consecutively in semesters. Sixteen masters prepared faculty members taught the courses through interactive television. Three approaches were used: lecture only (LO), lecture plus a lecture capture backup (LLC), and lecture capture plus the innovative flipped classroom approach (LCI). The lecture captures were recorded using previous semester lectures with updates to content as needed. The third method used no real-time lectures (Missildine et al., 2013).

They had two research hypotheses. The first was to examine differences among the three methods. They found that average test scores ranked significantly higher for the LCI group, a result of an addition 47 students receiving a passing grade. The second assessed student satisfaction scores across the three methods. The LCI groups' satisfaction was less than the LLC group, however they noted a limitation was that the survey was designed by administration and lacked validity (Missildine et al., 2013).

The study found the advantage of this approach was that students were engaged in the case studies. Using lecture capture and working with small groups of students using simulations and other learning activities, provided students with a way to integrate theory with practice. Ultimately, they felt that the approach furthered the formation of the student as a professional (Missildine et al., 2013).

Kim, Kim, Khera, and Getman (2014) examined three undergraduate university classrooms in southern California (USC) using the flipped approach. They based their study on a

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RCOI framework. The RCOI framework theorizes four elements that contribute to success in the learning environment. They include cognitive presence, social presence, teaching presence, and learning presence (Kim et al., 2014).

1	Table 1 Revised community of inquiry framework.					
	Type of Presence	Definition	Example			
	Cognitive Presence	Knowledge building involving critical and creative thinking	Challenging tasks, the cyclical process of practical inquiry, and a multivariate measure of critical and creative thinking			
	Social Presence	Encouraging collegial settings	Discourses among students and instructor that promote positive affect, interaction, and cohesion			
	Teaching Presence	Instructional orchestration appropriate to the learning environments	Task sets such as organization, design, discourse facilitation, and direct instruction			
	Learner Presence	Self- and co-regulation of learning	Self- and co-regulatory strategies that marshal thoughts, emotions, motivations, behaviors and strategies			

Figure 5. Community of inquiry framework. Reprinted from The experience of three flipped classrooms in an urban university: an exploration of design principles, by M. K. Kim, S. M. Kim, O. Khera, & J. Getman, 2014, *The Internet and Higher Education, 22*, p. 42

The purpose of the study was to examine the effectiveness of the flipped approach, as well as, proposing a new design framework based on results. In summary, 9 design principles listed below were found to be effective as a result of the study (Kim et al., 2014).



Figure 6. Community of inquiry framework. Reprinted from The experience of three flipped classrooms in an urban university: an exploration of design principles, by M. K. Kim, S. M. Kim, O. Khera, & J. Getman, 2014, *The Internet and Higher Education, 22*, p. 44.

In another case study that examined university student engagement and the flipped classroom using a workshop approach, Jarvis, Halvorson, Sadeque, and Johnston (2014) noted

that flipped classrooms may in fact facilitate deep learning, and subsequently, the practices promoted by a flipped classroom, advocate active learning and are supported by the social constructivist theories of learning (Jarvis et al., 2014).

The study suggested a large-class engagement model (LCE), focused particularly on student participation. Students achieved higher grades when they adopted the deep-study learning approach. It was also suggested by the authors that results for enhanced learning could present higher, if this method was adopted in secondary education.

A further study conducted by Melinda R. Hodkiewicz (2014) in Australia explored the relationship between participation in preworkshop activities and performance in a flipped-learning classroom in larger classes. The 407 participants were both domestic and international students, and included 64 women enrolled in a bachelor or master's program in mechanical and chemical engineering. Students who generally did well at the university level in traditional classrooms, also did as well (not better) in a flipped learning environment. This, they believed, was due to the fact that students have already developed and routinely apply the appropriate skills to a different learning environment. The interactive nature of the workshops allowed students to cover material at their own pace, and was consolidated nicely during the weekly lecture sessions.

Considerations made by Hodkiewicz (2014) included the idea that despite effectiveness, flipped classrooms have been criticized for the workload involved. Preparation in the beginning takes time to develop, (i.e., pre-recorded materials, quizzes, etc.) However, the authors expressed that once the materials are done they can be re-used and updated. They emphasized that more needs to be done to support international students.

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A study conducted by Lujan and DiCarlo (2014) focused on using the idea of the flipped classroom and student-centered learning as a tool for taking exams. The participants were enrolled in a post-baccalaureate program in medicine at Wayne State University. The program identified students in underrepresented backgrounds who had the potential to succeed in medical school but were not chosen. Thirty-five percent of the material was not covered in class, and required the students to seek elsewhere for the content.

Touching on the idea of higher-order learning (Hung, 2015), students had to use prior knowledge coupled with new knowledge they were seeking in order to make connections to answer the complex questions being asked of them. Students were informed that although all the material would not be covered, they would be tested on it, and that the exam would be collaborative (Lujan & DiCarlo, 2014).

During the post-exam review, students along with the professor deconstructed the exam questions. Students explored why answers were right or wrong and maintained an understanding of principles and concepts. Students were evaluated on performance (50%) and behavioral parameters, which included participation and effort (50%).



Figure 8. Student Exam Scores. Reprinted from The flipped exam: creating an environment in which students discover for themselves the concepts and principles we want them to learn, by H. Lujan & S. DiCarlo (2014), *Advances in Physiology Education, 38*, p. 340.

