The Flipped Classroom and Its Influence on High School Student Engagement

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Abstract

The purpose of this qualitative research is to describe the experiences of two groups of students who participated in a flipped classroom during Grade 11 Modern World History and a Grade 11 Biology. A literature review documenting the benefits and challenges of the flipped classroom is provided. For this action research, data were collected from 48 students who completed three sets of qualitative questionnaires and participated in two focus groups. The results are represented through three dominant themes. As perceived by students, the flipped classroom promoted active-learning, enriched relationships, and a steep learning curve. More specifically, the flipped classroom promoted active learning that was self-directed, engaging, and empowering. With regard to relationships, teacher-student and student-student were embellished. As well, this new style of learning proved to be initially frustrating for many students. Throughout the paper, characteristics of 21st century learning theory are used to conceptualize the study and its findings.

Words in Abstract: 150

Total Words in Paper: 8,307 (Exactly 7,096 without references)

(Note: Length for *Canadian Journal of Education*: 5,000 to 7,000 [excluding references]; over 7,000 words will not be accepted; references: 1,200 words)

Introduction

In describing its salient principles, the flipped classroom is a method of delivering new curricular content via pre-class videos that are assigned to students to watch as homework (Fultan, 2014). In other words, the flipped classroom gives students an opportunity to independently gain exposure to content prior to class via experiencing the teacher's lecture at home. Thereafter, upon entering the class, students are empowered with self-confidence due to possession and construction of new knowledge. Face-to-face class time involves students critically analyzing content through open discussions, pair-share activities, student presentations, quizzes, and mini-lessons, for example (Rotellar & Carns, 2016). Subsequently, during class time, students manipulate, assimilate, implement, and embellish their knowledge. Applying Bloom's taxonomy of learning to this process, the flipped classroom endorses that students independently experience lower levels of cogitative development (i.e., knowledge and comprehension) and then employ higher forms of cognitive growth (i.e., application, analysis, synthesis, and evaluation) during class time with assistance from the teacher and peers.

Teachers who endorse and embody this pedagogy envision teaching and learning in a unique way—the teacher promotes a type of learning where students actively interact with and construct meaning from content, rather than passively receiving and regurgitating information. In this flipped environment, the teacher is a facilitator, coach, resource-link, and learning catalyst. The student is the producer of knowledge, a critical and creative thinker, and a responsive and responsible learner. This 21st century style of learning is student-centered, multisensory, hands-on, and relevant. The knowledge that evolves in this type of environment is both independently and socially constructed. In sum, for the flipped environment to be effective, not only do teachers need to be familiar with and utilize the technology associated with this mode of

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content delivery, they need to comprehend and promote (through their class time activities, for example) the philosophical underpinnings of this active learning.

The purpose of this research is to describe the experience of students who participated in a flipped classroom while enrolled in a Grade 11 Modern World History or a Grade 11 Biology course. The social studies course was taught by Kent Avery, and the science course was taught by Carolyn Huggan, both of whom are co-authors of this article and co-researchers of this action research. In what follows, an abridged literature review documents the benefits and challenges of the flipped classroom. For this qualitative study, data were collected via three sources. First, 48 students (of a possible 54 students) completed open-ended questionnaires at the beginning, middle, and end of their respective courses using the flipped classroom model. Next, these 48 students part-took in two focus groups. Also, during delivery of the courses, the instructors maintained a personal journal where they documented their thoughts and student observations. For the domain of this paper, journal data was not included. Three dominate themes evolved. As perceived by students, the flipped classroom promoted active-learning, enriched relationships, and a steep learning curve. Features of 21st century teaching and learning theory are threaded throughout the discussion and findings of the study.

Significance of the Study

For many reasons, this research is topical, practical, and significant. First, the concept of the flipped classroom relates to students and the technological needs of the modern world. A core responsibility of any teacher is to ensure that students have the knowledge and abilities needed to be productive, involved citizens in a society, which is digitally dependent and globally connected. In turn, teachers need to endorse learning that is both learner-autonomous and socially constructed, while simultaneously capitalizing on the potency and potential of the digital

