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Learning Designs Using Flipped Classroom Instruction

Conception d'apprentissage à l'aide de l'instruction en classe inversée

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Abstract

The flipped classroom is an instructional model that leverages technology-enhanced instruction outside of class time in order to maximize student engagement and learning during class time. As part of an action research study, the authors synthesize reflections about how the flipped classroom model can support teaching, learning and assessment through the implementation of three inquiry-based learning designs: (1) guided collaborative discussion, (2) tabletop white boarding and (3) the development of augmented reality auras. Principles for teaching effectiveness are used as a lens to guide the reflection on the benefits and challenges with each of the learning designs. Findings suggest that flipped classroom models that emphasize collaborative learning, group work and accessibility can enable and support inquiry-based learning. Recommendations are provided for educators interested in designing learning using a flipped classroom instructional model, as well as suggestions for future action research agendas.

Résumé

La classe inversée est un modèle pédagogique qui met à profit l'apprentissage hors des heures en classe et qui est rehaussé par la technologie pour maximiser l'engagement et l'apprentissage des apprenants en classe. Dans le cadre de cette étude de recherche-action, les auteurs résument les réflexions sur la façon dont le modèle de la classe inversée peut appuyer l'enseignement, l'apprentissage et l'évaluation par la mise en œuvre de trois conceptions d'apprentissage par investigation : 1) discussion collaborative guidée, 2) tableau blanc de table et 3) développement d'auras en réalité augmentée. Les principes d'enseignement de l'efficacité sont utilisés comme optique guidant la réflexion sur les avantages et les défis de chacune des conceptions d'apprentissage. Les conclusions suggèrent que les modèles de classes inversées qui mettent l'accent sur l'apprentissage collaboratif, le travail en groupe et l'accessibilité peuvent permettre et appuyer l'apprentissage par investigation. Des recommandations sont fournies pour les éducateurs qui s'intéressent à la conception pédagogique à l'aide d'un modèle de classe inversée, ainsi que des suggestions pour la recherche-action future.

Introduction

Contemporary uses of technology are said to allow for "innovative approaches to teaching and learning that improve the quality of students' learning experiences while increasing student choice" (Alberta Government, 2013b, p. 14). The concept of the flipped classroom, an emerging term in the literature, is one such innovative approach to teaching and learning (Baker, 2000; Bergmann & Sams, 2008, 2012; Prober & Heath, 2012; Toto & Nguyen, 2009; Young, Hughes, Inzko, Oberdick, & Smail, 2011; Zappe, Leicht, Messner, Litzinger, & Lee, 2009). This approach is also referred to as inverted classroom (Gannod, 2007; Gannod, Burge, & Helmick, 2008; Lage, Platt, & Treglia, 2000) and generally categorized in literature as video-based lectures (Foertsch, Moses, Strikwerda & Litzkow, 2002; Kellog, 2009; Seery, 2010). Fostering the power of emergent technologies to improve pedagogy, flipped classroom instruction provides students with traditional lecture materials in an alternative format outside of the classroom enabling class time to be used to actively engage students in inquiry-based learning (Bergmann & Sams, 2008; FLN, 2014; Ullman, 2013).

Inquiry is a process of exploring and learning in the world guided by a passion to understand and continually learn (Aulls & Shore, 2008; Shore, Birlean, Walker, Ritchie, LaBanca, & Aulls, 2009). Friesen (2013) describes inquiry-based learning as "the processes of posing questions, problems or issues, gathering information, thinking creatively about possibilities, becoming proficient in providing evidence, making decisions, justifying conclusions, and learning the ways of challenging, building upon and improving knowledge of the topic or field of study" (p. 154). When students engage in inquiry-based learning, active questioning, critical thinking and investigation that promote deep understanding of content occurs (Aulls & Shore, 2008; Erbas & Yenmez, 2011). In a collaborative setting, students explore real-world problems and experts are consulted as part of the inquiry process (Friesen & Scott, 2013). Inquiry-based learning is grounded in constructivism, a learning theory that emphasizes social interaction and the active building of knowledge through ongoing reflection and continual improvement of understanding (Carr-Chellman, 2010; Cornelius-White & Harbaugh, 2010; Gagnon & Collay, 2006).

Flipped classroom instruction moves some of the formally designed instructional activities outside of the classroom in order to create the opportunity for more student-centered learning and meaningful inquiry during class time (Bergmann & Sams, 2008; FLN, 2014; Lage et al., 2000; Toto & Nguyen, 2009; Ullman, 2013; Zappe et al., 2009). When implemented, flipped classroom instruction can encourage the implementation of active and engaging learning activities such as knowledge building, collaborative discussion, problem solving, and hands-on activities (Hamdan, McKnight, & Arfstrom, 2013; Project Tomorrow, 2013; Toto & Nguyen, 2009; Ullman, 2013). Successful methods documented in the literature on flipped classroom designs discuss inquiry-based activities, such as hands-on projects and group work, skill practice, lab activities, small group tutoring, speeches and conversation, exploration of real world problems and peer review, to name a few (Bergmann & Sams, 2008, 2012; Hamdan et al., 2013; Ullman, 2013). Findings suggest that flipping content review to outside of class time can allow for deeper engagement with the content during class activities with peers, which can enable more personalization and continual feedback on learning (Hamdan et al., 2013; Project Tomorrow, 2013). As such, flipped classroom instruction holds promise for improving student learning experiences.

In this paper, the authors discuss and reflect upon the enactment of three learning designs as part of an action research study created to maximize instructional time for inquiry-based learning. This action research study was carried out in the context of a master of education program and combines insights and reflections from the educator-researcher who engaged in collaborative inquiry with two course instructors. Creswell's (2012) characteristics of action research informed the study: "a practical focus, the educator-researcher's own practices, collaboration, a dynamic process, a plan of action and sharing research" (p. 586). Findings from the present study suggest that research-informed instructional techniques used in the flipped classroom can enable teachers to maximize face-to-face instruction in order to support inquiry-based learning and more active student engagement in learning.