Lujan and DiCarlo (2014) found that material that was covered still scored significantly higher that what was not covered, however, they noted that the material covered still scored high, which they interpreted to suggest that students do not need to cover all material in class to learn. They also emphasized that collaborative learning helps prepare students for their professional lives.

Baepler, Walker, and Driessen (2014) found in their study of flipped classrooms in large chemistry lectures in a university in Minnesota, reducing auditorium seat time and providing a more active learning classroom, supported results that showed students learn just as well, and in some cases better.

Yet another study conducted to investigate the use of flipped classrooms, this time the focus was in an introductory teaching course (Vaughan, 2014). The reasoning behind the study was to provide pre service teachers with the opportunity to prepare themselves with skills and strategies to use as an engagement opportunity in their teaching of classroom students. Vaughan (2014) emphasized the need to "capitalize on the technological mindset of millennial learners." Vaughan was looking at three inquiry questions:

- 1. How does using the flipped classroom model impact on the engagement millennial students have with course topics?
- 2. What are the management strategies necessary for successful implantation of the flipped classroom model?
- 3. How does the flipped classroom model build a broader understanding of instructional strategies in pre-service teachers? (Vaughan, 2014, p. 29)

In response to the first question, students in the flipped classroom asked more questions and pushed boundaries for innovative modifications. In the second question, setting parameters that were easy to understand and encouraged all students to come to class prepared to engage in what they were learning worked best. In the third question, teachers were encouraged to teach their peers using flipped learning. They created videos in small groups and extended classroom activities such as debates and discussions (Vaughan, 2014). The most surprising outcome for the author was the professional growth of the author's own experience as a teacher educator. Vaughan's (2014) own preparation and learning about technology and the tools needed to teach pre-service teachers. He found a significant growth in his own knowledge, this unexpected amount of learning meant revisiting and adjusting objectives for future learning. He suggested that future studies should focus on the organization and management of a flipped classroom.

The flipped model gives the gift of time to a teacher educator. With the traditional lecture occurring outside of the classroom, the challenge becomes how to maximize the additional instructional time. The more time gained for teaching and learning in the classroom, there is more opportunity for depth and creativity. (p. 39)

Hsiu-Ting Hung (2015) researched the flipped teaching method in Taiwan, specifically looking at English-language learners and active learning. She used a posttest-only quasiexperimental design, with a Web Quest active-learning strategy. The participants were recruited from a class of foreign language learners taking an English communication class. They had learned English for an average of 10 years, they had access to a computer lab with desktop computers, and none of the participants had ever been part of the flipped classroom. The first group was a structured flipped classroom using Web Quests. A Web Quest by definition is:

a scaffolded learning structure that uses links to essential resources on the World Wide Web and an authentic task to motivate students' investigation of a central, open-ended question, development of individual expertise and participation in a final group process that attempts to transform newly acquired information into a more sophisticated understanding. (p. 82)

The second group was structured as a semi flipped classroom. They used a tool called TED-Ed. Based on the TED conferences, this site was launched that allowed users to flip and customize using quizzes and supplementary information to study or for teaching purposes. Also a control group received the class in a traditional manner (Hung, 2015). The research was conducted over a period of 8 weeks. The experiment used 3 groups. The assessments included, lesson assessments, a study log, learning experience questionnaire, and a semi-structured interview. The structured flipped classroom scored significantly higher than the traditional classroom in lesson assessments. The semi structured flipped classroom out-performed the traditional classroom as well. In terms of perceptions, both flipped classrooms expressed significantly higher satisfaction than the control group. In terms of participation, students from the flipped classrooms expressed that they were more motivated, spent more time on the course previewing learning materials, and were more stimulated to become active learners (Hung, 2015).

William Slomanson (2014), after 36 years of teaching legal education, was making the decision either to retire or to move away from his traditional teaching into teaching a flipped classroom form of a blended learning environment. It is to our benefit that he decided on the latter. His first step was to tackle the effectiveness of such a method. He then defined the term and looked at misconceptions of what was thought to be a flipped classroom. To his discovery, Slomanson came to realize that during all his years of teaching, he was not reaching more than half his students, and his idea of a successful classroom meant reaching the dozens that he did. Flipping the classroom to him seemed to be the solution that would allow all his students to

begin the learning process. With that idea Slomanson embarked on making his own videos, he noted the learning process in the preparation (videos being too long), however he embraced the idea of students being able to take in his lecture material at their own pace (Slomanson, 2014). He called upon the work of Michel Horn, co-founder of the Innovative Institute, to reinforce the idea that,

Moving the delivery of basic content instruction online gives students the opportunity to hit rewind and view again a section they don't understand or fast-forward through material they have already mastered. Students decide what to watch and when. Such options give them greater ownership over their learning. (Slomanson, 2014, p. 97)

Some of Slomansons' (2014) requirements for his course included outlining each video prior to class. He noted that students would browse the video, and then watch it again for outlining, and finally "binge" watch all videos, in preparation for final exams. Slomanson begins all lectures with discussion and he requires students to browse the internet during the in-class collaborative exercises, as he would move about the room observing and responding to students. He now had time to use class time to form actual law firms and class debates. His "aha" moment came when students began to ask for more classes in the flipped format.