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world. Student-centered pedagogy, such as the flipped classroom, is a way to capitalize on good teaching and digital literacy. Having stated such, many teachers lack formal training or background experience with regard to the flipped classroom. For example, on Prince Edward Island (Canada) (the location of this research), Preston et al. (2015) found that most educators who incorporate technology into their teaching use basic digital tools like YouTube, multimedia presentations (e.g., PowerPoint, Prezi, etc.), and class websites. Despite the need for teachers to integrate technologies into education, growth in this area is slow, challenging, and somewhat superficial (Abbitt, 2011; Bauer & Kenton, 2005). According to Abeysekera & Dawson (2015), research on the flipped classroom is "under-evaluated, under-theorised and under-researched" (para. 4). Part of the choice to complete this research was based on the fact that, in reviewing peer-reviewed literature, we found no research on the flipped classroom within elementary or secondary schools in Canada. Moreover, most flipped classroom scholarly research is conducted in non-Canadian postsecondary environments. In turn, our research, which targets technology-based flipped classrooms in a Canadian high school is timely, relevant, and significant.

Literature Review

Predominantly targeting postsecondary environments, extant research pertaining to the flipped classroom has been quite positive. Educators and researchers have identified general benefits of the flipped classroom to be: increased student engagement with content, an increase in the quality of teacher-student interactions, and an increase in student motivation (Arnold-Garza, 2014; Clintondale High School, 2012; Enfield, 2013; Gross, Pietri, Anderson, Moyano-Camihort, & Graham, 2015; McLauglin et al., 2014). DeGrazia, Falconer, Nicodemus, and Medlin (2012) noted that students supplied with video lectures arrive to class better prepared, compared to when they are assigned textbook readings. Gross et al. (2015) and Mok's (2014)

research also supported the idea that flipped classroom students come to class better prepared. Equipped with the pre-recorded video, students are empowered with a unique learning opportunity. Because they have the ability to re-watch, rewind, and/or fast-forward the videos, students can manipulate the pace in which they receive content (Abeysekera & Dawson, 2015; Arnold-Garza, 2014; Enfield, 2013). In such a manner, students can take ownership of and responsibility for their learning (Educause, 2012; Mok, 2014; Laman, Brannon, & Mena, 2012). With the delivery of curriculum content offloaded to recorded videos, teachers acquire more class time for students to critically reason through problems and apply real-life issues to course content (Rotellar & Cains, 2016). Other research highlights that the active learning students experience during class creates a positive learning environment and a positive attitude to learning (Donovan & Lee, 2015). Flipped pedagogy often gives teachers more time to personally interact with students and recognize gaps in their learning (Fultan, 2014; Kovach, 2014). Said in a somewhat similar fashion, the flipped method creates space and time for increased formative assessment (Bergmann & Sams, 2012). Also, as indicated by Enfield (2013), "The videos provided a good resource to direct students to when they were absent from class" (p. 25). In reviewing these benefits, the flipped classroom appears to provide enriched opportunities for many students to experience positive self-directed and collaborative learning.

With a summary of the benefits articulated, what are challenges commonly associated with the flipped classroom? According to Franel (2013), "Flipped learning places more of a burden upon the student to take the lead in the learning process" (p. 120). Some students may be (initially) resistant to the flipped method, because it requires that they be self-managed, independent learners of new subject matter. Consequently, some/many students come to class unprepared to participate in active learning activities related to the content (Herreid & Schiller,

2013). For students who enjoy in-class lectures and the synchronous ability to ask questions to the teacher during lectures, the flipped classroom was not as enjoyable as a traditional lecture (Khanova, McLaughlin, Rhoney, Roth, & Harris, 2015). Also, Nielsen (2012) highlighted concerns with potential lack of student accessibility to online resources and with the fact that the flipped classroom is dependent upon technological resources, which have financial implications for the school, teachers, and parents. Further, Nielsen accentuated that, with the educational movement towards not assigning student homework, flipped learning might not be an ideal fit for some public schools. Also, the instructor needs to spend a great deal of time preparing and developing videos that are content-laden, concise, professional, and, in general, model good lectures (Arnold-Garza, 2014; Enfield, 2013; Khanova et al., 2015; Tolks et al., 2016). In addition, in order to create online video lectures, instructors may need to learn new technological skills (Educause, 2012). Having stated such, once quality videos are created, they may be used for several courses. (See Table 1 for summary of benefits and issues of the flipped classroom). Table 1: The Flipped Classroom: Potential Benefits and Issues