Reflecting on learning designs through disciplined action research can inform and develop a shared understanding of the strengths and areas for improvement in future iterations of learning designs. Friesen[1]s (2009) Teaching Effectiveness Framework can provide a foundation for educators to reflect on how inquiry-based learning environments and tasks are designed. The framework consists of five principles: (1) teachers are designers of learning, (2) work students are asked to undertake is worth their time and attention, (3) assessment practices improve student learning and guide teaching, (4) teachers foster a variety of independent relationships, and (5) teachers improve their practice in the company of their peers. Focused on the facilitation of meaningful learning through exploration of relevant issues, the Teaching Effectiveness Framework can be applied to evaluate technology-enhanced pedagogies.

A design team of grade nine teachers in one school engaged in task design and one teacher researcher engaged in ongoing reflection as part of an action-research project designed to improve inquiry-based learning opportunities for students (Creswell, 2012; Parsons, Hewson, Adrian, & Day, 2013). The design team each enacted three learning designs in their own classrooms by utilizing flipped classroom instruction over the course of one school year across five grade nine social studies classrooms. In this article the scope is limited to the reflections and insights of the educator researcher from the design team who used the first three principles of the Teaching Effectiveness Framework as a preliminary lens to reflect on the learning designs (Appendix A), along with insights and reflections from a collaborative inquiry process with course instructors.

The article is organized in five sections. First, a summary of the educational context is provided. Next, a review of the literature on the benefits and challenges of incorporating flipped classroom instruction is provided. This review identifies the gap in existing scholarship on flipped classroom instruction in kindergarten to grade twelve education, specifically pertaining to the grade nine level, subject area of social studies and instructional design intended to maximize class time when implementing flipped classroom instruction, which this action research project targeted. Third, the learning designs enacted using flipped classroom instruction are discussed using the common elements of collaboration, group work and accessibility. Fourth, the principles of the Teaching Effectiveness Framework (Friesen, 2009) are used as a lens to reflect on and evaluate the learning designs. Last, the authors discuss the findings and recommendations for educators who design instruction using flipped classroom instructional models and for scholars developing future research agendas.

Educational Context

Technology enabled approaches to learning can be effective in increasing student understanding of educational concepts. Consequently, effective and purposeful integration of technology has become an integral part of the vision for learning currently being promoted in Alberta (Alberta Education, 2010; Alberta Government, 2013b; Friesen, 2009; Friesen & Jacobsen, 2011). The provincial need to better prepare learners for both future challenges and opportunities is identified in the provincial ministry's vision document, *Inspiring Education*, which highlights the need to prepare learners through the effective and innovative use of technology as engaged thinkers and ethical citizens with an entrepreneurial spirit, valuing opportunity, fairness, citizenship, choice, diversity, and excellence (Alberta Education, 2010). Furthermore, the *Ministerial Order on Student Learning* emphasizes the need to develop learner competencies in communication, critical thinking, complex problem solving, and the application of multiple literacies (Alberta Government, 2013c). A focus on learner competencies, versus content and skills, requires an educational shift away from the dissemination of information to a process of inquiry-based learning and includes the learner's ability to know how to learn, think critically, identify and solve complex problems, manage information, innovate, create opportunities, apply multiple literacies, communicate, and demonstrate global and cultural understanding (Alberta Education, 2010).

Alberta is currently undergoing a process of curriculum redesign and development of a new competency-driven and digitally based kindergarten to grade twelve provincial curriculum (2013a). Moreover, the province's *Learning and Technology Policy Framework* (2013b) accentuates the use of technology to create learner-centered, personalized and authentic classrooms. This framework emphasizes the need for teachers and administrators to stay current, participate in, and apply educational technology research into teaching and learning (Alberta Government, 2013b). Flipped classroom instruction could support this new educational vision. It is a concept that enables the incorporation of new pedagogical strategies (Bull, Ferster, & Kjellstrom, 2012), and it incorporates technology to increase student engagement in learning.

Literature Review

The flipped classroom is described as replacing in-class lectures with methods to explore and review required materials outside of the classroom through video clips, readings, or screencasts (Prober & Heath, 2012; Project Tomorrow, 2013; Toto & Nguyen, 2009; Young et al., 2011; Zappe et al., 2009). In this paper, flipped classroom instruction or flipped learning is discussed using the explicit definition provided by the Flipped Learning Network (FLN) (2014), which is "a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive, learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (p. 1). In this section, the benefits and challenges of designing flipped classroom instruction are discussed. Benefits include maximizing class time, designing authentic learning experiences, supporting student-centered learning and personalization (Bergman & Sams, 2008; 2012; Brunsell & Horejsi, 2013; Hamdan et al., 2013; Project Tomorrow, 2013). The many challenges associated with flipped models, such as creation of instructional materials and access to technology, for both teachers and students are also

discussed (Bergman & Sams, 2008; 2012; Lage et al., 2000; Toto & Nguyen, 2009; Ullman, 2013). These benefits and challenges are summarized in Appendix B.

Benefits of Flipped Classroom Instruction

Researchers describe the benefits of flipped classroom instruction for both teachers and students, which include maximizing class time for inquiry-based activities that develop learner competencies, such as collaborative group work and discussion (Bergmann & Sams, 2008; Hamdan et al., 2013; Lage et al., 2000; Project Tomorrow, 2013). Instead of instructor-driven content delivery, face-to-face instructional time can be transformed into an inquiry-based, student-centered learning environment in which students actively engage in activities such as knowledge building, collaborative discussion, problem solving, and hands-on activities (Hamdan et al., 2013; Project Tomorrow, 2013; Toto & Nguyen, 2009; Ullman, 2013). Specifically noted by Lage, Platt, and Treglia (2000), more time becomes available to explore course material through group work, class presentations and the use of electronic media. With the flipped class model, the time learners spent engaged in project work and problem-solving activities was increased (Bergmann & Sams, 2008; Zappe et al., 2009). Bergmann and Sams (2012) conclude that class time can be used for various student-centered activities, such as content creation, exploration of real-world problems and solutions, concept analysis, use of manipulatives, experimental inquiry, class debates, and oral presentations. Students have an opportunity to use class time to collaborate with peers on projects, engage more deeply with content, receive feedback, develop skills, and receive personalized remediation (Bergmann & Sams, 2008; Hamdan et al., 2013; Lage et al., 2000; Project Tomorrow, 2013; Toto & Nguyen, 2009; Zappe et al., 2009). Instructors can use classroom time to focus on helping students to learn how to problem-solve, in collaboration with others and through guided in-class discussions (Bergmann & Sams, 2009; Driscoll, 2012; Hmelo-Silver, Duncan, & Chinn, 2007; Project Tomorrow, 2013).

