

Flipped Learning: A teacher's perspective.

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This research follows on from the research: Exploring teachers' and students' responses to the use of a Flipped Classroom teaching approach in mathematics (Oakes, Davies, Joubert & Lyakhova, 2018)

Specifically it focuses on a teacher's perception of the impact of utilising a Flipped Learning classroom; both using the participation in the above research and drawing on the work of other authors.

The research will dig deeper into the categories of preparation, homework and lessons and ascertain from the teacher perspective whether these areas can become the non-negotiable elements of the course. It will also consider the impact of workload and the assumptions that as teachers we make of students' understanding of technology and time management.

The primary source of the data analysis is qualitative and the main area to analyse is whether the preparation and trust that is given to students in this type of learning is repaid?

Flipped classroom, pedagogy, resources, depth, connection

Introduction and background

The flipped learning approach is based around students arriving at a lesson having completed work that gives them a basic understanding of the concepts and methods required for the tasks of the lesson. The philosophy behind this approach gives lesson time for collaborative working on tasks that develop deep learning through making connections and engaging in investigative and challenging problems. This relies on a basic understanding being acquired by students outside of timetabled lessons and there are a variety of ways this can be achieved; the use of instructional videos is a popular strategy.

My interest in the approach came about due to the reduced time allocated to the teaching of the further mathematics advanced level (A level) qualification and the emphasis the new syllabus placed on understanding of concepts. Both of these challenges could potentially be overcome through a flipped learning approach. I had also found that the level of collaboration and discussion between students was minimal and the flipped classroom approach had the potential to encourage both of these. I chose to conduct the research with a Year 12 further mathematics advanced subsidiary level (AS level) group of four students. However, as well as the many advantages there were also disadvantages to consider.

The main advantages cited in research considers both the lesson time and the use of homework. In lessons, the teacher is present and students can collaborate when the challenging work is being completed and as the work is more challenging, the students are more likely to become stuck, enabling the teacher to guide students and help them to work through the task.

The time when my students really needed me physically present is when they get stuck and need my individual help. They don't need me in the room to yak at

them and give them content, they can receive content on their own. (Bergmann & Sams, 2012. p. 5)

The benefits of flipped learning approach to homework is that students are able to spend as long as they need in order to understand the concepts and methods and produce notes or highlight or annotate given notes that they found useful. Another observation was that the students arrive at the lesson with a similar level of understanding. (Straw, Quinlan, Harland & Walker, 2015.)

The disadvantages focus around time and readiness. Time is required to make or find suitable videos and tasks for the lessons that stretch and deepen understanding and promote collaboration.

Finally, we found that the students' unfamiliarity with flipped learning and the instructors' significant start-up effort were the two major challenges to implementing flipped classrooms. (Lo, Hew, & Chen, 2017. p. 66)

This is due in part to the vast amount of resources that are readily available and so the need to sift through them in order to find the video and resource that best suits the students that you are teaching. (Wilson, 2019.) The second main disadvantage revolves around the readiness of students to have the maturity to watch and ensure understanding of the topics in the videos.

However, owing to their lack of self regulated competence, most students might fail to browse and comprehend the instructional materials out of class by themselves. (Lai & Hwang, 2016. p. 126)

This was a lesser concern due to the nature of the group involved; being at least sixteen years old and on the first year of the A Level further mathematics course, I felt that students would have the maturity, commitment and learning skills needed to embrace the flipped learning approach.

Methodology

I chose to structure the flipped learning experience by producing videos and notes to accompany the videos. Students used sticky notes to write any queries that they had from watching the video. The final part of the homework made use of mechanical questions, designed to test students' understanding of the content of the videos. Having used homework time to deliver the content of the lesson and complete the basic questions, lesson time was freed up to develop deeper understanding of the concepts through challenging problems and tasks that encouraged students to collaborate and discuss their strategies for finding solutions to the problems. The students were consulted about the research from the outset, with their consent being obtained to participate in the research, interviews and questionnaires.

Before starting the flipped learning approach, there were concerns about the impact of implementing this approach. The possible impact of the flipped learning approach can be broken down into three areas; teacher preparation, student homework, lessons. With respect to teacher preparation, the major concern was time; the time taken to source or make the videos and the time taken to find appropriate resources to stretch and challenge students and encourage collaboration and discussion. (de Araujo, Otten, & Birisci, 2017.) The prospective impact on students was more about the type of homework and the readiness of students to embrace the approach. On the subject of lesson time, rather than starting with introducing the content, the starting point was to assess understanding and consider any queries that the students had and check answers to the few basic questions students had also completed as part of the homework. In order to minimise the potential impact on

homework, I decided to make my notes available for students to annotate and highlight as an alternative to making their own notes.

Due to the nature of the class involved the sample was very small; four students. The majority of the data was qualitative through observation and pupil comments. The students were interviewed and the interview data was made available to me. (Oakes et al., 2018).

Findings

Student Workload and Readiness

Homework

Homework changed in the type of homework that was set and the accessibility of the work. As long as students had access to technology, and with my students, this was not an issue, the homework was, on the whole, less stressful as students were watching the videos, making notes and completing a few standard questions. This compares to before when students would be set follow on questions from the work in lessons, which could be challenging and therefore potentially students could become stuck, creating a stressful and negative situation.