Potential Benefits	Potential Issues
 Students learn at own pace/experience self- directed, independent learning (Educause, 2012; 	 Students may have limited/no access to online documents (Nielsen, 2012)
Enfield, 2013; Fultan, 2012; Laman, Brannon, & Mena, 2012; Mok, 2014)	 Student may lack discipline to complete required homework and come to class unprepared (Ash,
Students come to class better prepared	2012; Herreid & Schiller, 2013)
(DeGrazia et al., 2012)	 Quality online preparation results in an increased
 Greater teacher-student interaction; teacher understands student needs (Bergmann & Sams, 2012; Fultan, 2014; Kovach, 2014) 	workload for teachers (Arnold-Garza, 2014; Enfield, 2013; Khanova et al., 2015; Tolks et al., 2016).
 Engage/motivates students/positive learning environment (Clintondale High School, 2012; 	 Teacher may need to learn technological skills (Educause, 2012).
Donovan & Lee, 2015; Enfield, 2013; Gross et al., 2015)	 No homework movements do not align with flipped class delivery (Nielsen, 2012)
 Supports 21st century student-centered learning (Fultan, 2012) 	 Student may prefer in-class lecture where they have an opportunity to ask questions during
 With student absenteeism, core content is not missed (Enfield, 2013). 	lecture (Khanova et al., 2015)

Compared to traditional modes of learning, the answer as to whether or not the flipped classroom improves test scores and overall grades is unclear. Fulton's (2012) flipped classroom research touts greater learning and increased test scores of high school students. Other research highlights little to no difference in student grade performance (Findlay-Thompson & Mombourquette, 2014; Marlowe, 2012; McLaughlin et al., 2013). Additional research highlights that grades and tests scores for students who experience flipped learning are higher than traditional modes of learning (DesLauriers, Schelew, & Wieman, 20122; Gross et al., 2015; Laman et al., 2012; Missildine, Fountain, Summers, & Gosselin, 2013; Talley & Scherer, 2013). Jensen, Kummer, and Godoy (2015) conducted a comparison study with flipped and non-flipped classrooms both of which utilized active learning techniques. Jensen et al.'s results showed no significant differences in student grade results, learning gains, or learner attitude. With the exception of Fulton, each of these aforementioned grade-performance studies were conducted within postsecondary education and science, technology, engineering and math (STEM) courses such as physics, biology, chemistry, and statistics. Other than anecdotal references, there exists little research to objectively document student grade scores as it relates to the flipped classroom, particularly within public education (Abeysekera & Dawson, 2015; Hamdan, McKnight, McKnight, & Arfstrom, 2013; Herreid & Schiller, 2012; Jensen et al., 2015; Milman, 2012).

Research Design

At its core, the qualitative paradigm is about understanding human experiences (Marshall & Rossman, 2011; Merriam, 2009; Patton, 2015). This project assumed a qualitative methodology, because the study documented the perceptions of high school students who experienced the flipped classroom. In further clarifying the organizational dimensions of the study, we employed an action research design (Efron & Ravid, 2013; Noffke & Somehk, 2011).

According to Efron and Ravid (2011), the seminal purpose of action research is to improve one's professional practice. In turn, action research is commonly used by teachers who want to inform pedagogical praxis. For this study, two of the three researchers (i.e., Kent and Carolyn) were the instructors of courses where they employed techniques of the flipped classroom. Through participating in the research, collecting student data, and maintaining a personal journal, it was the desire of these instructors to understand the needs and experiences of their students and, accordingly, adapt their teaching. In many ways, for these two teachers, the action research served as a type of hands-on professional development with regard to the effective pedagogy and delivery of the flipped classroom.

Kent's Grade 11 Modern History course had a total student enrollment of 25 students, and Carolyn's Grade 11 Biology course had a total student enrollment of 29 students. Before agreeing to participate in the study, students and their parent/guardians were given invitation/information letters about the research. After both the student and his/her parent/guardian understood the details of the study, to be a participant in the study, each student had to sign a consent form. Of the possible 54 students enrolled in both courses, 48 students signed the consent form and agreed to participate in this research.

Data Collection and Analysis

Data were collected via three sources: student questionnaires, student focus group interviews, and a journal maintained by both instructors. However, for the purpose of this paper, only data from the questionnaires and focus groups were used. First, students completed three anonymous open-ended questionnaires. The first questionnaire was assigned three weeks after courses began; 42 of 48 students completed the questionnaire. The second questionnaire was assigned seven weeks after experiencing the flipped classroom; all 48 students completed the questionnaire. The last questionnaire was completed by all 48 students at the end of five-month course. Each questionnaire contained three questions, which asked students to document such things as their learning preferences, new skills they were obtaining due to the flipped class, challenges they were experiencing due to the flipped class, and the overall impact the flipped learning had on them.