Using a flipped classroom instructional design, teachers can better create authentic learning experiences. Authentic learning opportunities are similar to the everyday activities of professionals who work in a discipline (Jacobsen, 2010) and authentic learning allows students to learn about topics that matter to them (Alberta Government, 2013b). Technology can be used to connect students to real-world expertise and authentic problems (Klein et al., 2011), and can be incorporated in designing inquiry-based learning. Using collaborative and connected technologies, learners can share their projects globally (Klein et al., 2011) and engage in social learning opportunities that increase peer interaction and access to diverse ideas and knowledge (Brown & Adler, 2008; Jacobsen, 2010). As well, students can become experts in their area of study. By combining appropriate technology to task design, students can represent learning in a variety of ways to demonstrate the extent of their understanding (Jacobsen, 2010). Moreover, students can explore real world problems (Bergmann & Sams, 2008); students can choose how learning is represented, what resources are used to demonstrate understanding, and how work is shared. As such, incorporation of flipped classroom instruction into task design can enable class time to be maximized for engaging learners in authentic learning opportunities.

A predominant concept appearing in publications on flipped classroom instruction is student-centered learning (Bergmann & Sams, 2008, 2012; FLN, 2014; Sesen & Tarhan, 2011; Toto & Nguyen, 2009; Ullman, 213; Zappe et al., 2009). The flipped classroom design can support students in using technology to "access, share and create knowledge" (Alberta Government,

2013b, p. 6) thus shifting instruction from a teacher directed to a student-centered environment in which topics are explored in greater depth (Zappe et al., 2009). Numerous benefits of technology-rich student learning have been documented in scholarly literature (Alberta Government, 2013b; Friesen, 2009; Friesen & Jacobsen, 2011). Flipped classroom instruction can support designing technology-rich student-centered learning experiences.

Evidence exists that flipped classroom instruction can allow for the personalization of learning (Bergmann & Sams, 2008, 2012; Driscoll, 2012; Lage et al., 2000). Personalized learning is defined as engaging learners in learning possibilities available anywhere, anytime, anyplace, and at any pace "through a range of learning environments that provide flexible timing and pacing to meet diverse students needs" (Government of Alberta, 2010, p. 67). Students have greater control over their learning experiences, rather than being restricted by standardized instructional approaches and tasks (McLoughlin & Lee, 2008). Digital and social technologies can be used to create a participatory culture, which changes possibilities for learning, collaboration, socialization, access to resources, and connectivity (Jenkins, Purushotma, Weigel, Clinton, & Robinson, 2009; Jenkins, 2010). In a participatory classroom, students have more choice in what they learn and how they interact with rich online resources and communities to build ideas and work on projects (Jacobsen, Lock, & Friesen, 2013). As a result, learning becomes more social, participatory, and relevant with opportunities for students to make a meaningful contribution to the world's knowledge online while developing valued competencies. Flipped classroom instruction can support learning that is competency driven and can help to develop competencies in information management, critical thinking, complex problem solving, and the application of multiple literacies (Bergmann & Sams, 2008, 2012; Brunsell & Horejsi, 2013; Driscoll, 2012; Hamdan et al., 2013; Project Tomorrow, 2012). In other words, flipped classroom instruction can support contemporary learning environments and learner goals.

Knowledge acquisition can be promoted using numerous instructional methods designed to support learners of different ability levels. Published research indicates that flipped classroom instruction can support multiple student learning abilities, with students choosing the best method for their learning (Bergmann & Sams, 2008; Lage et al., 2000). Flipped classroom instruction has been found to allow students to learn at their own pace, regardless of place or time, when intentionally woven into instructional design (Bergmann & Sams, 2008, 2012; Driscoll, 2012; FLN, 2014). For example, Bergmann and Sams' (2008) case study comparison of two high school chemistry classes over a two-year period indicated that students appreciated being able to pause and rewind video lessons as needed. When implementing the classroom flip, Bergmann and Sams noted they were able to invest more time with struggling students while enabling their brighter students to work independently and move ahead at their own pace. Students also identified enjoying working at home at their own speed, and they appreciated the individualized attention from the instructor when struggling to understand concepts during class (Bergmann & Sams, 2008, 2012).

Flipped classroom instruction can allow for information to be "chunked", or broken into smaller sections for knowledge acquisition, which results in more effective and efficient task completion (An & Reigeluth, 2012). Bergmann and Sams (2008) reported that teachers perceived students developed a better grasp of content from viewing lessons at their leisure and breaking content into smaller chunks when necessary. Further, teachers identified they could invest more time communicating with students who need help since immediate assessment of student progress and

understanding can occur during class time. The individual pacing and increased attention during class time results in learners benefitting from personalized learning with improved communication between teachers and students (Bergmann & Sams, 2008; Johnson, 2013; Kay & Edwards, 2012).

Challenges with Flipped Classroom Instruction

While there are numerous advantages to flipped classroom instruction, there are also some challenges for teachers and students. Teacher challenges include creating and making videos in formats that are widely accessible for students. If students are expected to watch online videos outside of class time, then access to networked technology is required (Ullman, 2013). Alternatives, such as videos accessible on DVDs or USBs and access to school technology, must be made available (Bergmann & Sams, 2008; Ullman, 2013). For learners without computer access, allowing class time to watch videos when assignments are completed or providing access to computers outside of class will help limit technological barriers (Ullman, 2013). Other challenges for teachers include video production time and equipment costs, not to mention the requisite expertise. Lage et al. (2000) concluded one significant shortfall of the flipped classroom is higher set-up cost for teachers. These costs may include an increase in time required to create electronic lectures and new in-class learning activities, as well as software required to create instructional videos or podcasts (Gannod et al., 2008; Lage et al., 2000; Yarbro, Arfstrom, McKnight, & McKnight, 2014).