Research in the K-12 Environment

Research in the K-12 environment is a little less represented in the literature, however, it is the focus of the activity portion of this project, therefore we will look at some examples of what has been found. It is important to keep in mind that many of the findings found in the higher education research questions can be somewhat generalized to the K-12 sector, specifically their focus on learning and preparation. A summary of flipped classroom research results will follow two more examples of resource and ideas being used in the K-12 sector.

One example of active learning was documented by Kris Wetterlund (2008), a principal and educator. Dalton School in New York was an elementary school exploring the learning of archeology. The teachers had purchased reproduction artifacts from the Metropolitan Museum of Fine Art, in New York City. They would bury them for their third graders to uncover. The students were given archeology tools and geographical areas. Once uncovered, the students would match the pieces with a digital database of artifacts. From there, the students would explore online about the culture and period of the artifact.

A more famous example of the flipped classroom is Salman Khan's Kahn Academy. He has been quoted as saying: "Teaching by night and reflecting on a subject by day is the way education is evolving in the age of online lectures" (Parslow, 2012, p. 337).

Parslow (2012) noted that the Kahn approach is quickly being adopted by learners. A situation is developing from this, in which students impose their preferences on teachers. Salman Kahn, known as the YouTube professor, had provided at the time of this publication 3250 digital lectures at no cost. Kahn believes this is the solution to educational problems is a flipped classroom teaching method that includes his short-video lessons. He advocated expressively for the changing role of teachers in the classroom.

Summary of Findings

It has been shown through the research that a flipped classroom has many benefits for both teachers and students. For teachers it provides time (Vaughan, 2014) and efficiency in the classroom (Fulton, 2013). Students are prepared for deeper learning and engagement. It provides the teacher with accurate results of where students struggle, through ongoing assessments both in and out of class. Teachers demonstrate professional growth (Vaughan, 2014). Most importantly, it allows the teacher to spend more one on one time with students. For students, because lessons are primarily done at home using technology, it allows them to allocate more time for learning. For the students who don't have access at home, arrangements are with the teacher to view material during recuperation time or at a local library ensures the time allocation is met. The use of technology allows the students to view lessons at their leisure and review lessons as many times as necessary (Slomanson, 2014). Students are more engaged during in-class activities (Missildine et al., 2013), are actively learning (Baepler et al., 2014; Kim et al., 2014; Wetterland, 2008), and show increased participation (Hodkiewicz, 2014; Hung, 2015). The learning is student-centered (Lujan & DiCarlo, 2014), and students are motivated to learn (Hung, 2015).

The research has also shown that schools and districts have seen an increase in student success using the flipped classroom method, as compared to traditional classrooms (Tamim et al., 2011).

It is important to emphasize that, in order for flipped classrooms to be successful, the face-to-face and online portions of a flipped classroom need to be structured cohesively to achieve success in the learning goals set for students (Strayer, 2009). The message is that the flipped classrooms design is meant to replace lectures and introduction lessons in the classroom to make time for deeper investigation of the learning objectives. Kathleen Fulton (2012) has listed most of the advantages of a flipped classroom:

- 1. Students move at their own pace.
- Doing "homework" in class gives teachers better insight into student difficulties and learning styles.
- Teachers can more easily customize and update the curriculum and provide it to students 24/7.

- 4. Classroom time can be used more effectively and creatively.
- Teachers using the method report seeing increased levels of student achievement, interest, and engagement.
- 6. Learning theory supports the new approaches.
- 7. The use of technology is flexible and appropriate for "21st century learning".
- 8. There is more time to spend with students on authentic research.
- Students get more time working with equipment that is only available in the classroom.
- Students who miss class for debates/sports/etc. can watch the lectures outside of class.
- 11. The method promotes thinking inside and outside the classroom.
- 12. Students are more actively involved in the learning process.
- 13. They also really like it.

(Herreid & Schiller, 2013, p. 62)

In their article on flipping your students' learning, Aaron Sams and Johathan Bergmann (2013) have stated:

Education is for everyone, but the way we deliver education and the way students receive it is not the same for everyone. A flipped classroom gives teachers the flexibility to meet the learning needs of all their students, and it gives students the flexibility to have their needs met in multiple ways. By doing so it creates a classroom that is truly student-centered. (p. 20)

It is not my intention to make the reader believe that flipped classroom is the only way to educate students. However, it has been demonstrated convincingly that the advantages to this method should not be ignored as a very effective teaching strategy.

Barry Bachenheimer, the Director of Curriculum, Instruction, and Assessment at Pascack Valley Regional High School District in New Jersey, had this to say about flipped classrooms:

Like any educational methodology, flipped classroom is not something to be used every day. It is simply one of many ways to reach students and to maximize classroom time. (Dunlop, 2014, p. 16)

The next section of this project is to give a teacher some tools and tips for embarking on a flipped classroom approach. It is recommended that teachers begin the process by flipping a single subject. The guide will explain the structure, types of activities for the classroom, resources to use in a flipped classroom, difficulties one might encounter, and some sample lesson templates and rubrics.

A Teachers Resource Guide to

Flipping the Classroom

Jessica Hodgson

April 26, 2015

Structure

The term flipped classroom has been defined as:

Events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa. The use of learning technologies, particularly multimedia, provides new opportunities for students to learn, opportunities that are not possible with other media. (Kim et al., 2014, p. 82)

Flipping the classroom requires a shift in perspective that the teacher must take in running the classroom. The main idea is to use the time efficiently in the classroom to create an environment of active learning. Other benefits include the ability to collect data and analyze what students understand, while tailoring the learning experience to individual needs.

