THE EFFECT OF USING WEEKLY PODCASTS ON STUDENTS’ LEARNING

by

Ahmed Shawli

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of

Master of Science

in

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STATEMENT OF PERMISSION TO USE

In presenting this professional paper in partial fulfillment of requirements for a master’s degree at Montana State University, I agree that the MSSE program shall make it available to borrowers under rules of the program.

Ahmed S. Shawli

July 2014
ACKNOWLEDGMENTS

I would like to express my gratitude and appreciation to all those who help me in completing this project. Special thanks to the Gallatin Valley Home-school Co-op (GCHC) who afford me the opportunity to conduct this project with the science class students. I also would like to thank and express gratitude to all the students and parents in GCHC science class for their support and enthusiasm in class as well as for their effective participation in my project. And finally I would like to acknowledge with appreciation the role of Dr. John Graves for his support, guidance, and full effort to maintain the progress of this project.
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ABSTRACT

In this project, the effect of flipping the classroom by the use of videocasts was studied to measure its effectiveness on student learning outcomes compared to the traditional classroom. Also the effect of increasing the number of videos per week on students’ learning was studied. To accomplish the objectives of the project, the class was divided into three periods: no video period, one video a week period and two videos a week period. The data revealed that students scored higher in the one video period in both teacher-made assessments and weekly online quizzes. Also, increasing the number of the videos to two did not show any increase either in the teacher made neither assessments nor the online quiz result. Overall, students reported positive feedback regarding the flipped classroom approach and the results showed that they preferred it to the no videos period, traditional approach.
INTRODUCTION AND BACKGROUND

The Gallatin Christian Homeschool Co-op meets weekly at the E-Free Church building in Bozeman, MT. The purpose of the Co-op is to provide classes for the students who attend regularly. Students from newborn to 18 year old attend the Co-op and classes are only offered for students aged 3 and above. The number of students enrolled in this program varies each semester. However, 123 students were enrolled as of spring 2014. There were some volunteering teachers who had no students enrolled, but most of the teachers were the students’ parents who participated in teaching different types of courses (personal communication, J. Pannell, January 16, 2014).

In the fall of 2013, I was participating in a training program for teachers as part of the MSSE program with Dr. John Graves, who volunteer teaches at the Home School once a week. He was teaching a weekly science class to students aged between 15 and 18, 9th -12th grade students. Dr. Graves was using the flipped classroom as a teaching model to deliver the course materials to his students. He was making a weekly podcast that students had access to prior to class. The class time was mostly used for discussing concepts, working on gaps in learning, and providing an active learning environment through the use of inquiry-based activities. The 9th -12th grade students liked using the flipped classroom model and they considered it an effective tool for learning.

In spring 2014, I taught science (microbiology) to the same age group of students. The class consisted of 16 students who attended class once a week. After discussing with Dr. Graves about using the flipped classroom approach with the students, I proposed a model to study the effectiveness of using this method by increasing the number of podcasts to twice a week. This lead to the focus of this study, What was the effect of
increasing the number of podcasts in a 9th -12th grade Home School Science classroom?

CONCEPTUAL FRAMEWORK

Blended learning, using traditional face-to-face teaching and podcasts are changing the way educators conduct classes within the classroom. This promotes creative thinking and problem solving which is necessary for developing knowledge and understanding (Liamthaisong, Pumipuntu & Kayapard, 2011). Det (2003) identified the blended learning to be a combination between the conventional face-to-face learning and the online learning approaches. Blended learning is also described as maximizing the best advantages of face-to-face learning and multiple technologies for learning delivery (So & Brush, 2008). When examining the model of blended learning using e-learning environments, students today should adapt to the use of the technology, as the current generation of students are high users of technology. With the development of the Internet in the last 30 years, education has become based on gaining knowledge and understanding from other sources than the traditional classroom model. When considering Vygotsky’s theory of mind and students reaching their zone of proximal development, this model support students learning at their pace, in reference to their current abilities (Vygosky, 1978).