Flipped classroom instruction can prove to be challenging for designing intellectually engaging flipped learning materials that support the learner in being active in the learning process. Published research indicates that due to video-lectures being transmitted in a perceived less formal learning environment, some students report being less attentive and self-disciplined when compared to live instruction (Foertsch et al., 2002). Additionally, Lage et al. (2000) reported that when provided with printouts of course notes, combined with the ability to playback lectures, many students were discouraged from taking their own notes. While providing students with notes can be generally ineffective, students can benefit from outlines and graphic organizers that act a scaffold for note taking and that facilitate greater understanding of lecture material (DeZure, Kaplan & Deerman, 2001). Further, Bergmann and Sams (2008) found that some students reported missing the opportunity to ask questions during lectures when viewing material outside of class. Consequently, a passive learning style of sitting and listening is not conducive to flipped classroom instruction. When designing flipped instructional materials, methods for encouraging intellectual engagement must be considered, such as through interactive videos and outlines that provide scaffolding and direction for learners, to better ensure students are actively engaging with material outside of class time.

Another potential drawback identified by Toto and Nguyen (2009) is preference by some students to attend lectures over watching or listening to virtual lessons. Students noted a tendency to be more easily distracted from learning while watching video lectures and reported concerns over quality of recorded lectures, including difficulties with volume, the size of video windows, and platform compatibility. Furthermore, virtual lessons longer than thirty minutes were found to be too long. Despite these challenges, findings revealed that the implementation of flipped classroom instruction for 25% to 50% of the time would be acceptable to students.

The selected literature reviewed for this study revealed both benefits and challenges in designing flipped classroom instruction. The benefits discussed include maximizing class time, fostering authentic learning, student centered learning and personalization. There can also be technological barriers and learning preferences that present challenges for both teachers and students when considering designing flipped classroom instruction. In the next section, the authors discuss the enactment of three flipped instruction learning designs.

Enactment of Flipped Instruction Learning Designs

In the present action research study, flipped classroom instruction was implemented in five grade 9 social studies classes at a grade seven through nine public school in Alberta, Canada during the 2013-14 school year. The following three designs – 1) *Charter for Children*, 2) *Five Factors of Immigration* and 3) *My Perspective on Immigration* – were collaboratively developed by a team of three Alberta teachers. Three common elements of flipped classroom instruction emerged from the literature and informed the first iteration of the learning designs: collaborative learning (Ullman, 2013), group work (Bergmann & Sams, 2008, 2012; Hamdan et al., 2013; Ullman, 2013), and accessibility to technology (Bergmann & Sams, 2008, 2012; Fulton, 2012; Ullman, 2013). These themes are discussed as part of all three learning designs to illustrate how research informed the instructional design.

Charter for Children

Drawing upon research literature, *Charter for Children*, a guided collaborative discussion activity, was designed by a team of Alberta teachers to integrate the themes of collaborative learning, group work and accessibility to technology into the flipped classroom design. First, students viewed a series of teacher-created video story narratives of Dustin Milligan's (2013) *Charter for Children* book series. These stories address individual rights outlined in the Canadian Charter of Rights and Freedoms and were recorded for purposes of this design.

In a conventional design, students would be given one class period to read one book and work on a related assignment in the following class. This approach may result in the need for additional time to complete the assignment at home. However, because stories were pre-recorded, the flipped classroom design gave students the choice as to which video narratives to watch and it also provided additional class time to explore course content (Bergmann & Sams, 2008; Brunsell & Horejsi, 2013). Students could access the narratives online through the school's learning management system, the researcher's YouTube channel or using USB memory sticks with the video files preloaded. Students were also provided access to computers in the school's learning commons (Bergmann & Sams, 2008, 2012; Fulton, 2012; Ullman, 2013). Students were provided with one week to view four of nine videos and to complete a classroom entrance ticket. Similar to formative assessment techniques described by authors as methods of activating students as owners of their learning (Wiliam, 2011), a classroom entrance ticket is an intentionally designed student handout with questions that compliment the learning activity to not only ensure a task has been completed, but to also assist learners in engaging in reflection on their learning. An entrance ticket template is illustrated in Appendix C. In this case, students used the classroom entrance ticket to summarize what they felt they had learned from the video regarding the particular right(s) and/or freedom(s) addressed in the story.

Students were required to provide their completed entrance ticket to gain entry to class (Bergmann & Sams, 2008; Brunsell & Horejsi, 2013; Moravec, Williams, Aguilar-Roc, & O'Dowd, 2012). If they had not completed this task prior to class, a laptop was provided in an alternate space to view the videos (Ullman, 2013). Once finished, students were invited to join class. Class instruction occurred over three days. In class, students collaboratively discussed curricular topics in small groups of three to five members (Bergmann & Sams, 2008; Brunsell & Horejsi, 2013). For two days, groups were provided with questions as a guide to ensure key concepts were discussed. The use of class time was flexible and students progressed at their own pace, taking additional time when required. However, deadlines for question completion and idea gathering were imposed so students did not fall behind their peers. Each student was assigned an individual role to encourage participation. Learning became student-centered as students worked together to build upon existing knowledge and problem-solve to find answers to questions they struggled to explain (Armbruster et al., 2009). Students also engaged in analysis and synthesis as they worked through the guiding questions (Bergmann & Sams, 2008; Driscoll, 2012; Hmelo-Silver et al., 2007; Project Tomorrow, 2013). The teacher was able to act as a guide (Bergmann & Sams, 2008; Hamdan et al., 2013; Project Tomorrow, 2013; Sesen & Tarhan, 2011; Zappe et al., 2009), personalizing the activity and providing immediate feedback to groups (Bergmann & Sams, 2008; Hamdan et al., 2013; Project Tomorrow, 2013). Students recorded their ideas on chart paper in groups and presented ideas to the class on the third day.