After completion of the courses, 48 students part-took in two focus groups. The first focus group was held in the school lecture theater, where all 48 students from both courses gathered. Projected on a screen, a list of guiding questions led the large group discussion¹, which lasted 59 minutes. Fifteen of the 48 students chose to articulate their views, opinions, and beliefs. A second focus group, with six student volunteers was organized. This interview lasted 84 minutes. These six students were also present during the large-group discussion, but, in reviewing the transcripts, only one of these six students spoke during the large group discussion. In total, of the 48 students who partook in the study, 20 students actively participated in focus group discussions. Both focus groups were audio-recorded and transcripts were created from the recordings.

Data were analyzed through content analysis (Savin-Baden & Major, 2013), which was enacted through a number of stages. First, typewritten questionnaire answer and transcripts were assembled. The researchers read and reread these data several times to gain familiarity with the overall content. Next, the questionnaire answers and focus group transcripts were reread, but more systematically to create categories of key ideas, phrases, commonalities, differences, and patterns (Marshall & Rossman, 2011; Merriam, 2009). At this point, similar categorical themes were merged into larger themes in response to the research purpose (Miles, Huberman, &

¹ This large focus group not only was a way to collect data, but it served as a metacognitive activity for all students who experienced the flipped classroom. The discussion was a class activity directed at helping students reflect upon and understand their learning preferences.

Saldaña, 2014). With this purpose (i.e., what were the experience of students who participated in a flipped classroom while enrolled in a Grade 11 Modern World History or a Grade 11 Biology course) at the forefront of our minds, we reread the questionnaire answers and focus group transcripts again in an attempt to answer that main research question. From our analysis, three domain themes surfaced. As perceived by students, the flipped classroom promoted active-learning, enriched relationships, and a steep learning curve. Under each of these major themes, we looked for reoccurring sub-themes as articulated by participants. We also included some outlying comments articulated by participants to help articulate a well-rounded explanation of thematic findings.

Findings

In this section, we present the thematic findings of the study. As a part of this explanation, we include many participant quotations that are poignant and representative of themes. As indicated by Anderson (2010), the use of quotes promotes credibility of the findings, gives participants voice, and enhances readability. In presenting the findings, we also took the liberty to paraphrase participant comments. Below, all names are pseudonyms for students who participated in the focus group. Whenever questionnaire answers are used, they represent an anonymous student, because students did not identify themselves when completing the questionnaire.

Active-Learning Experience

External Classroom Learning. Many students explained that the flipped classroom forced them to assume more responsibility for their learning, especially outside of the classroom. Lucas talked about this external classroom learning:

You actually have to be an adult. You have to self-teach yourself. You have to watch stuff at home. You have to do your work. You need to stay on top to make sure you continuously grow as a student.

Jackson said: "The flip classroom has kind of like helped me learn on my own." James believed, "[The flipped classroom] makes me become a more independent person, and I don't have to rely on a teacher to help me along the way." Oliver thought the flipped classroom mandated that the student become responsible for his/her own learning. For him it was a "sink or swim" type of learning. Kennedy said much the same thing when she said, "It helped me become more responsible as a student and take charge of my own learning." Mia believed that through the homework section of the flipped class she was learning to learn: "I've grown a lot academically, because I've learned how to study better on my own." Sadie indicated that being required to independently review videos and their associated notes for homework was a style of learning that suited her well; she enjoyed learning in the comfort of her home.

On the questionnaire, we asked, "What skills have you potentially gained from the flipped style of learning?" Again, many of the answers from students reflected the idea that they believed the homework section of the flipped classroom made them more independent learners. For example, students said the flipped classroom was about:

- "Taking greater responsibility for my own learning,"
- "Independence-[it] enhanced how I study and learn on my own," and
- "It has made me more of an independent learner."
- "It has helped me to learn for myself."

On the questionnaire, one student pointed out, "I don't believe this [the flipped class] is for high school. It should be for university as my marks have suffered as a result of it." However, overall,

most students explained that the homework aspect of the flipped classroom had a self-regulating catalytic effect—it enticed them to become responsible for their own learning and supported their future success in life.

