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Sample Literature Review on the Flipped Classroom

Grade 97%

25% Literature Review

Due at the beginning of class 6. Electronic submission.

You will be given three articles related to an area of study in mathematics education. You will select an additional three articles from primary sources (journals or books) to add to your body of literature. Synthesize all six articles to prepare an argument for summarizing past research while advocating for the need to more research in the specified area of mathematics education. The following points will guide the development of your paper:

A. Maximum 5 pages (2,500 words) in addition to your title page and references.

B. The title page is a page on its own and should contain a title for your literature review, your name (with middle initials), your email information, and the number of words in the document.

C. Your paper should have an introductory paragraph, body (several paragraphs), and concluding paragraph.

D. Do not include numbered or bullet points in any part of your writing. The writing must include fully-developed ideas structured within paragraphs, not within numbered or bulleted points.

E. You may use parenthesized information and dashes but, if you use them, keep them minimal.

F. Quotes are only to be used if you are citing a very special passage that you cannot summarize. See APA guide for the correct manner in which to insert quotes into your writing.

G. You may use footnotes. If you use them make sure there are only a few (e.g., no more than 2 or 3 footnotes in the entire paper).

H. Do not use endnotes.

I. Include a separate page for your references, cited using APA formatting.

J. Your writing must adhere to APA (6th ed.) standards. (As a part of APA, make sure your use the *Oxford Comma* rule. For example, I like apples, oranges, and bananas [correct]. I like apples, oranges and bananas [incorrect].)

K. Creating a strong final paper involves ***multiple*** reads and drafts of writing. Make great use of your writing partner in this course; help your writing partner, as best as you can. Use the read-aloud strategy discussed in class.

Rating Scale for Scoring

Criteria	5	...	1
Literature Review	Synthesis of literature is woven together presenting an argument that reflects the breadth and depth of literature in the field. Analysis of literature considers the complexity within each study as well as connections between studies; such as the extent to which the studies address the complexity of the issue and assumptions underpinning each study.		Literature review is a collection of individual articles; typically not in the authors voice (e.g., Smith said), subsequently, the author was not able to formulate an argument.
Argument	Argument is well-reasoned, argued, insightful, and clear.		Argument appears to be an afterthought and as a result, it is missing the insight needed to convince the reader that more research is needed in the field.
Writing adheres to standard conventions including APA formatting.	Transitions from one sentence to the next are well bridged providing a well crafted underlying structure that communicates important information in the depth and breadth required. The writing style has a distinct tone and voice that is appropriate for academic writing and adheres to the APA conventions.		Although the writing adheres to standard conventions, it is awkward and difficult to read which could in part be due to issues with APA formatting.

On a fundamental level, all teachers want their students to actively engage in the learning process and to successfully achieve the prescribed outcomes. With the technologically savvy post-millennial generation now entering high school, finding ways to keep them engaged poses a significant challenge. Many mathematics teachers have recognized the value of dialing in to students' technology as an avenue to motivate them. One relatively new technique is a flipped classroom approach, as described by Bergan and Sams (2012). Generally, this involves teachers providing instructional videos for students to watch at home, then using in-class time to work on problems, activities, and projects. It is a flip of the traditional classroom, in which students engage in lower cognitive level work (remembering and understanding) at home and higher cognitive level work (applying, analyzing, evaluating) in class. After a year of using a flipped classroom, Bergam and Sams (2012) noted the success of this model and believed it could be applied to any classroom. However, due to the novelty of the flipped approach, there was a significant need for examination and consolidation of current research on student engagement and achievement in flipped high school mathematics classrooms. From this review emerged new directions for future research; using a flipped approach as a means of differentiation, implementing a flipped-mastery model (Bergan & Sams, 2013), and redefining blended learning. By further exploring these options it may be possible to utilize a flipped approach to increae both engagement and achievement.

In order to examine student engagement in a Grade 10 flipped mathematics classroom, Muir and Geiger (2016) conducted a case study to determine student and teacher perception of the benefits of a flipped approach. They used the motivational framework presented by Abeyseker and Dawson (2015) and examined student responses to an online survey and interview questions. Muir and Geiger (2016) observed that students attributed the flipped

classroom to a greater sense of competence, relatedness, and autonomy which are the key elements of the motivational framework. They also noted the teacher believed the approach to be a more effective way of motivating his students.

Studies in other secondary mathematics classrooms have also reported a flipped approach leads to greater student motivation and engagement (Bhagat, Chang, & Chang, 2015; Clark, 2015). However, in both studies, student achievement was also tested. These researchers administered a content-based test to two groups; one of which was exposed to a traditional approach, and one a flipped approach. Clark (2015) concluded that student performance on the test was the same for both approaches. Bhagat, Chang, and Chang (2015) noted no difference in average and high achievers, but saw improvements for low achievers with the flipped approach. These findings indicated that students were more engaged in a flipped approach, but this engagement had not led to stronger student achievement. Clark (2015) noted the possibility of a novelty effect, seen with any new technology implementation. If this were the case, then once the novelty wore off the flipped approach would offer neither engagement nor achievement. Therefore, the flipped approached has not yet been used to its full potential and needs to be enhanced in order to deliver both student engagement and achievement.