Five Factors of Immigration

In the second learning design, *Five Factors of Immigration*, the themes of collaborative learning, group work and accessibility to technology were also integrated into a flipped classroom design using a tabletop white boarding activity. The activity required students to apply knowledge gained from a teacher-created instructional video, which highlighted the five factors that influenced Canadian immigration, in order to explore an interactive website. The primary objective of using the video and web resources was to provide scaffolding on the five factors that influence immigration prior to class so that students could engage in a more complex learning task during class time. Similar to the previous example, students were provided with multiple ways to access the video. As before, students were required to complete a classroom entrance ticket to demonstrate that they had watched the video and had reflected on their understandings. In small groups, students used erasable tabletop white boards made of opaque Plexiglas to collaboratively recall, organize and define the five factors influencing immigration, and to provide one example of a push and pull factor for each. During this process, the teacher posed critical questions, acted as a guide (Bergmann & Sams, 2008; Hamdan et al., 2013; Project Tomorrow, 2013; Sesen & Tarhan, 2011; Zappe et al., 2009), and encouraged students to think deeply (Hmelo-Silver et al., 2007). Once students finished the group activity, they completed an exit pass in which they ranked the five factors in order of personal importance and provided a rationale for their decision. An exit pass is a technique that can be used to analyze the extent of students' learning and to inform instructional adjustments (Wiliam, 2011).

My Perspective on Immigration

Incorporating the themes of collaborative learning, group work and accessibility to technology, the third learning design was a Career and Technology Foundations (CTF) project-based learning assignment (Alberta Education, 2011), *My Perspective on Immigration*. In this learning design,

students were required to create an augmented reality aura using the mobile application Aurasma on the topic of immigration. Augmented reality is a technology that lays computer-generated virtual imagery three-dimensionally on top of a live direct or indirect real-world environment in real time (Azuma, 1997). The aura students created in this task was the virtual layer linked to a two-dimensional target image. In this task, similar to previous learning designs, students were introduced to the project in class, were instructed to watch the teacher-created video, and were asked to complete an entrance ticket over a three-day period (Bergmann & Sams, 2008; Brunsell & Horejsi, 2013; Moravec et al., 2012). The video summarized the steps involved in creating an aura, as well as tips for success during this process. Prior to creating auras, students had to write a speech on their chosen topic and submit their completed entrance ticket. Once each of these requirements were satisfied, the student was given access to a school-owned iPad to create the auras. As a result of individual pacing, students progressed at different rates (Driscoll, 2012; Hamdan et al., 2013), which allowed for the teacher to support students with individual learning needs (Bergmann & Sams, 2008; Sesen & Tarhan, 2011; Zappe et al., 2009). Once the aura was complete, the student documented their learning using a formative self-assessment tool, *Stars and Stairs*, which required students to reflect upon their work and identify both an area of strength and weakness in the final product.

Reflection on the Learning Designs

The first three principles of Friesen's (2009) Teaching Effectiveness Framework, teachers are designers of learning, work students are asked to undertake is worth their time and attention and assessment practices improve student learning and guide teaching, have been used in this study as a preliminary lens for reflection and improvement. A chart that details the strengths and weaknesses of each learning design is provided in Appendix D. The following discussion provides a summary of the teacher-researcher reflections about the first iterations and implementation of the learning designs.

Principle 1: Teachers are Designers of Learning

The first principle of teaching effectiveness is embedded into task design, and focuses on teacher creation of tasks that are intellectually engaging by utilizing students' prior knowledge, allowing opportunities to organize and use knowledge conceptually, and by building assessment into the fabric of study (Friesen, 2009). All three of the learning designs in this study incorporated the technique of scaffolding as a method to incorporate prior knowledge into learning. In *Charter for Children*, students applied prior knowledge of individual rights in Canada to Milligan's (2013) books. This application included notes explaining individual rights afforded to citizens in Canada, as well as class materials that fall under the knowledge and application sections of Bloom's Taxonomy (Bloom, 1956). In *Five Factors of Immigration*, students were required to apply their prior knowledge about immigration. Scaffolding included the teacher-created instructional video highlighting the five factors influencing Canadian immigration. Then, students were instructed to visit an interactive website where they were asked to view and reflect on personal accounts of individual reasons for immigrating to Canada. Viewing the video and completing the corresponding task outside of class time, as well as completion of a classroom entrance ticket, allowed teachers to engage students in more complex learning activities during class time than they would otherwise have had time to execute if they relied on class time alone (Bergmann & Sams, 2008; Driscoll, 2012; Gagnon & Collay, 2006; Cornelius-White &

Harbaugh, 2010; Hmelo-Silver et al., 2007; Pitt & Kirkwood, 2010; Project Tomorrow, 2013). In *My Perspective on Immigration*, students were required to apply prior knowledge, including information obtained through *Five Factors of Immigration*, as well as other in-class tasks. Furthermore, students were required to apply information from the Aurasma instructional video, which provided an overview of how to use the augmented reality technology.

In addition to emphasizing the use of prior knowledge, all three learning designs promoted high levels of intellectual engagement in class by students as they completed activities that required them to organize and use knowledge conceptually. Intellectual engagement refers to "a serious emotional and cognitive investment in learning using higher order thinking skills (such as analysis and evaluation) to increase understanding, solve complex problems, or construct new knowledge" (Friesen, 2009, p.43). In *Charter for Children*, students were organized into small groups and provided with guiding questions to facilitate collaborative discussion, to assist students in organizing knowledge, and to help students conceptually organize information (Bergmann & Sams, 2008; Brunsell & Horejsi, 2013). Similarly, in *Five Factors of Immigration*, in-class instruction emphasized intellectual engagement by guiding students in contemplation, interpretation, understanding, and collaborative meaning-making (Friesen, 2009). Collaboratively recalling, organizing and defining the five factors that influence immigration tasked students with accessing and conceptually organizing prior knowledge gained from the flipped instructional video. As well, *My Perspective on Immigration* effectively incorporated this consideration of prior knowledge. Students were required to create a representative visual image as well as write and record a speech answering two inquiry questions: How is Canadian identity affected or influenced by immigration policies? How is quality of life affected or impacted by immigration (how does Canada benefit from immigration)? Through task completion, students contemplated and interpreted the two questions to determine their personal understanding, find meaning and critique their ideas.