Classroom activities give the opportunity for feedback, more individualized time, and time to facilitate mastery learning. It is important to note that peer learning should also play a crucial part of your classroom activities.

I want to emphasize that the way you introducing the flipped classroom to your students is as crucial as the functioning of the flipped classroom itself. Many students, particularly in the elementary classrooms, have not been exposed to this form of teaching, therefore, it requires patience, practice, and consistency in the way that it is introduced. Flipped classroom will work most effectively and efficiently if the method is introduced to your students at the beginning of the year.

There are two key components to a flipped classroom: the activities that take place outside the classroom (usually conducted at home with technology), and the in-class activities.

At-home activities are delivered using technology, and should be the primary lesson. This lesson can incorporate surveys, assignments, and quizzes for feedback and accountability. In-class activities are used to reinforce what was learned at home. This time should be used to cover any material or concepts that appeared to be unclear as demonstrated by the survey, assignment, or quiz results. In-class activities should be engaging, collaborative, and differentiated.

Step-by-Step Elements of Planning for the Flipped Classroom

- 1. Begin planning your long-term goals for teaching the school year.
- 2. Break your long-term plans into terms, and subsequently into topics you will teach for a given subject.
- Record lectures; organize presentations or existing videos into the topic lesson plans you wish to teach.
- 4. Incorporate surveys, short answer questions, and quizzes into the recordings to provide formative assessment, ensure accountability for the students, and to guide your teaching.
- 5. Assign the lectures/videos/presentations, including the formative assessment, for homework as an introduction, or as a further study on a long-term topic.
- 6. In class activities are planned with engaging and collaborative learning activities to support, critically examine, and practice the assigned topic.
- 7. Ensure that the planning of in-class activities provide many opportunities for feedback

A List of Engaging Learning Activities

The following is a list of the types of activities to engage the learning of your students. You should choose a variety of activities depending on your lesson, and provide them with different methods of engaging in deep learning. Most of these methods have been incorporated in traditional classrooms after the lesson is taught. In a flipped classroom, students come prepared to engage in these activities to develop deeper learning.

Applications

Application activities allow students to use what they have learned to problem solve and use the new learned information in different ways.

Extensions

These activities cover information beyond the given concept to encourage deeper learning.

Questioning

This method is about breaking down concepts into smaller chunks that are solved systematically by the students.

Student-Generated

This allows students to create and share content with their peers.

Experiential

This method has the students learning through immersive hands-on activities. They learn concepts through experiences.

Discussion

Students engage in deeper learning through discussion.

Assessment

Formative assessment should be ongoing in both components of the flipped classroom. This provides feedback to guide classroom direction and teaching.

A List of Collaborative Activities

The following is a list of activities to get your students working collaboratively in the classroom. As with engaging activities, a variety should be used to expose the students and teach your lesson.

Grouping students

There are several ways to group students dependent on the dynamic and outcome to be achieved. Some examples could be grouping by mutual goals, by student skills, by role, and even sometimes at random. It is important that the students understand expectations of groups and clearly present these instructions and practice them at the beginning of the year.

Small group problems solving

The teacher presents problem-solving activities in small groups. The teacher circulates in the groups and helps or challenges the group.

Peer instruction

This is based on a systematic process to encourage collaborative learning. In this method students take the lead role in instructing their peers. The teacher can mediate the process.

Peer feedback

This is where students evaluate their peers. This can be done through rubric design. Just-in-time teaching (JiTT)

Just-in-time teaching is a strategy where teachers use performance data to understand where students are struggling as well as students who may be more at-risk. This allows the teacher to give these students more individualized attention. These assessments can be done prior to class as mention, attached to a presentation or video lecture in your flipped classroom. The teacher then uses this to guide the in-class activities for that student or group of students who are struggling. This method compliments differentiated instruction.

Online Tools, Programs, and Applications for Flipping the Classroom

There are many online tools to use as both educator and student. I have listed some that I think are user friendly and efficient. This is not an exhaustive list, just a helpful one to get started.

Flipped classroom all-in-one tools

The following is a list of tools that are all encompassing tools for educators to use in the classroom. Edmodo is often used at the elementary and secondary level. Google classroom is gaining popularity. Explain Everything is a unique interactive whiteboard and screencasting tool used by over 1.8 million students and educators.

Edmodo (<u>https://www.edmodo.com</u>) all-encompassing online tool for teachers to incorporate lectures, lessons, presentations, quizzes through a classroom account.

Google Classroom (<u>https://www.google.com/intl/en_ca/edu/</u>) an all-encompassing tool for the classroom teacher to incorporate lectures, lessons, presentations, quizzes.

Explain everything (http://www.morriscooke.com/applications-ios/explain-everything-2)

Places to find videos

The following is a list places to find already made videos that educators share to help with flipping the classroom.

Kahn Academy (https://www.khanacademy.org) videos for lessons

Brain Pop (https://www.brainpop.com) videos for lessons

Discovery Education (http://www.discoveryeducation.ca/Canada) Canadian site for videos

Youtube (https://www.youtube.com) find videos for lessons

Padlet (https://padlet.com/padlet-backpack) presentation software

Nearpod (<u>http://www.nearpod.com</u>) website to produce lessons and share with other teachers.