A part of being a self-directed learner was having course content accessible, having the teacher accessible, and allowing the student to be in control of his/her learning. Mason was very appreciative of accessibility of online notes. He explained that he often forgot his binder, and for him, it was so convenient to be able to access notes on his phone. Carter also referred to convenience when he said, "It's a lot easier to carry around a phone in your pocket than it is to carry around a book or notes." Several students made the point, "There's more things going on in [my life] than school" (Sadie). Many students talked about their participation in sports and volunteer events, and they explained that they have part-time jobs. In general, students explained that the delivery and dynamics of the flipped classroom fit into their busy lifestyle and made learning more convenient and accessible.

Engaged. When asking students to identify the types of learning activities they liked to do during their high school courses, they referred to discussions, debates, hands-on labs, and experiential learning. Then many students expressed their belief that the flipped classroom enabled a style of learning that they preferred. Zoe and Nora stated, "An advantage of the flip classroom is we could have these large discussions" and "Advantages of it [the flip classroom] are all the group conversations." Several students were excited by the technological addition of the videos. Sadie was excited by the homework videos and said, "Videos are more exciting, like there's something different that you can experience." Ryan's comment was similar: "To touch on the videos again, I think they might even be a more valuable teaching asset than just notes … Because they kind of immerse you more, I find."

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Specifically, with regard to class-time portion of the flipped class, Anna excitedly explained that she was engaged in class and motivated to orally express her views during class. Carter welcomed the unique classroom learning environment associated with the flipped class. He explained:

When you do the same thing from Kindergarten to Grade 11, it's just the same thing all the time. So it's [the flipped class] a change of atmosphere, and it's more engaging because you're not... bored as much with the same old routine.

Jackson was also motivated by this novel learning environment. He compared his other nonflipped classes to his flipped class:

Some teachers when I go to their class I know exactly what's going to happen. I'm going to go in. They're going to say hi or whatever. We're going to talk for five minutes. They're going to do some notes and give us a sheet. But when you come to the flipped classroom, it's a different thing every day.

Many of the comments from students indicated that they were bored/somewhat bored in many of their classes, and, in contrast, the flipped classroom style of learning was new and enticing.

Through the questionnaire, when asked to explain how the flipped classroom potentially affected their participation during class time, many students expressed that they were more engaged. Some of these answers reflecting this point included:

- "I am more engaged and asked more questions. I discovered how to think before I speak about an issue."
- "The flipped classroom has made things more interesting."
- "I have become more involved in the class as a result of the flipped classroom."
- "It has been engaging because it is a more active way of learning."

- "[I am] interested in discussions."
- "I have become more involved and invested in class."
- "Class is never boring."

Again, an undertone of these answers was that the students were motivated to participate and engaged by, what was for them, a new style of learning. Having stated such, there were a few students who did not enjoy aspects of the flipped class. Some of these comment were: "I have lost interest in this course as a result of the flipped classroom," and "Learning has become more difficult—[I'm] drowning in a mountain of work."

Empowered. Students also identified the many new skills they believed they acquired because of the flipped class experience and included: visual learning skills, questioning skills, critical thinking skills, debating skills, listening skills, socialization skills, attentiveness, adaptability, open-mindedness, group dynamics, and thinking about things through a different worldview. Several students equated the self-directed learning to securing a life skill that they believed they would need to achieve success in other courses and later during adulthood. For example, Ryan talked about an epiphany he had shortly after experiencing flipped learning. He said, "It just kind of dawned on you that you have to go home and take initiative and be more responsible with your work and put more effort into it if you wanted to succeed." Brendan believed the flipped class would help him think more critically, which would help him in life. He said, "I feel like we learned more life skills with the flipped classroom, because, instead of just learning facts, we got to actually dig deeper and see the other side of things." Oliver stated, "The flipped class is really good to prepare you for postsecondary education, because it really teaches you to be more independent. You're the only one driving yourself." Adding to Oliver's comment, Lucas believed: "The flipped classroom is just preparing you for university and life in general to do your own work and save your own butt. So if you're going to slack in this, you're not going to go far."

Although the majority of students explained that they acquired many new skills, a few students saw no difference in their skill set; however, those students suggested that the stagnant development was due to their lack of personal effort. For example, Carter talked about his friends' lack of effort when he said, "They [his friends] wanted it [learning] to be more like paint-by-numbers sort of thing. They didn't want to apply themselves. They just wanted to have the answers given to them." Two other students said: "I feel lost and frustrated not knowing the material, but I have no time to look at notes at home." And "More independence for learning allowed me to slacken off—hard to keep work ethic up."