While there is evidence of principle one, teachers are designers of learning, in all three learning designs, there are also areas we identified for improvement. For example, in *Five Factors of Immigration*, if teachers prepared an inquiry question for students to explore throughout the task, this approach could strengthen principle one. Given that this activity was designed to introduce immigration and strengthen student knowledge required for a final summative task, the use of an inquiry question was not considered. However, in the future, students could be introduced to the final inquiry question in the flipped instructional video or could be involved in collaboratively designing the inquiry question based on personal experiences and stories of immigration in the class. The use of inquiry questions can be considered when teachers reflect upon task design in an effort to redesign so that learning specifically requires students to "inquire into questions, issues and problems" (Friesen, 2009, p. 5).

Principle 2: Work Students Are Asked to Undertake is Worth their Time and Attention

Similar to principle one, elements of principle two, work students are asked to undertake is worth their time and attention, were found to be visible in all three learning designs developed by the design team. Inquiry is emphasized in two tasks through posing inquiry questions. In *Charter for Children*, students investigated how effectively the Canadian Charter protects individual rights. In *My Perspective on Immigration*, to organize and conceptually apply information, students were required to create a representative visual image as well as write and record a speech about

Canadian identity, quality of life and immigration policies. Through task completion, students contemplated and interpreted questions to determine their personal understanding, find meaning and critique their ideas.

In addition to emphasizing inquiry, the three learning designs required learners to have a deep foundation of factual knowledge, contextually understand facts and ideas, and organize knowledge in ways that facilitate retrieval and application (Friesen, 2009). In *Charter for Children*, to answer the inquiry question, students were required to develop factual knowledge of what individual rights the Canadian Charter of Rights and Freedoms affords citizens. Students had to conceptually understand these rights and apply this understanding by providing contextual evidence to support their reasoning in the form of scenarios that proposed multiple perspectives. *Five Factors of Immigration* also required learners to develop understanding from the teacher-created video. Students used tabletop white boards to collaboratively recall, organize and define the five factors influencing immigration, and provide one example of a push and pull factor for each. This activity required learners to contextually understand information, and organize it in a way that facilitated retrieval and application (Friesen, 2009). Students were free to choose any format to organize white boards (i.e. listing information in tables, mind maps, lists), and could easily erase and change board layout. In addition, by organizing students in a collaborative group setting, conversation was emphasized, which allowed students to discuss personal relevancy and connect learning to life inside and outside of school (Friesen, 2009). Similarly, in *My Perspective on Immigration*, by requiring students to create both a visual image and speech, learners were supported in developing a deep understanding of factual knowledge, being able to organize knowledge and demonstrate understanding both visually and through writing (Friesen, 2009).

As well as evidence of inquiry and of learners developing a deep contextual understanding of knowledge, the three learning designs emphasized conversation and incorporated both disciplinary and interdisciplinary perspectives (Friesen, 2009). Through organization of students into small groups to engage in discussion on identified curricular topics, conversation was emphasized in both *Charter for Children* and *Five Factors of Immigration*. As well, students were encouraged to reflect upon personal experiences and make connections, thus linking learning to life outside of school. In *My Perspective on Immigration*, the conversations occurred less formally. Students worked at table groups, allowing for opportunities to construct knowledge through informal conversations with peers; they were free to ask for feedback and co-create speeches with partners. However, creating a speech with a partner was not a requirement. Aside from conversation, incorporation of interdisciplinary perspectives was evident in two learning designs. In *Charter for Children*, this learning task connected to science, through environmental issues, and English language arts, by understanding the meaning in a given text. *My Perspective on Immigration* integrated the communication technology cluster of the draft CTF program of studies (Alberta Education, 2011), as well as the visual competencies from English language arts (Alberta Learning, 2000).

As in principle one, there are areas that the learning designs can benefit from revision to strengthen principle two. For example, conversation, such as with a community or family member who had immigrated to Canada, could have been further emphasized in *My Perspective on Immigration* to help strengthen personal relevancy of the task (Friesen, 2009). Further, enhanced conversation and peer review can be accomplished by including a collaborative component to the speech-writing task where peers reflect upon each other's work and provide

feedback for improvement. As well, *Five Factors of Immigration* does not connect to learning outside of social studies. Working collaboratively within the English language arts and math disciplines to connect learning to visual representations, such as the creation and interpretation of charts or visual images of living conditions in societies with high emigration statistics, might further engage learners in deep thinking and intellectual rigor in this learning design.

Principle 3: Assessment Practices Improve Student Learning and Guide Teaching

As with the first two principles, principle three, assessment practices improve student learning and guide teaching, was also found to be evident across the three learning designs. In all three designs, assessment practices were a seamless component of the learning process. Clear learning goals and standards are evident in each design, which integrate assessment-for-learning, and feedback. Additionally, evaluation criteria were transparent, providing clear overviews of both the aims of work and what successful completion means for the learner. The *Charter for Children* learning design includes clear goals and expectations, with a clear overview of both the aims of work and what successful completion means. Students were provided with a detailed overview of completion requirements at the start of the task. Requirements were clearly articulated by the teacher and interactively projected on a SMART Board. Next, the teacher posed an inquiry question and explained the following steps: review a teacher-created video, complete a classroom entrance ticket to demonstrate understanding of concepts from the video, join a small group discussion with peers and fulfill a role within the group, collaboratively discuss and record answers to guide questions, self-assess and reflect using a rubric provided that outlined the task's learning outcomes, and complete a written response answering the posed inquiry question. A clear overview of expectations and assessment of the performance task was embedded into the learning design.