If the purpose of a flipped approach was reimagined as a tool for differentiation, then this approach may also increase student achievement. Bhagat et al. (2015) reported a significant improvement in the low achievement group when exposed to a flipped approach. These low achievers received more attention from their teacher, could problem solve with other students, and had the ability to stop and replay videos, which allowed them to take as long as they needed to understand a topic. These observations, particularly the value of being able pause and replay videos, were confirmed by other researchers (Bergam & Sams, 2012; Clark, 2015; Muir &

Geiger, 2016; Siegle, 2014). These findings also agreed with previous research conducted at the post-secondary level by Bidwell (2014). She reported that engineering and biology students at two different universities showed an increase in student performance for low achievers when a flipped approached was used. Furthermore, she noted a flipped approach fit the way students expected to learn.

Although discussion around differentiation often focuses on low achievers, it is important to also remember the high achievers in a classroom. In one study the researchers observed no difference between a traditional and flipped approach for high achievers (Bhagat et al., 2015). This was likely due to the fact the high achievers would have mastered the material, regardless of the teaching style, and therefore needed enhanced material. Siegel (2014) postulated that the flipped approach offers many opportunities to provide this enhancement for gifted students. When trying to differentiate, teachers make changes to the content, process, product, and learning environment (Siegel, 2014). The flipped classroom offers teachers the opportunity to do this. Teachers were able to provide gifted students with more advanced content to view at home. Siegel (2014) further noted students were able to quickly skip through videos of concepts they knew, and instead could be guided to other websites to explore a topic in greater depth. The teacher asked for a more detailed process when problem-solving, and expected different products from the high-achievers. Finally, the learning environment was completely altered using in-class time to explore and examine challenging content with other like-minded individuals.

It has been well-reported that a flipped approach allowed low and high achievers to receive differentiated instruction, based on their individual needs. In fact, a flipped approach offered the opportunity for all students to learn at their own pace, and tailor their learning to their expertise (Bhagat et al., 2015; Muir & Geiger, 2016). This individualized, student-centred

approach was the focus of ~~much~~ current research on the flipped classroom, and aligns ~~almost~~ well ~~perfectly~~ with what Bloom (1971) called *mastery learning*. Bloom believed that all students in a general classroom could successfully meet course outcomes, given right conditions were in place. Bloom's approach called for the organization of course material into units, which were assessed formatively after initial instruction. This formative assessment provided feedback and corrective procedures for students, to fill in missing gaps in understanding. They were then formatively assessed a second time to confirm the gaps had been filled. For students who demonstrated a solid understanding on the first assessment, Bloom (1971) proposed teachers have enrichment and extension activities for them to complete. Additional research has shown that mastery learning, although historically challenging to implement, led to higher achievement and greater confidence among students (Guskey, 2010). Guskey (2010) believed there was promising work to be done by incorporating mastery learning, an old concept, with new innovative strategies.

Bergam and Sams (2013), two of the first to implement the flipped classroom, identified the strong potential of applying mastery learning to a flipped approach and developed what they called the *flipped-mastery model of education*. They tested this model in their high school chemistry classes. The course was divided into objectives and videos were created for each. ~~The~~ Students viewed ~~the~~ videos and completed associated activities. The instructor then formatively assessed their learning and guided them to either revisit certain topics (low achievers) or delve deeper into a topic (high achievers). When prepared, students completed a summative assessment, randomly generated from a bank of questions for each student. The instructor then met with the student to discuss the incorrect answers. This approach was reported to have led to greater student achievement and enjoyment (Bergam & Sams, 2013).

Bergam and Sams (2013) strongly advocated for a flipped-mastery model of teaching and learning, however they were not confined by the strict view of a flipped classroom that some hold. They and others noted that sometimes direct instruction is not the best way to teach a topic (Bergam & Sams, 2013; Siegle, 2014). Many other researchers have commented that a "traditional" flipped approach is not suitable for all topics, all the time (Clark, 2015; Siegle, 2014). A variety of instructional approaches will likely be most effective. A flipped approach is a form of blended learning and teachers must realize that there is not one prescriptive model that works in all cases. Sometimes a video at home is an effective way to introduce a topic, but sometimes a concept will call for direct in-class instruction. Other times an inquiry or discovery activity will be the best way to start a lesson. Teachers must strive for a true blend of different instructional tools that will best meet the outcomes. This is possible because a flipped approach can be defined however the teacher wants in order to achieve success.

Since much of the current research regarding flipped mathematics classrooms has failed to demonstrate both student engagement and achievement, the structure of a flipped approach needs to be reimagined. Bergam and Sams (2013) advocated a flipped-mastery model. This is a blend of different instructional strategies and aspects of a flipped classroom, combined with a mastery learning framework. This approach has shown great potential in high school chemistry classes. Thus, further investigations into this, and other blended approaches, are needed to support whether a similar approach can improve student achievement, while also increasing student engagement in high school mathematics classrooms. ✓

for instance, ...

good point.

nice conclusion

Well done! Your voice comes through presenting a solid argument for more research

Lit Rev 10
Arg. 10
Writing 9

29/30

References

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