In particular, organization and time management were two skills students believed they acquired due to the flipped classroom experience. For many students, the flipped classroom mandated and/or helped them to be organized. Jackson explained that the flipped classroom helped him overcome his procrastination tendencies. He said:

For me, I'm a pretty lazy kid. Like when I go home, some days, I won't take my books knowing that I have homework. That's just kind of who I was I guess. And like, the flip classroom you have to do the work, or you're not going to pass, you know what I mean? On the questionnaire, two students explained, "I have developed the ability to not leave stuff to the last minute" and "I feel more organized."

Enriched Relationships

Teacher-Student. For the courses, the instructors recorded videos through which they personally explained course content. These videos were taped in various locations, including in the teacher's home and places within the local community. Carter thought seeing the teacher in

situations other than in front of the class embellished teacher-student relationships. On this topic, he said:

You see him [the teacher] at his house doing a video for us. It's more of a ... person in general, not just a teacher who you have at school. So people ... that more human one-on-one type of interaction, relationship type of thing, rather than just being a teacher.
Hailey also spoke of the embellished interaction she experienced with her teacher. She said, "You do get to see a lot more of Mr. Avery and that also helps with, like, asking questions. ... whenever you could relate to a teacher more, it's easier to ask them questions." Through the questionnaire, several students made the same comment with regard to feeling more comfortable to ask teachers questions because of seeing them on the videos. Hailey went on to explain that these types of interactions fostered an element of trust within the teacher-student relationship.
Also, seeing teachers on videos made some students less intimidated to email them with questions. Sadie explained:

The only teacher I ever emailed ... was my flip classroom teacher ... she was real easy to reach out to. She was always available and wanting to interact with her students, even if that meant not in the classroom.

In sum, the flipped class appeared to change the power dynamics often associated with traditional learning; the teacher changed from being viewed as an authoritarian figure to the teacher being an approachable person open to addressing student questions and concerns.

Another aspect of embellished teacher-students relations was linked to the topic of technology. Ryan and Carter explained how the technological aspects of the flipped classroom promoted accessibly of teachers, which for them strengthened teacher-student interactions. Ryan believed teachers who flip their class need to be technologically savvy. In turn, "if you want to

ask any particular question, you could just send the teacher a message" (Ryan). "Any teacher who tends to do the flip classroom, tends to be more available or ready to answer you" (Carter). Sadie believed that the flipped dynamics of the classroom made these teachers more open to digitally submissions of work. On this note, she explained, "Also, the flipped classroom teachers, like Mrs. Huggan and Mr. Avery, they're the only two teachers—where I've been in a class—where you can hand things in online. Also with regard to technology, some students recognized that, if a teacher employs a flipped method of teaching, these teachers need to be active learners, themselves. Carter explained how viewing the teacher as a learner can embellish teacher-student relationships when he said, "The fact that both sides are learning, the teacher and the students, it helps, because they can sort of relate to us more."

Student-to-Student Collaboration Promotes Critical Thought. Many students

explained, because they were given the content to review for homework, their class time was dedicated to collaborative forms of learning. In particular, many student comments on the questionnaires explained aspects of this collaborative learning and the influence it had on them:

- "It helped me to become more responsive during class time."
- "This class has helped me feel greater comfort in speaking and expressing myself in classrooms."
- "[There is] More time in class to discuss topics."
- "I can talk about what we discussed in class at home."
- "It has taught me to actively think about the context and consider ideas."
- "[I am] interacting with my own opinion by talking with peers in class discussions"
- "I am better at working with others."
- "I broke out of my shell to speak."

These comments highlight that the collaborative peer discussions students experienced not only mandated greater dialogue between students, it promoted critical thought about content.

Learning Curve

Skepticism, Misconception, and Adjusting. During the focus groups and through questionnaire answers, it was obvious that at the very least many students were dubious about the flipped classroom. In particular, Scarlett said, "At the beginning of the semester, I think everyone was really, kind of, nervous ... not a lot of people knew what it was about. We were all really nervous and thought we were going to fail the course." James explained, "I was skeptical about the flipped classroom at first, but as time progressed, I was, like, wow. This is a great experience for me." Hailey described what her friends initially said about the flipped classroom when they initially experienced it:

I would hear other people around me say like, 'Oh my God, I hate the flipped classroom. It's stupid.' ... It was only a week in, but they'd be like, 'Oh I don't like this, and how are you supposed to do this and this,' ... I think some of us were probably like that because we're not use to it, right?