Today’s educational settings are moving towards e-learning environments, but currently the support from the traditional face-to-face learning environments still needed. This fact leads to the idea that a blended learning environment approach brings the two learning environments together and corrects the deficiencies of both the online and face-to-face model (Balci, 2008). In the blended learning-teaching model the purpose is to establish a balance between the online learning and face-to-face models. There is no
simple theory of how to balance the blended learning approach however research indicates that it needs to be a balanced effective model as to meet the individual needs of the learner. It is known that there should be a clear relationship between the explicit teaching model, and the podcast e-learning scenario (Silverwood, 2007). Podcasts are media digital files made available to be distributed through the Internet and downloaded to portable audio or video media players such as computers, IPods, IPhones, etc. (Jham, Duraes, Strassler & Sensi, 2008). Other important considerations are that the activities merge together to form a blended model of learning.

The American Society of Education and Development cites blended learning as one of the top ten trends in the knowledge delivery industry of education in today’s modern society (Graham, 2006). Siemens (2004) states that in the last two decades technology has changed the way we live, learn, and communicate in our day-to-day lives. This also allows sharing of information to be available 24 hours a day in an environment that supports and suits the learner’s needs (Hargadon, 2010). With faster Internet, learning within the 21st century has promoted the expansion of digital technologies that have provided a platform for educators to re-think the traditional views and strive to develop further blended learning environments. This allows further face-to-face interaction with the students, forming more one to one interactional relationships with student-centered pedagogy to support an in-depth learning model (Soloman, 2007).

The blended learning model also allows students to interact with multimedia, supporting auditory learners in the process, allowing students to re-listen to the subject content and be more prepared when attending traditional face-to-face learning
environments. Students who have participated in the blended learning model are more successful than those educated in the traditional manner (Yapici & Akbayin, 2012).

Educators are aware of the advantages of using podcasts in explicit learning models. Research indicates that the expectations of the students to use new technologies are high. The qualities of students’ in online course discussions indicate the positive flexibility and convenience to listen to content anytime, anywhere and to multitask whilst moving about (Jowitt, 2008). Other major positive factors that support the students learning outcomes are the ability to re-listen to the podcast at their convenience for supporting long term memory input and higher order thinking (Barron, 2004). Smith and Fidge (2008) state that the use of podcasts compacts the facts and enables more explicit teaching that supports discussion and inquiry based learning models.

Other evidence indicates that students use podcasts when reviewing content for revision and preparation for exams. Evidence shows that this type of study method is more efficient than if students were studying from written notes (Ramaswami, 2009). Furthermore, podcasting has expanded the integration of the classroom-teaching model on the basis of pedagogical concerns rather than administrative convenience. Teachers also have speculated that the experience of an improved study environment may eventually reduce face-to-face learning time and support higher rates of competition of tasks and higher academic levels amongst students (Heilesen, 2010). Hew (2009) states that the availability of the podcast in his research did not appear to encourage students not go to class.

Hew (2009) conducted seven studies using descriptive research models that examined the use of podcasts by teachers, and students. His studies identified some
negative aspects to using technology whilst broadcasting, which included the students’ lack of experience in using the broadcast platform. Other issues included users experiencing technical problems when accessing and downloading the broadcasts, and students’ inability to see relevance within the content (Bell et al., 2007). Instructors’ barriers on the other hand, were mostly the lack of experience dealing with podcasting, finding time for podcast preparation, problems in fitting podcasting in their subject area (Hew, 2009).

In conclusion, the use of blended learning teaching model with face-to-face teaching and using podcasts in educational settings support the students’ learning by allowing them access to information at their convenience. Both auditory and visual learners have reported an increased ability to absorb the content. Research indicates that the blended learning model supported students’ achievements levels more than traditional teaching methods and developed positive attitudes towards using technology. A few negative aspects were indicated with technical problems and lack of experience as factors in the user’s inability to access or use the technology. However, the positive endorsements for the model include students’ readiness to be prepared prior to class, participation whilst in class, and the ability to review content when appropriate to the individual student for use in revision or studying for exams. Other indicators support the ability for students to learn at their own pace supporting Vygotsky’s (1978) theory of proximal development.