LearnZillion (https://learnzillion.com) website to produce lessons and share with other teachers. *TedEd* (http://ed.ted.com) recorded videos to use in your flipped classroom

Video Creation

If you are interested in creating your own videos, the following is a list of websites and apps to create, edit, and save your videos.

WEVIDEO (https://www.wevideo.com) Online video editing.

Loopster (https://www.loopster.com/) Online video editing.

Youtube (https://www.youtube.com) Post videos and create subscriptions for your students.

Vimeo (https://www.vimeo.com) Post videos and create subscriptions for your students.

Verso (<u>http://versoapp.com/#verso</u>) app to record and share videos.

Camtasia Studio (https://www.techsmith.com/camtasia.html) Software to create videos

CamStudio (http://camstudio.org) Free software to create videos

EduCreations (https://www.educreations.com) Website and application to create videos.

ShowMe (http://www.showme.com) Website and application to create videos

Classroom tools for developing ideas and group work

These are innovative classroom apps to use for brainstorming, using post-it notes, and to create concept maps for learning and discussing topics.

Poppplet (https://popplet.com) Ipad education application uses tools for brainstorming

MindMup (<u>https://www.mindmup.com</u>) application used to create concept maps

Lino-it (<u>http://en.linoit.com</u>) A web application for structure ideas using sticky notes.

Assignment tools

Every student and teacher needs a common place to share and submit assignments in the flipped classroom. Google drive and dropbox are excellent tools to store documents online.

Google Drive (<u>http://www.google.ca/drive</u>) cloud storage. Students can send assignments electronically.

Dropbox (https://www.dropbox.com) cloud storage. Students can send assignments

Assesment tools

These two apps are used for assessment and to keep track of student work and responses online.

EasyPolls (https://easypolls.net) easy to use online system for conducting polls in the classroom. *Folio for me* (http://foliofor.me) A web application for creating e-portfolios.

Tools for connecting classroom community

In an effort to have students connect outside the classroom. It is also important to

connect families and peers to the learning community. The following is a list of applications to

help connect students to the community.

Class Dojo (https://www.classdojo.com) online connection with parents

Twitter (https://www.twitter.com) tweet classroom happenings.

Instagram (https://www.instagram.com) post pictures of classroom activities.

Blogs - websites to host student writings that are interactive and published online.

- Weebly (<u>www.weebly.com</u>)
- Wikispaces (<u>https://www.wikispaces.com/content/classroom</u>)

Getting Started

Tips for flipping the classroom for the first time:

• Plan the way you introduce the flipped classroom.

Set up a website (blog) for posting assignments and learning activities. I like Weebly. Here is a basic video to set up a Weebly blog.

(https://www.youtube.com/watch?v=qu50A7sZPCQ)

- Set up Edmodo or Moodle account for housing your videos and lessons.
- Set up a Google drive to send and receive assignments.
- Set up a twitter account and Instagram for your class.
 - Edudemic provides an excellent guide on twitter for educators and the classroom. Everything from setting it up with proper privacy settings, to daily use with your students. <u>http://www.edudemic.com/the-ultimate-twitter-</u>

guidebook/

- o Plan your in-class assignments directly related to the home lesson.
 - This preparation takes time, but should be no different than your regular classroom planning. I suggest creating the in-class assignments first, followed by the home lesson. That will ensure cohesiveness in the learning objectives.
- Create or find videos for your lessons and learning objectives.
 - There are several applications to use as mentioned above. Kahn Academy has a great guide to getting your classroom online.

https://www.khanacademy.org/coach-res/reference-for-coaches/how-to/a/getyour-class-online.

Vimeo's video school has a guide on how to create a video.

https://vimeo.com/videoschool .

 Depending on what application you choose to create your video, there are how to guides with each application.

- Learn how to screen cast and embed videos.
 - The following is a helpful video on how to embed videos.

(https://www.youtube.com/watch?v=cO63F9LxrDY)

- Have a parent letter to explain the flipped classroom and the expectations of the students.
 - I have given a few examples of interesting letters I have found. They are available in the appendix.
- Set up Google forms to get feedback from parents and students.
- Create a check sheet for students' flipped assignments.
- Set up a communication tool for parents such as Class Dojo.

Keith Hughes posted a very comprehensive video explaining how to start flipping your classroom. I recommend this video. He provides many tools and a how to on the beginning process and create videos. <u>https://www.youtube.com/watch?v=ZRvmjjeZ9CA_</u>.

The following is some helpful advice for the first few days of introducing a flipped classroom to parents and students. As well as some templates for lesson plans and rubrics that are helpful to use in your classroom.

<u>Day 1</u>

You should introduce the basic workings of the flipped classroom and explore the websites and applications that will be used throughout the year. If time allows, do an introduction class with everyone all together to work out any kinks in the technology and website information. That evening send home the letters and ask the students to perform a small lesson and online feedback form to see if there are any difficulties. You might also want to include a small video for parents to explain the flipped classroom approach.

Day 2

Explore questions received from the feedback forms and reactions to the small video lesson that was posted. For students who have difficulty accessing technology. Set up an alternative way for these students to complete the assignments. If all goes smoothly expand the lesson with some collaborative work in the classroom. Flipped classroom routine should be included in all the routines that you set up at the beginning of the year.

Parent's night

This is a chance for you to teach parents about the flipped classroom. Show a video and answer questions. Explain expectations of both student and parent. Explain how assessment will be done both in class and through the website.