Like Hailey, Liam's first impression of the flipped class was not positive. He articulated his views and said:

When I was introduced to the flip classroom, I was like, 'Oh, this is going to be stupid. This is not going to change class whatsoever.' [But] whenever we actually started getting into ... things, like doing debates instead of tests and stuff, it actually helped out quite a bit, and I thought it isn't as stupid as I thought it'd be.

Mason confessed he "was a little scared" upon hearing that his Biology course was going to be flipped, and Zoe's remark was "Oh, dear!" when she first heard her Modern History course was going to be flipped. Jackson provided an interesting comment with regard to his misconceptions about a flipped class environment: "For me, when I first heard about the flipped classroom, the first thing that came to my mind was 'no homework,' and I was like, 'sweet, that's unreal." Honestly, for like a month, I did nothing. I watched my mark go down." With regard to the initial learning curve associated with the flipped classroom, through questionnaire comments students said it was "difficult to adapt to [the flipped class]" and "learning how to use technology as part of my own learning." The majority of students spoke about the adjustment phase they experienced when first becoming involved with the learning associated with the flipped classroom.

One of the adjustments of the flipped class was that the instructors provided online notes for most of the course material. The majority of students liked the fact that they were provided these notes. They explained that online notes allowed for open discussion to take place during class. For example, Charlotte said, "I find that since the notes are online and we don't have to write them down in class, we have a lot more time to do class discussions and things, which is how I learn best." Many other students agreed with Charlotte. For example, James liked the online notes and the time they freed up during class, which was filled with student participatory activities. Other students said, "[I] like not copying notes in class" and "More time in class for other things is a good thing rather than taking notes."

Although the majority of students preferred receiving notes online, a few students actually liked taking notes during class, because, through writing notes they made meaning and had an opportunity to ask questions about the notes. Mason explained, "For me, I like to learn more when we're in a classroom and get the notes there, because then I'm allowed to ask questions." Student questionnaire comments also indicated, "I miss not taking notes during class" and "I feel lost and frustrated not knowing the material. I have no time to look at notes at home." In turn, some students enjoyed being taught knowledge-level content during class.

Student Advice. When asking student for advice for instructors considering the implementation of the flipped class, students were quite vociferous. Lucas succinctly stated, "You have to warn them [the students]" ahead of time. Anna said, "Help them [the students] ease into it, and don't like push it on them too strongly. Just realize the fact that it might take a little bit for them to get used to it and understand it." Kennedy said that the instructor needed to accentuate to the students at the start of class that the students need to keep up with the course workload. Similarly, a student on the questionnaire said that it was important for the teachers to clearly explain to students that the homework required outside of class was vital to in-class learning. Mason thought it would be a good idea for him and his classmates to write a letter to future students describing what they need to do to be successful in a flipped class.

Several students discussed the right time to introduce the flipped classroom to students. Ryan thought it was fine to start the flip experience in high school, because it was an ideal time to "change learning attitudes of students." Many students thought it should be implemented before Grade 11. Jackson suggested that the process be introduced in Grade 9 and then all high school courses should be flipped. Sadie thought that the first six years of elementary school should be the "normal or traditional routine and then another six years of the flipped classroom." One student concluded, "This is happening too late in public school—need this to be introduced earlier in school."

Discussion and Implications

An educational philosophy closely aligned with the flipped classroom is the concept of 21st century teaching and learning. It is about transforming how educators and students are influenced by each other's ideas. For example, in relation 21st century teaching and learning, the Action Canada Taskforce (2013) indicated that teachers need to be facilitators of learning. However, we ponder upon the popular statement, *teachers are facilitators of learning*, yearning for greater meaning. For example, in this research, the teachers were facilitators of learning merely through posted video and provision of online notes. Fullan (2013, 2014) and Hattie (2012) state that teachers need to be more than mere facilitators. Teachers were to be organizers of constructive learning experiences for students. They were organizers of in-class constructive learning. They need to act as role models themselves as learners and risk-takers. They need to be approachable and, ideally, accessible outside of class time. They need established trust among and between teacher and students. They enticed students to become more than the students knew was possible.

