Student attitudes towards flipped classroom

A focus group study on attitude change in Swedish upper secondary school, within mathematics towards flipped classroom

Oscar Ölmefors

Master thesis in Technology and Learning, degree project for the study programme Master of Science in Engineering and of Education
Stockholm 2016
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Introduction

Mathematics could be the most hated or loved subject in compulsory school. Different views on how the education should take place is a common topic of discussion today, both in society and in forums for teachers. In Sweden today, newspaper and politicians often use the PISA test as a baseball bat for their arguments. It is a strong belief that a PISA test alone can show how good or bad Swedish schools and mathematics education are. Discussions on which method could be the better one are common. Methods are good to use, but “nothing is as practical as a good theory” (K. Lewin, 1945). There are hundreds of valid methods for teaching today. Flipped classroom is a relatively young method resulting in different outcomes in different schools and groups. Therefore, it is of interest to study how flipped classroom affects students both in their results and in their attitudes towards their days in school.

Flipped classroom is often connected with watching films before class. It is the most common image of flipped classroom. If there would be a definition it would be much broader. To explain flipped classroom in one sentence, it would be homework first, then lesson. But flipped classroom is more than only a teaching method, it is a way for the educator to break down what is going to be learned and how it is going to be learned.

The study was conducted in a Swedish upper secondary school focusing on the last course in mathematics. Eight students were selected for focus group interviews, four students in each group, and totally eight interviews between the two groups. An observation on direct participation was also performed along with the focus group interviews. During the last two weeks written tasks were collected from the eight students and compared with tasks from a period of non-flipped classroom. In addition, seven lessons from flipped classroom and non-flipped classroom were recorded for later analysis.

All students gave interesting indications of change in attitude, but there is no conclusive evidence indicating that their results improved when flipped classroom pedagogic was employed.
**Purpose**

The purpose of this study is based on the ambition of understanding fundamental pedagogics of today. In today's western civilisation every man and woman utilises both smart phones and computers to connect to online encyclopedia; however, when educating our younger generation, we still use blackboard and chalk in lectures, often followed by a summative test. The old world pedagogics described above extends to very few students. Today the majority holds the belief that by encouraging a competitive spirit canalized by way of summative tests, the students will be able to achieve more and quicker, forgetting that grades and tests were introduced only to separate students from higher studies.

The interest in flipping the classroom is now bigger than ever. When googling the phrase “flipped classroom” one enters 2,000,730 search results (2016, May 2). Today a teacher can easily, with the help of information and communication technology, manufacture a test with the purpose of educating instead of judging and valuating the students. The teacher can just as easily prepare a student for a lecture in under five minutes. One problem might be the changes for teachers and students. What will happen in that change of pedagogics? Can flipped classroom change students’ attitudes to school and towards a healthy learning period? What would happen if students were exposed to flipped classroom in their latter part of upper secondary school?

The purpose of this master thesis is to examine if there is a change in student’s attitudes towards learning when changing a standardised teaching model to a flipped classroom model. If we can make maths classes more accessible to our students, we could also shape a generation that thinks that math is not necessarily the hardest of all subjects in school and only for the “whizz kids”, but also to give math the same status as any other subject. Math will not be harder or easier, and the art of educating can be performed in a more elaborate way. This master thesis project will hopefully bring light on how to use films for preparing lectures/assignments. And how to give students more time to work on tasks.
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Abstract
In traditional schooling, one-way monologue from teacher to student is the established way of communication in the classroom. Modern pedagogues are presently breaking free of this status quo. This master thesis explores whether there is a change in the student’s attitudes towards their schooling and whether there is an academic benefit for the student when applying a flipped classroom model. This study was performed in Swedish upper secondary school during the students’ last course in mathematics. The study was carried out using focus group interviews and direct participating observation. During the six-week period of interviews and participating in the classroom written tasks were collected and analysed, and the classroom was filmed to help analysing behaviour of the students, both with flipped classroom and without. The outcome shows positive reactions from the students concerning this change in pedagogics, but also some inertia in some individuals. The result shows a positive attitude change concerning communication and collaboration in the classroom, although no difference in academic achievement were visible. More studies are needed, but a theoretical base needs to be built before future studies can be conducted. Today flipped classroom is undertheorized in ways of an academic model. Future research could be theorizing flipped classroom and exploring whether implementing this pedagogic model also brings forth a change in academic achievement apart from changing the attitudes of the students.