METHODOLOGY

The purpose of this study was to determine the effectiveness of using blended learning or a flipped classroom on high school students, grade 9-12, through one
semester. The blended learning consisted of weekly podcasts (video casts) made by the teacher and viewed by students prior to class. Students were able to watch the videos on a website that was generated especially for this course using Google Site (https://sites.google.com/site/bozemansstudents/). Time in class was spent for activities, discussion of concepts, working on gaps in learning and to clarify misunderstanding points that students encountered. The research methodology for this project received an exemption by Montana State University’s Institutional Review Board and compliance for working with human subjects was maintained (Appendix A).

In order to determine the effectiveness of using blended or flipped classroom learning style, the course was divided into three different periods. Each period was four weeks long. In the first period, weeks one to four, the students were not introduced to the video cast at all, instead, they had full time face-to-face instruction. This period was referred to as no videos. During the second period, weeks five to eight, the students were introduced to flipped learning by watching a single podcast prior-to-class each week, the one video period. The third period, weeks’ nine to twelve, students were using the site to watch two different podcasts prior-to-class each week and this time was referred to as the two videos period. The time in class in period two and three was spent to reinforce learning by identify gaps in learning, examining concepts more deeply and going over some of the students’ questions in order to provide them clarifications on misunderstood points.

Answering the two research questions required using four different data sources: in-class teacher-made assessments, online quizzes, student surveys and student interview. The four different data collections strategies were applied to the three research periods,
which contributed in providing quantitative and qualitative data to draw the final conclusion of the research. A triangulation matrix illustrates how the data collection of this research was planned (Table 1).

Table 1
Data Triangulation Matrix

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Data source 1</th>
<th>Data source 2</th>
<th>Data source 3</th>
<th>Data source 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary question</td>
<td>Teacher-made assessment</td>
<td>Online quizzes</td>
<td>Pre-unit and post-unit Student surveys</td>
<td>Post-unit Student interview</td>
</tr>
<tr>
<td>How does podcasting improve students learning?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary question</td>
<td>Teacher-made assessment</td>
<td>Online quizzes</td>
<td>Pre-unit and post-unit Student surveys</td>
<td>Post-unit Student interview</td>
</tr>
<tr>
<td>Is increasing the number of podcasts per week effective for the students?</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

The Teacher-made Assessment were used to measure student understand of the content being taught (Appendix B). A total of four assessments were used and they varied from 7 to 10 questions. The assessments topics were bacteria, viruses, mold and human cells. The results were used to measure students learning and to direct my teaching. Averages between assessments were calculated and compared between assessments to determine changes.

Online Quizzes were utilized to measure the students’ understanding of the weekly content provided via videos (Appendix C). A total of 12 assessments were used and they varied from 6 to 10 questions. Students did the quizzes after they had watched the videos at home. The results were used to direct my teaching and to measure the students learning outcomes.

The Pre-unit and Post-unit Surveys were used also to collect data from students (Appendix D&E). They were mostly focusing on the students’ experiences with the
flipped the classroom and the traditional classroom. The survey also asked students to identify their learning style as either visual, auditory, tactile or kinesthetic. A total of four surveys were used and they varied from 5 to 10 questions. These were given to students in class except survey four that was given online. The surveys were taken every three weeks and students were given 10 minutes to complete the surveys. The results were calculated and compared among the assessments to determine changes.

The Student Interview was administered at the end of the semester (Appendix F). It centering on the students’ experiences using the flipped classroom and the traditional learning. The interview was held in class and consisted of nine questions that were focused on flipping the classroom experience. Survey data was analyzed for themes and used as evidence to support other data.