Assessment included both assessment-for-learning and assessment-of-learning methods (Earle, 2013; William, 2011). For example, in all three learning designs, classroom entrance tickets were used to assess completion and understanding. If classroom entrance tickets were not complete, learners were supported in watching the video during class time without repercussion (Ullman, 2013), and then joined the class once finished. As well, all three learning designs shifted the teacher's role to a guide in learning (Bergmann & Sams, 2008; Hamdan et al., 2013; Project Tomorrow, 2013; Sesen & Tarhan, 2011; Zappe et al., 2009), which allowed for formative assessment through immediate feedback, and provided students clarity and individualized assistance (Bergmann & Sams, 2008; Hamdan et al., 2013; Project Tomorrow, 2013). In both the *Charter for Children* and *My Perspective on Immigration* learning designs, students reflected on their learning through a self-assessment rubric. As well, the *My Perspective on Immigration* learning design included a peer-assessment of completed projects. Students worked in table groups, constructing knowledge, co-creating speeches and receiving feedback through informal peer conversation. Organizing students in table groups allowed students to discuss and clarify learning goals in a collaborative manner.

The final work product in each of the learning tasks included summative or assessment-of-learning components. For example, in the *Five Factors of Immigration* design, the students ranked the five factors in order of personal importance and provided a rationale in the exit pass task, which was collected by the teacher for grading purposes. In *My Perspective on*

Immigration, speech submissions were graded using a teacher-generated rubric with specific learning criteria. A rubric was also used for evaluating completed Aurasma projects.

All three of the learning designs in this study can benefit from ongoing improvements that strengthen assessment and feedback. For example, models of quality work could be provided to students (Friesen, 2009). Previous student exemplars did not exist for *Charter for Children* and *My Perspective on Immigration*. Teachers could create examples and ask students to use the rubric to find evidence of the learning criteria. In subsequent iterations of the learning designs, work samples from this study can be used as models for learning and understanding criteria. In *Five Factors of Immigration*, photo exemplars did exist, but were not utilized. It is recommended that when providing direction for the in-class activity, a photo exemplar is included to strengthen student understanding of criteria. Additionally, assessment should be revisited in all three designs. For example, while evaluation criteria was transparent in *My Perspective on Immigration*, students did not receive the peer assessment rubric or final summative rubric until the end of the task. As this was the first iteration of the learning design, the rubric was not developed in advance. As well, in all three designs, the design team created assessment materials without student input. Opportunities for students to co-create criteria could be included in future iterations of each learning design. Last, to strengthen teacher reflection on task design in all three activities, creating opportunities for teachers to share learning designs within a professional learning community to receive feedback from colleagues is also recommended.

Summary of Findings

Using the first three principles of the Teaching Effectiveness Framework (Friesen, 2009), both the strengths and areas for improvement were identified in three learning designs that used a flipped classroom instructional model with attention to themes emerging from current literature: collaboration, group work and accessibility to technology. A limitation of this study is that strengths and weaknesses were identified using reflection notes from one grade nine teacher researcher working as part of a design team in one school. Areas of improvement include incorporating both disciplinary and interdisciplinary perspectives, emphasizing personally relevant conversations, providing opportunities for students to co-create assessment criteria and models of quality work, and engaging teachers to collaboratively reflect through professional learning communities on evidence of student learning and assessment data.

While this paper has synthesized selected scholarly literature and provided three learning designs for flipped classroom instruction in grade nine social studies classrooms, there are numerous areas of inquiry and research that will benefit from future study. Most notably, because of the limited existing scholarship in kindergarten to grade twelve education related to flipped classroom instructional models, additional classroom based research is recommended. As well, while grounded in scholarly literature, further investigation of the learning designs and design iterations is recommended. An iterative, design-based approach to research can assist in addressing the current research limitation of how to design student centered, personalized and authentic learning designs that promote collaboration, group work, and accessibility to technology. Investigation can include replication of inquiry learning designs, which will also assist in generalization of inquiry findings. Moreover, replication can also address literature gaps by addressing curriculum implementation and the impact of flipped classroom instruction on student learning. To strengthen findings of the learning designs discussed in this study,

evaluation of the discussed learning designs using additional scholarly frameworks, such as the SAMR Model (Puentedura, 2009), TPACK (Mishra & Koeler, 2006) or Teaching for Understanding with Technology (Wiske, Rennebohm Franz, & Breit, 2005) may also be considered. Overall, it is evident that continued research in flipped classroom instruction is required, particularly in kindergarten to grade twelve educational settings.

Conclusion

The action research presented in this paper described three learning designs that utilized a flipped classroom instructional model with an emphasis on collaboration, group work and accessibility. To provide a rationale for this innovative work, an overview of the current educational context in Alberta was discussed. Benefits and challenges emerging from the body of literature on flipped classroom instructional models were summarized relative to the advancement of educational practices in Alberta. Three learning designs using flipped classroom instruction were reviewed through the lens of the first three principles of the Teaching Effectiveness Framework (Friesen, 2009). Findings indicated both strengths and areas for improvement in the discussed learning designs, particularly in assessment practices. Research in technology-enhanced learning environments is growing; however, further investigation of the benefits, challenges, implications, and implementation of flipped classroom instruction in kindergarten to grade twelve classrooms is needed.

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Appendix A: Summary of Learning Designs Enacted in Flipped Classroom Action Research