Classroom Lesson Plan Template

Flipped Classroom Lesson Plan

(Group)

Authors:

Lesson Title:

Subject Area(s):

Grade Level:

Time Needed:

Competencies

Learning Objectives (including cognitive and behavioral objectives)

Student Learning Resources at Home

- Example
- watch video x (name of the video) for xx minutes <u>http://www...</u>
- Play Game x (name of the game) for xx minutes <u>http://www</u>...
- Teacher self-created materials video, game, quiz ...

Student Learning Activities at Home

- Fill KWL chart for the lesson
- Prepare questions for the teacher
- Suggest other learning resources

Classroom Activities

- Materials preparation
- To engage the students by surveying learning outcomes through their KWL chart
- Address common problems
- Facilitate whole group discussion
- Differentiation/Individualization
- Let the above levels teach the below levels
- Leveled group activities
- Guide by the side

Assessment

- Formative/Summative
- Challenging questions
- Interactive quizzes

K-W-L Chart Sample

What I <u>K</u> now	What I <u>W</u> onder	What I have <u>L</u> earned
	(or <u>w</u> ant to know)	

Examples of Rubrics for Evaluating Flipped Format

Flipped Classroom Lesson Plan Rubric

(30/30	points	20 of 3	0 for	lesson	plan	10/30 for	lesson	nlan ⁻	presentation))
ſ	50/50	pomus,	20 01 5	101	1000011	piun,	10/50 101	1000011	piun	presentation	,

Criteria	Sub-categories	Points Assigned	Developing	Proficient	Score
Lesson Info	Author Lesson title Subject Area Grade Level Time Needed	1	0.5	1	
Competencies	One –three entries	1	0.5	1	
Learning	Cognitive	1	0.5	1	
Objectives	Behavioral	1	0.5	1	
	Video/Audio	2	1	2	
Learning	Game	2	1	2	
Resources at Home	Quiz	2	1	2	
Learning Activities at Home	Students filling in KWL form: -What is learned, -Where it was learned, and -What questions they still have	2	2	2	
	Instructional materials preparation	1	0.5	1	
Classroom	Student home learning assessment	1	0.5	1	
Activities	Instruction for common problems	2	1	2	
	Individualized or small group differentiation strategies	2	1	2	
Assessment	Formative/Summative assessment Challenging questions for higher performers Differentiated assessment	2	1	2	
	strategies		 Tota	l Score (20)	
			1018	n Score (20)	

Flipped Classroom Lesson Plan Presentation Rubric

Criteria	Points Assigned	Developing	Proficient	Score
Content Coverage and Organization	2	1	2	
Individual Performance & Cooperation	2	1	2	
Audience Engagement	2	1	2	
Professionalism	2	1	2	
Time Control	2	1	2	
		Т	otal Score 10	
Guidelines	 Use Wiki well Every member presentation Cover the mathematical Cover the ma	bsite or PPT for er of the group n in contents tent and procedu oratively cation appealing ofessional manne as 12-15 minute	presentation nust play a role ure logically to audience er, language, vo s	in the ice, eye

(30/30 points, 20 of 30 for lesson plan, 10/30 for lesson plan presentation)

Flipped Classroom Student Learning Checklist				
What have you learned?	List the contents learned			
Where and how did you learn it?	<u>Where:</u> Indicate the URL or the software <u>How:</u> Such as watching, listening, playing, chatting with friends, online group, social network, with parents or siblings, etc.			
What questions do you still have?	Bullet questions for the teacher in the classroom			
Other	Record any suggestion or issues			

Flipped Classroom Student Learning Checklist

Flipped Lesson Plan (Example)

Authors: Melissa Bersano Lesson Title: Standard Form, Word Form, and Expanded Form (Expanded Notation) of numbers less than 10 million and decimals through the hundredths place value. Subject Area(s): Math Grade Level: 5 Time Needed: 60-80 mins at home, 60-70 mins. in class **Competencies** (1-3 entries)

Learning Objectives (including cognitive and behavioral objectives)

 \checkmark Students will be able to represent whole numbers less than ten million through the

hundredths place value in expanded notation.

 \checkmark Students will be able to represent whole numbers less than ten million through the

hundredths place value in word form.

 Students will demonstrate understanding of the 3 forms of numbers through the completion of a quiz.

Student Learning Resources at Home

• Instructional Videos:

Place Value- Expanded form and Word Form of Numbers <u>http://www.youtube.com/watch?v=uBuofv6Bbn0&feature=player_embedded#t=42s</u> Standard and Expanded Form of Decimals <u>http://www.youtube.com/watch?v=nt2aov1t3Js&feature=relmfu</u>

• Games:

QUIA- Match the standard form and expanded form of numbers (<u>http://www.quia.com/mc/279741.html</u>) AAA Math- Using expanded notation to write standard form (http://www.aaamath.com/g31d_px1.html#section2)

Matching the standard form to the word form.

(http://www.math-play.com/math-racing-place-value-game/math-racing-place-value-game.html)

(http://www.free-training-tutorial.com/place-value/airplanes.html)

Student Learning Activities at Home

- Complete a 3-2-1
 - 3- Define standard form, word form, and expanded notation (cite resources used)
 - 2- Provide two examples of each form
 - I- Which form do you feel is harder to write?: Word or expanded?
- Prepare 2 questions for the teacher and post on class blog
- Complete 5 practice problems of choice on each of the (4) worksheets attached. (Used attached number word table to assist with word form)

Classroom Activities (pick what applies in the lesson)

- Students share 3-2-1 note card in cooperative groups
 - \circ look for common themes
 - look for differences
 - see if peers can answer question
- Whole Group: Address common problems & facilitate whole group discussion. (record notes that answer common problems in math journal (notebook).
- Extension/Remediation stations (based on exercises completed at home on worksheets).