DATA ANALYSIS

The results of the (Pre-unit) Survey indicated that 47% of the students classified themselves as visual learners, whereas 40% tended to be kinesthetic learners \((n=14)\). Both auditory and tactile students shared the same percentage of 6.67% (Figure 1). When asked about their preference in learning, 20% of the students preferred the traditional face-to-face teaching style and 20% chose the (prior-to-class) videos as their preference. However, 60% of the students favored a combination of both face-to-face and (prior-to-class) videos as their best learning style. When asked about their time preference to be introduced to the weekly class’ material, 53% liked to be introduced to the material before class, while 47% preferred the class time for that.
The results of the (Pre-unit) Survey also showed some students’ prediction of videos’ usefulness. When asked, if they think watching a podcast every week for our class will add to their learning, 87% of the students reported yes, while 13% answered maybe. When asked about why they think the videos would be helpful, 60% answered that videos are a tool to learn scientific words and concepts, whereas others saw it as a source to review information.

Data from the Post-unit Survey showed that 73% preferred the video length to be less than 10 Minutes, while 27% thought time less than 5 Minutes was appropriate for the video length. One student said, “I think 10 minutes is enough because, normally it takes me more than 10 minutes to watch the video and take notes.” Another student said, “I spend more than 15 minutes to watch a 5 minutes video, because I stop the video several times to take notes.” When asked when they want to have access to the video, 25% answered 2 days before class and 58% answered 4 days before class, while 16% wanted to have access to videos 6 days before class (Figure 2).
The results from the Teacher-made Assessment in the one video period showed that students’ average grades were 91% and 93% for Assessment 1 and Assessment 2 respectively (N=12). However, the students’ average scores were 77% in Assessment 1 and 81% in Assessment 2 in the two video period (Figure 3).

Data from the Online Quizzes showed that students’ average results in the no video period was 70.5% (N=12). However, students’ average results increased to 90% in the one video period and to 89.7% in the two video period (Figure 4). When asked which
period was their preference, equally 37% of students preferred the *one video* a week and the *two video* periods, whereas, 25% of the students favored the *no video* period. One student said, “Videos let me learn at my own pace and it is a great tool to understand the main concept.” Another student said, “The weekly online quizzes highlight the main concepts in the lesson.” When asked if they ever reviewed the videos after watching them the first time, 25% of the students reported *yes* and 25% reported *no*, whereas 50% of the students answered they *sometimes* reviewed the videos.

![Figure 4. Students’ Online Quizzes Average Results, (N=12).](image)

The Data from the Pre-unit and Post-unit Surveys also showed results regarding students’ study skills and learning outcomes. In the *no video* period when asked about how often they take notes, the data revealed that 13% of the students *always* take notes in class, and 80% they *sometimes* take notes, whereas 6.67% of the students answered they *never* took notes (*n* = 12). In contrast, in the *one* and *two video* periods a total of 73% of the students *always* take notes while watching the videos, 20% indicated they *sometimes* take notes, while 6.67 responded they *never* took notes (Figure 5). Further, the result also showed that 87% of the students think the weekly videos helped them learn numerous
scientific words and 62.5% think the videos is an effective way to increase their learning. One student said, “Taking notes while watching the videos and writing down questions for the class helped learn a lot about bacteria and viruses.”

Figure 5. Comparison Between Taking Notes in No Video and One and Two videos periods, (N=12).