Table 1
Summary of Learning Designs Enacted in Flipped Classroom Action Research

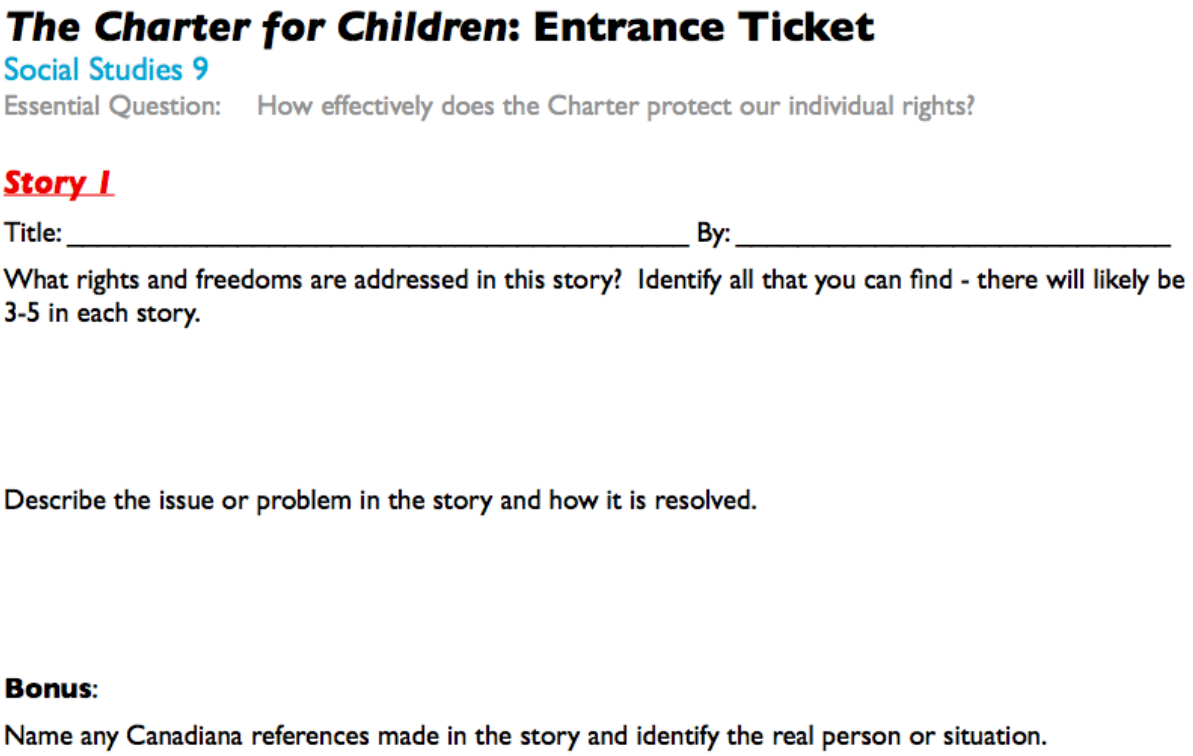
Task	Video Screenshot	Assessment
Charter for Children		Entrance ticket Teacher and peer feedback Self-assessment Written response
Five Factors of Immigration		Entrance ticket Teacher and peer feedback Exit slip
My Perspective on Immigration		Entrance ticket Target image Script Speech Gallery walk Self-assessment

Appendix B: Benefits and Disadvantages of Flipped Classroom Research

Table 2
Benefits and Disadvantages of Flipped Classroom Research

Benefits of Flipped Classroom Instruction	Disadvantages of Flipped Classroom Instruction
Opportunities for class time maximized for inquiry-based, active, and student centered activities (collaborate with peers on projects, engage more actively and deeply with content, receive feedback, and further develop skills).	Students not being able to ask questions when they arise during video instruction.
Supports authentic learning opportunities (learn about topics that matter to the student, represent learning in a variety of ways).	The requirement of technology and an internet connection to complete lessons.
Student-centered learning opportunities – access technology to engage in learning, explore topics in greater depth	Creating and making videos in formats that are widely accessible for students.
Personalized learning – students are able to pause and rewind video lessons when necessary, work at home in their own way, such as chunking, and at their own speed, allowing for multiple student learning styles, with students choosing the best method for their learning.	Students being less attentive and self-disciplined when listening to instructional lectures asynchronously.
Increase in individualized attention from instructor when struggling to understand concepts during class.	Video production time and equipment costs.
Increase in student motivation and ownership over learning.	Students being discouraged from taking their own notes during video lectures.
Academically strong students are able to work more independently.	Preference by some students to attend lectures over watching or listening to virtual lessons.
Opportunities for instructors to engage learners in additional problem-solving activities.	
The ability for teachers to quickly assess student progress and make immediate modifications when necessary.	
Students can feel more comfortable asking questions.	
Increase in more faculty-student interaction.	

Appendix C: Entrance Ticket Template



***The Charter for Children*: Entrance Ticket**

Social Studies 9

Essential Question: How effectively does the Charter protect our individual rights?

Story 1

Title: _____ By: _____

What rights and freedoms are addressed in this story? Identify all that you can find - there will likely be 3-5 in each story.

Describe the issue or problem in the story and how it is resolved.

Bonus:

Name any Canadiana references made in the story and identify the real person or situation.

Figure 1. Entrance ticket template.

Appendix D: Summary of Evaluation Findings

Table 3
Summary of Evaluation Findings Using Friesen's (2009) Teaching Effectiveness Framework

Principle	Criteria	Charter for Children	Five Factors of Immigration	My Perspective on Immigration
Teachers are designers of learning.	Tasks are intellectually engaging by utilizing students' prior knowledge.	Yes	Yes	Yes
	Tasks are intellectually engaging by allowing opportunities to organize and use knowledge conceptually	Yes	Yes	Yes
	Tasks are intellectually engaging by building assessment into fabric of study.	Yes	Yes	Yes
	Learning requires students inquire into questions, issues and problems.	Yes	Yes	Yes
Work students are asked to undertake is worth their time and attention.	Learners to have a deep foundation of factual knowledge, contextually understand facts and ideas, and organize knowledge in ways that facilitate retrieval and application.	Yes	Yes	Yes
	Learning tasks incorporate both disciplinary and interdisciplinary perspectives, requiring deep thinking and intellectual rigour.	Yes	No	Yes
	Conversation is emphasized in tasks, which are personally relevant to learners and connect to life inside and outside of school.	Yes	Yes	No

Principle	Criteria	Charter for Children	Five Factors of Immigration	My Perspective on Immigration
Assessment practices improve student learning and guide teaching.	Assessment is a seamless component of the learning process.	Yes	Yes	Yes
	Assessment-for-learning strategies are integrated.	Yes	Yes	Yes
	Opportunity for students to co-create assessment criteria with teachers.	No	No	No
	Feedback opportunities are embedded into the learning process to support improvement.	Yes	Yes	Yes
	Clear learning goals and standards in assessment-of-learning.	Yes	Yes	Yes
	Models of quality work are provided.	No	No	No
	Evaluation criteria are transparent, providing clear overviews of both the aims of work and what successful completion means for the learner.	Yes	Yes	Yes
	Student reflects on assessment data.	Yes	Yes	Yes
	Teacher reflects on assessment data.	No	No	No

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