Assessment

- Response cards:
 - o Part 1
 - Students are given 3 note cards that read as follows: word form, standard form, expanded form.
 - Teacher presents different forms of numbers on Smartboard and students are to hold up the correct form card. Teacher records on grid those who respond incorrectly for each prompt/question.
 - o Part 2
 - Students use whiteboards to respond to teacher prompts/questions.
 - Ex. Teacher writes 26,546,000 on the Smartboard. Students write the expanded form on their whiteboard and hold up. Teacher records on grid those who respond incorrectly for each prompt/question.
- Differentiated assessment strategies for Part 2 above.
 - Aide scribes on whiteboard for low achieving and/or special education students. (reduced written load completely, while still assessing concept knowledge)
 - Low achieving and/or special education students work with an aide separately and are provided note cards that can be arranged to make word form, standard form, and expanded form for each example (reduced written load, while still assessing concept knowledge).

Complications that may arise

Online access for students

It is important to be clear to students about the reasons for flipping the classroom. In order for it to work effectively, students need to do the lessons at home. Very few students do not have access to technology at home, however there are still a few. One complication that may arise is what to do with a student who can't participate in the online component at home.

My suggestion would be to provide this time in class during what would normally be a teacher's review time with students. It should be made clear to parents that this is a large component of the students' learning time and encourage the purchase of the technology.

Some families have justifiable reasons why they can't provide access for their children; you may suggest the library where students can access the computer. If that is not possible, it would be agreed that the student stay in class during the teachers set review times to provide the student with access to a computer.

Respect homework guidelines

It is important not to increase the amount of time a student must spend on the at-home activities. School boards have suggested amounts of time a student should spend on homework, depending on grade level. In your planning, try to be aware of the amount of work you are asking of the students, and adjust accordingly.

Students who don't complete work assigned

Flipped classroom or not, there will always be those students who don't do their homework. These students for various reasons come to class unprepared, and quickly lose sight of the topic, disengage because they can't make relevant contributions. One way of making students accountable is to have a survey, quiz, or short answer question at the end of every athome lesson. For those students who still come to class unprepared, I would suggest making two groups in the class.

One group would be for the students who come to class prepared. You can provide them with extending activities to deepen their learning. The other group would be made up of students who come to class unprepared. Also included in this group could be students who did the athome lesson, but are still struggling with the concept. The feedback provided on the formative assessment you included with the video will be able to tell you.

The students who come to class unprepared will watch the video as a group. The teacher can work with this group to extend the learning once they are done. This would also help the teacher in differentiating the lessons.

Teachers are still lecturing during class-time

Flipping your classroom takes time to work out the kinks, but also to change the mindset of how we teach. As a teacher, you may be very tempted to continue whole class instruction at the front with all eyes looking and listening. Remember that in-class time is a students' time. The teacher is in the role of facilitator. This does not mean you shouldn't stop the class periodically to mention an important point that all students could benefit from, it means that you work closely with individuals or small groups to target difficulties and encourage progress.

Resources for the flipped classroom

The following is a list of websites, documents, and blogs that I encourage you to explore for help and ideas.

http://www.edutopia.org

A comprehensive website and online community that increases knowledge, sharing, and

adoption of what works in K-12 education.

http://www.edutopia.org/blog/flipped-learning-lets-talk-tech-jon-bergmann

A flipped learning toolkit for educators.

http://flippedclass.com/category/flipped-class-101

Everything about flipping your classroom.

http://flippingwithkirch.blogspot.ca/2012/04/what-does-my-flipped-classroom-look.html

A blog which as a reflection on many years of flipping a classroom.

https://www.pinterest.com/weareteachers/flipped-classroom-resources

A pinterest board full on flipped classroom resources.

https://www.pinterest.com/hinniger20/flipped-classroom

A pinterest board full of resources for the flipped classroom

http://docsflippedclassroom.weebly.com

A blog about flipped classrooms on Weebly

http://flippedlearning.org/site/default.aspx?PageID=1

A website devoted to flipped learning.

http://wiki.ubc.ca/Documentation:Flipped_Lab_Flipped_Classroom_Resources

The University of British Columbia wiki on flipped classroom resources and examples.

http://blog.peerinstruction.net/an-annotated-list-of-flipped-class-tools-and-resources

An Annotated list of flipped classroom resources.

https://tackk.com/Flipped

Resources for flipping your classroom.

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Appendix

Included in this appendix, is a list of resources to help support you in continued learning of the flipped classroom format. There is a link to a publication as well as a sample template letter for parents.



 $info.eb.com/wp\-content/uploads/2013/09/Flipping {\bf WhitePaper.pdf}$

This is a link to a pdf file put together by Britannica. It contains useful tips to support a flipped classroom and lesson plans ranging in levels and subjects.

Sample Parent Letter

Dear Parents,

I have the privilege of teaching your child in grade 6 mathematics this school year. I wanted to let you know about an approach to teaching that I will be using this year in all my classes. It is called the "flipped" classroom. The basic concept behind a flipped classroom is that what was traditionally done in the classroom becomes homework and what was traditionally done at home (homework) is done in the classroom.