INTERPRETATION AND CONCLUSION

Flipping the classroom approach was applied to the bacteria and viruses class I was teaching in the spring of 2014 at the Home School Co-op. According the results, the weekly podcasting was an effective tool which students could utilize to improve their learning. A comparison between the results of the traditional classroom and the flipped classroom utilizing the video casts showed an increase in the students’ note taking habit and learning outcomes. Before the use of the video cast method, a low number of students were able to take notes during the class time. However, after the use of the videos, students were able to take effective notes and ask in-class questions that increased their learning outcomes. The reason could be due to the fact that students were learning at their own pace before coming to class, tended to be more familiar with the subject when
they come to class, and were able to ask questions that furthered their learning. This supports the work by Barron (2004). Moreover, the results showed an increase in students’ scores in both one video and two video periods compared with the no video period. Students’ dominant learning style, which was visual learner, was a strong factor behind their high score in these two periods. When students watched the videos at home before class, it enabled me as an instructor to teach more complex aspect of the concepts and provided more time to spend on in-class activities, supporting the work of Smith and Fidge (2008). In addition, in the one and two video periods there was more time to be spent on one-to-one communication with students, which helped them mastering some aspects of the content. Students in these two periods appeared to be more confident about asking questions whether in class or one to one communication with the teacher, and this might be due to the fact that they were more familiar with the concepts prior to class time.

Furthermore, after implementing the classroom research project, it appeared that increasing the number of videos per week did not affect the students learning outcomes. Compared to the one video period, the two video period students scored slightly lower on both Teacher-made Assessments and Online Quizzes. One possible explanation could be the fact that students were exposed to more information in this period. This could lead to some sort of confusion to the students that resulted in lower scores. Another probable justification could be the fact that students in the two video period were introduced to the viruses, which was a harder topic for most of them. One negative aspect associated with utilizing the flipped classroom approach in this project was the fact that two students
were not able to access the weekly videos because they had no Internet service at home. This was also confirmed in the literature by Bell et al. (2007).

In general, this classroom research project showed that students’ learning and in-class performance outcomes increased when flipping the classroom. Both the Teacher-made Assessment and Online Quizzes are supportive of these outcomes. Furthermore, data from the students’ responses showed that students like the flipped classroom approach, mostly because they enjoy watching the videos at their own pace, a trend supported by Vygotsky (1978), and preferred coming to class ready to participate in the classroom activities to further their understanding.

VALUE

This classroom research project was a viable way to study the effectiveness of the flipped classroom approach. By implementing this project, homeschooled students became more familiar with the use of this method in learning and increased their interest of learning biology, specifically microbiology. Students were introduced to several basic aspects of the microbiology world, including evolution and diversity, cell structures, food industry and fermentative microbes, and microorganisms’ relationships with human immune system.

In addition, implementing the project had many positive effects for me as a teacher. I became more familiar with using software for instructional videos production. I also had the chance to be more familiar with creating websites for instructional proposes using Google Site. The website created for the class was a great instrument to communicate with students outside the classroom. Further, I had the chance to implement several teaching strategies and models in class, especially in the one and two
video periods. The teaching models included concept attainment, jigsaw, cooperative learning and inquiry based learning. Furthermore, the project familiarize me with the use many classroom assessment techniques (CATs), which worked as a catalyst to enhance my teaching skills and the course effectiveness in general. The CATs included background knowledge probe, minute paper, muddiest point, memory matrix, defining feature matrix, and concept map. Additionally, this project opened a new avenue for my teaching interest. The implementation of this project acts as a precursor to my interest in pursuing a doctoral degree in the education field and motivated me to discover more about the flipping classroom approach.
REFERENCE CITED


APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL
MEMORANDUM

TO: Ahmed Sowli and John Graves

FROM: Mark Quinn, Chair

DATE: November 21, 2013

RE: "The Impact of Podcasts on Students' Learning" [AS12113-EX]

The above research, described in your submission of November 20, 2013, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal regulations, Part 46, section 101. The specific paragraph which applies to your research is:

X (b) (1) Research conducted in established or commonly accepted educational practices such as (i) research on regular and specialty educational instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

X (b) (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

(b) (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

(b) (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if those sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.