In relation to the above, an implication of this research is the need to re-examine the teacher's role. The flipped classroom constitutes a role change for teachers, as they release their dominance at the front of the class to a collaborative student-centered community of synergetic, symbiotic learners. These new 21st century teacher-student relationships reflect a type of learning that is decentralized, non-hierarchical, social, hyper-linked, collaborative, and synergetic (Preston, Jakubiec, Jones, & Earl, 2015). These relationships generate new roles and responsibilities for students, too. Twenty-first century learning is about students dynamically assuming the responsibility of knowledge activator, producer, and disseminator (Fullan, 2013, 2014; Prensky, 2012; November, 2010, 2012). Each student is also needs to be a tutor, coach,

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and teacher of other students (and, at times, teacher of the homeroom teacher). The flipped classroom experience is one way to entice students to assume these new learner roles and responsibilities. However, as the findings show, largely during the initial stages of the experience, there was a notable amount of student resistance to this new learning. The student comments like I have to "teach myself" the content was a phrase negatively used to describe the learning. To address this learning curve, teachers who employ the flipped classroom need to teach the students what the flipped class is and is not. Potentially, teachers may start with a pilot or trial flip class that might focus on a curriculum unit, instead of the entire course.

This research supports various student perspectives; their view towards their own learning and self-regulation, as well as ability to reflect on their academic learning and independent work ethic as they relate to the learning community fostered in the flipped classroom environment. The infusion of core values of 21st century learning theory, namely, innovation skills of creativity, critical thinking, collaboration, and communication are evident in the core learning that occurred in both flipped classrooms. The flipped classroom model is a vehicle to infuse these innovation skills, which allow students to master and understand these themes while learning core subject content in a meaningful, interdisciplinary way (Jenkins, 2009).

Changes in student demographics, changes to the world economy, global immigration, and advances in technologies have made the public school environment different than it was a mere decade ago. The delivery of education in public schools is at innovative crossroads, and new forms of pedagogy, as reflected in this research, need to be employed if teachers are to supply students with the learning experiences they need for the future. Although techniques and philosophies that focus on student-centered learning have existed for decades, the flipped

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classroom is a contemporary approach that can be used to partially address the needs of 21st century learners (Rotellar & Cains, 2016). For example, as exemplified in the findings of this study, improvements in student self-efficacy in regards to independent learning and time management indicate that the flipped classroom may be appropriate for preparing students for 21st century careers, which require a constant stream of on-the-job learning.

In line with 21st century teaching and learning and the findings of this study, the flipped classroom has implications on the school infrastructure and/or the physical layout of the classroom. There is a disconnect between modern classrooms that are ergonomically designed for passive student learning the and philosophies of 21st century teaching and learning. For example, school infrastructure and classroom resources, such as the position of blackboards/whiteboards, desks, tables, and the location and distribution of books and educational supplies are similar to delivery of 20th century education. As indicated by Branigan-Pipe (2016), rarely does the physical space and grouping of students connect with new pedagogy encouraged during professional development. Through this idea and through this flipped classroom research, we challenge teachers to reflect upon how the organization of classrooms and the scheduling and delivery of content and courses support or restrain the current learning and future needs of students.

We end by echoing the words of prominent researchers. Milman (2012) indicated, "Although there are many limitations to the flipped classroom ... instructors maintain that it can be used as a valuable strategy at any level, depending on one's learners, resources, and time" (p. 86). Indeed, we advise teachers to consider employing the flipped classroom if they wish to enhance student learning, improve student outcomes, and fully equip students to address 21stcentury needs. However, we are also cognizant of Jensen's (2013) words. "The flipped approach offers no additional benefits to student learning over a non-flipped, active-learning approach" (p. 11). In response, we endorse flipped learning, but we caution teachers that if they want to promote enhanced student learning via the flipped classroom, they need to do more than just move from physically giving a traditional lecture in front of the class to providing that same lecture in recorded format. Consequently, if teachers are planning to use the flipped classroom, they must reflect on such things as technological resources, professional development needs, and the planning of student-focused pedagogy during class. Moreover, they need to view learning as an intertwine process where the student experience in autonomous learning, cooperative learning, and relationship-dependent activities. Whether the teacher chooses to endorse their pedagogy through the flipped classroom or through active in-class learning really, is their prerogative.

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