So what will this look like this year in my classroom? The direct instruction or lecture portion of the class will become the homework. This will primarily be in the form of watching videos that have been produced by either me or someone else. Students could also be asked to read sections from the textbook.

After students watch the video or read the text, they will take notes on vocabulary, content and problem examples. When students come to class the next day we will briefly discuss what they heard in the videos and answer any questions they may have. The rest of the class time will be used for practicing the concepts from the video (homework in the traditional setting), working with manipulatives, and doing activities intended to enrich the curriculum. By moving the direct teach portion of the lesson to homework it frees up more time in the classroom so that I can interact more with my students and provide more individual help.

There will still be assessment of student learning through quizzes and tests. In addition, there will be some additional outside work such as projects, reviewing for quizzes and tests, and occasionally finishing work that could not be completed in class.

Here are some of the benefits to flipped instruction:

- 1. Students can watch a video on their own. They can pause and rewind whenever they need to review what they heard.
- 2. Parents do not have to worry that they can't help their child with the math homework.
- 3. It helps busy students. Many of our students are involved in activities outside of school and often have a hard time getting all their homework done. Students will

be able to watch videos ahead of time from their home computer, smart phone, laptops, I-Pads or school computers at their convenience.

- 4. In a traditional model, if a student had questions about problems they were doing at home, they had to go in for tutorials the next day. With this method, students are doing the work in the classroom and are able to get their questions answered immediately.
- 5. Flipping the instruction helps struggling students. By doing the work in the classroom, I will be able to monitor students more closely. I will be able to identify students quicker that have some misunderstandings or need more individualized instruction.
- 6. Learning is student-centered, not teacher -centered. Focus is not on the teacher teaching the content but on the student practicing and producing quality work.
- 7. There is more interaction between teacher-student and student-student. Since I won't be spending the class time in instruction, there is more time for me to answer student questions, work with small groups, and guide the learning of each student individually. There will also be more emphasis on students working collaboratively with other students to facilitate the learning. They will be able to have more relevant math conversations and tutor each other.
- 8. I am really excited about the flipped class approach in my classes. If you wish to learn more about the flipped classroom, I've provided some links to articles and videos on the Internet. If you have any additional questions, feel free to contact me.

Thanks, Ms. Jessica Grade 6 Mathematics Teacher Article Links:

- 1. Why the Flipped Classroom: <u>http://www.techsmith.com/flipped-</u> <u>classroom.html?gclid=CPmTpqb_wbECFWROTAod8WgAnA</u>
- How the Flipped Classroom is Radically Transforming Learning: <u>http://www.thedailyriff.com/articles/how-the-flipped-classroom-is-radically-transforming-learning-536.php</u>
- 3. The Flipped Class: Myths vs. Reality: <u>http://www.thedailyriff.com/articles/the-flipped-class-conversation-689.php</u>
- 4. The Flipped Classroom: What Does a Good One Look Like: <u>http://www.thedailyriff.com/articles/the-flipped-class-what-does-a-good-one-look-like-692.php</u>
- 5. Flipping Classrooms: Does It Make Sense?: <u>http://www.washingtonpost.com/blogs/answer-sheet/post/flipping-classrooms-does-it-make-sense/2012/06/06/gJQAk50vJV_blog.html</u>

Video Links:

- 1. What is the Flipped Classroom?: http://www.youtube.com/watch?v=4a7NbUIr_iQ
- 2. What the Flipped Class is not: <u>http://www.youtube.com/watch?v=hGs6ND7a9ac</u>

(www.dsisd.txed.net/DocumentCenter/View/57302)

Sample letter for students

Students,

During this class, you will be taught using a different instructional method called "flipping the classroom."

The Flipped Classroom method requires students to complete what would normally be done in class at home, and the work traditionally completed at home in class. Does this mean you will never have homework in this class? NO!

Your homework in (course name) will take on a different form. Instead of completing worksheets and other assignments at home, you will watch lecture videos created and/or assigned by (teacher). You will be responsible for watching this videos on your own time. They will either be uploaded to YouTube, shared with you via Google Drive, or both. You can access these videos on your personal computer, Chromebook, or smartphone.

Along with the video, you will be required to complete an activity. This could be a quiz or brief assignment, which upon completion will indicate that you have actually watched the video.

If you are unable to watch these videos due to lack of Internet and/or device access, please inform (teacher) IMMEDIATELY so other arrangements can be made.

FLIPPED CLASSROOM CONTRACT

By signing this contract, you are indicating that you understand and agree to the following:

→ I will watch all flipped videos assigned by (teacher) and will complete the accompanying activities.

→ I will ACTIVELY participate in classroom discussions and activities.

→ I will respect EVERYTHING and EVERYONE in the classroom at all times. This includes my classmates, teacher, and the classroom itself.

→ I will help to create a safe and welcoming learning environment for my peers and myself.

Please sign below to indicate that you have read and understand these expectations. Please return this to class as soon as possible, as this form is your first opportunity to earn points this semester.

(Student Signature and Date)

⁽Parent/Guardian Signature and Date)

 $⁽https://docs.google.com/document/d/1gYPZqKhQavlLwGKHQgbytC0isyJU0osj_hYNA-4lj4U/edit)$