(b) (5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public or private benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

(b) (6) Taste and food quality evaluation and consumer acceptability studies, if (i) wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.
APEENDIX B

TEACHER-MADE ASSESSMENTS
**Bacteria Diseases Assessment**

1. **What is the cause of:** (write the bacteria’s **NAME** and **SHAPE**)
   a. Salmonellosis:
   b. Anthrax:
   c. Strep-throat:

2. **Fill the blank:**
   a. Anthrax is a gram --------------- bacteria.
   b. Salmonella is a gram --------------- bacteria.
   c. Antibiotics are --------------------------------------------------

   --------------------------------------------------

**True or False:**

a. (  ) Salmonellosis is more common in the summer than winter.

b. (  ) Anthrax can be found naturally in water and it’s a sexually transmitted disease.

c. (  ) People get infected with anthrax when spores get into the body.

d. (  ) Doctors usually DO NOT treat strep throat with antibiotics.

e. (  ) Mild Salmonella infections usually resolve in 5-7 days and do require treatment with antibiotics.

f. (  ) Common symptoms of strep throat include severe diarrhea and high fever.
APPENDIX C

ONLINE QUIZZES
Week 11 Quiz

* Required

A gradual minor point mutation in HA and NA leads to ________
- Antigenic Shift
- Antigenic Drift
- Vaccination
- Variolation

A sudden and major change in the surface antigens of a virus leads to ________
- Antigenic Shift
- Antigenic Drift
- Vaccination
- Variolation

Why do we get a new Flu vaccine or "Flu shot" every year?

What dose pandemic mean?

What is Variolation?

Which one was first used by human to fight smallpox disease?
- Variolation
- Vaccination

Cowpox was used as a vaccine to eradicate the human smallpox disease.
- True
- False
APPENDIX D

PRE-UNIT STUDENT SURVEYS
Students’ Survey 1

1. Do you consider yourself as …
   - Visual (learn through seeing)
   - Auditory (learn through hearing)
   - Tactile (learn through touch)
   - Kinesthetic (learn through doing and moving)

2. Do you take notes during the classroom lesson?
   - Yes
   - Sometimes
   - Never

3. Do you find it hard to take notes and participate in class?
   - Yes
   - Sometimes
   - NO

4. When do you like to be introduced to the weekly class’ material?
   - Before class
   - In class
   - After class

5. Have you tried to find other sources to further your understanding about the weekly material such as reading a book or visiting online websites?
   - Yes
   - Sometimes
   - Never

6. Do you feel comfortable asking questions during teacher-directed lessons?
   - Yes
   - Sometimes
   - No

7. Do you feel distracted by your classmates during classroom lessons?
   - Yes
   - Sometimes
   - No
APPENDIX E

POST-UNIT STUDENT SURVEY
1. Have watched all the weekly podcasts?
   - Yes
   - Some of them
   - No

2. Do you like watching the weekly podcast?
   - YES!
   - Sometimes.
   - Not really.

3. Do you think it added to your learning?
   - Sure!
   - I don’t know.
   - Not really

4. Did you take notes during watching the weekly podcasts?
   - Sure! I like taking notes.
   - Sometimes I take notes.
   - I never take notes.

5. Do you think watching the weekly podcasts helped you learn some scientific terms?
   - Sure!
   - I don’t know
   - Not really
APPENDIX F

POST-UNIT STUDENT INTERVIEW
1. Did you take notes during watching the videos?

2. While watching the videos, did you stop the video, or rewind the video to review the lesson? If yes, why did you do that?

3. While watching the video, did you write down any questions you had? Did you ask them in class afterwards?

4. While watching the videos, did you experience any kind of external distraction? Like what?

5. Do you feel the videos helped you to learn bacteria and viruses concepts? Explain.

6. Do you think that the lessons’ videos helped you to learn the material at your own pace? Explain.

7. Briefly state what you like most about the Flip classroom approach.

8. If you are given the option, which one would you prefer, flip classroom approach or the traditional classroom approach to learning science? Briefly explain the reason for your choice.

9. Would you like to add anything else?