There is the concern that conscientious, weaker students could spend hours on making notes however, this was not observed. As I was making notes to use in the video I found that giving out the basic notes for students to annotate and highlight helped for some students. One student said, “I prefer making my own notes but I know other people prefer hers. But it is quite nice because you can have hers or make your own” (student observation HH1.) Students were also encouraged to write any queries on sticky notes at the place where there was some confusion and these were discussed at the start of the subsequent lesson.

As well as the watching of the video and making of the notes, students were also given a few straightforward questions to complete in order to check their understanding of the methods discussed in the video.

Lessons

Within lessons, students were more interactive and less passive in their learning. They arrived at the lesson with questions and queries and immediately they were involved in the lesson. This did mean that the students needed to be able to recognise and articulate their queries. There was more collaboration between students and much more discussion and questioning of the students rather than delivery by the teacher. Students also felt that they were engaged right from the start of the lesson: “we have more time in class as we just go in and we know what we’re doing straight away” (student observation HH3.)

Independence

The onus was very much on student independence and having the capacity, organization and commitment to work at home and produce notes that they could understand and to which they were able to refer back. It was observed that those students who were not used to working outside of lessons found it difficult to adjust at first to the necessity of arriving at lessons fully prepared, however, the direct impact

of not watching the videos on the ease of the lesson meant that students saw the benefits quickly.

Teacher Workload

The main finding was that initially it was very time-consuming for me. The making of the videos or sourcing of appropriate videos so that students were able to develop a secure understanding took a huge amount of time, as did the initial gaining of familiarity with the technology involved and finding a suitable platform for sharing the videos. Alongside the creating or sourcing of the homework tasks was also the creating or sourcing of suitable tasks for the lessons, ones that involved discussions, deep learning, the making of connections and collaboration.

However, a benefit was that assessment could take place in class and importantly it was more beneficial if that happened. I was able to check students' solutions to problems and understanding of concepts whilst they were working and therefore address any misconceptions before they became embedded. This freed up time that would have previously been used for assessment for the preparation of videos and resources.

Discussion

Advantages

Students could identify with the benefits of completing the homework. They preferred completing the challenging work during the lesson rather than at home. One student said "if you have ideas you can bounce them off everybody" (student observation HH2.) Another benefit was that the videos were always available and could be accessed whenever students needed them. This was very useful for revision. I found that lessons were more dynamic and I was enabling learning much more, rather than delivering content. There was also time between the initial learning through watching the videos and applying that knowledge and skill in the lesson. This had a benefit of giving students time to forget and retrieve their learning.

The utilisation of the flipped classroom approach also freed up time in lessons to involve other activities that were not directly part of the syllabus but would deepen the understanding of the content of the syllabus.

Disadvantages

As well as the time that this approach required at the outset, another disadvantage was the lack of verbal and non-verbal feedback whilst delivering and teaching content. Using a traditional approach, student reactions would be used to adapt the delivery to ensure understanding and avoid misconceptions. With the flipped learning approach, this was unavailable and identifying misconceptions had to wait until the subsequent lesson. However, as my knowledge of the students grew, so did my ability to anticipate where students would have a problem understanding a concept or step in the method and the videos were then made to reflect this.

Conclusion

Overall, the flipped learning approach worked extremely well with this group of students. I found that the making of the videos became easier, quicker, and so less

time consuming. They are also set up ready for next year's group of students. Once the platform for sharing the videos had been set up, then this was easy to keep populating with videos and sharing the link with the students. Due to the collaborative nature of the research with the students, their views were sought and valued and it became very clear that the students much preferred the videos that were made by me, as their teacher, and were short. They preferred to watch three short videos focusing on one concept or skill at a time rather than a longer video containing all three concepts/skills. It gave them the option to split up the work and they did not have to find a huge chunk of time in one go.

The lessons were enhanced and much more dynamic with students cooperating and collaborating to solve challenging problems. My role in lessons became much less didactic and more interactive. There was an atmosphere of engagement and involvement, with me leading the learning rather than managing it.

The mock results were also compared; the group that followed the flipped learning approach had a higher average and a lower standard deviation than had been seen by a previous group of students following the same syllabus. This at a simple level suggests a positive effect from the flipped learning, however, the validity of this is questionable due to the sample size.

After the initial few weeks, there was no problem with the readiness of the students to adapt positively to the flipped learning approach. The students involved were more than ready to take responsibility and repay the preparation and trust given to them by this approach. What is yet to be determined, is whether this is due to age of the students and/or the maturity in their learning skills and whether this approach can be successful with younger students. To sum up, for whom does the flipped learning approach work and not work, and why? (Stohr & Adawi, 2018.)

The next steps will be related to this, as well as continuing the flipped classroom approach with this group of students as they complete their A level further mathematics course; the flipped classroom approach will also be trialled with a Year 11 group of students as they embark on the additional mathematics qualification after completing their General Certificate of Secondary Education (GCSE) in mathematics and mathematics-numeracy.

The flipped classroom approach was a beneficial experience. "I think if people follow it properly, then it can really work." (student observation HH1.)

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