Keywords
Flipped classroom, Blended learning, Information and communication technology, Focus group interviews, Ethnographic observation, Direct participation and observation, Attitude behaviour to mathematics teaching, Time on task, Mathematic education, Upper secondary school, Pedagogic, Matematikundervisning, Gymnasieskola, Pedagogik, Genomgång.
Structure
The structure of this master thesis report are made up of IMRAD + Conclusion. IMRAD is the standard structure model for academic texts such as academic journals, bachelors and master degree reports. An academic report of the IMRAD model has the following structure.

- Introduction, why is this done;
- Method, how is this done;
- Result, this happened;
- Discussion, this part will link the result to background theory, relate to other studies, discuss advantages and shortcomings of the study.

This report also contains a conclusion.

- Conclusion, an anti-introduction and a way for the writer to express questions bigger than, or outside the assignment.

First. Introduction has it purpose to bridge the reader into the subject and the report. The reader should easily determine if this report is for her or not.

Second. The method states how the study was done. For example, which interview method was used or which technology is used during the study.

Third. The result part only features the collected data. The result should be a structured presentation of the data that is easily followed by the reader.

Fourth. In the discussion, this is where the writer can comment on the report, methods, results and shortcomings. The writer links the theoretical base with the result. It also brings up how that could affect future research.

Fifth. The conclusion is a bridge for the reader to see outside of the writer’s view. It will answer the question, why is what you are saying in the discussion important?

The IMRAD model is chosen because of its clearness to deliver theoretical background, result and discussion. It is also the most common writing model for academic journals from the first part of 20th century.
Literature review

Why is mathematics education an interesting topic?

If you ask an adolescent today about their favourite and their worst subject in upper secondary school, (students that are 15-18 years old) you will find that mathematics is overrepresented in both categories. The subject of mathematics in Swedish upper secondary school is compulsory in all the 18 national programs that are provided today in Sweden (Skolverket, 2016). It is a subject that combines both procedural and conceptual thinking, which could explain the breadth of the subject. And it is a subject that almost everyone assumes that they will need to a certain degree, mostly in their daily working life.

In Öhmans master thesis she presents a quote by one of her students from her group interviews: “I don’t know if you can say its universal (…); it’s knowledge necessary for survival.” (2015, p. 35). This answer came up when the participants were asked why they think mathematics is a compulsory subject. In their discussion about why it is a compulsory subject, all her participants claimed that mathematics is essential for our daily life. In our daily life, we use mathematics shopping, approximating parking spots and estimating when we arrive at our destination, taking a few examples. Mathematics is a subject that is woven into our existence from childhood to old age. There is only natural that there will be more than one method for teaching and learning mathematics in school. And that makes the subject of learning mathematics very complex.

The flipped classroom

The flipped classroom model contains many more concepts and functions besides merely watching films before class. Physics professor Eric Mazur from Harvard University has seen a great response in both attitudes and grades. When he started to flip his classroom, he used the course textbook. Even though most believe that the preparation part has to be a film, Mazur opposes that idea. In an interview with Mazur on flipped classroom for the online newspaper The EvoLLLution, an online newspaper for higher education, he expresses: “In fact, a lot of people think that the flipped classroom consists of having people look at video lectures, but you don’t need a video lecture” (The Flipped Classroom Will Redefine the Role of Educators, 2013). In the commentary, one can read comments about how many of their students that actually will take time outside school to prepare. Barker shows that those students who do not do any preparatory work outside school will not do that well unfortunately, but the students that do their preparatory work will earn twice the value (Barker, 2013). Even if Barker starts with a small review from the preparation material, it is hard to understand and to work with tasks without a theoretical or conceptual understanding (Barker, 2013). Those students that earn double value according to Barker, are also those who are well prepared and able to explain to their classmates in terms of open discussion. Those students are thereby given a way to consolidate their new knowledge (Barker, 2013).

What is a flipped classroom? The easiest answer would be homework first and then lecture (skolvärlden.se, 2013). When I speak to colleagues about flipped classroom, most of them answer: “Ah, it’s when students watch movies before the lecture”. Many teachers think it is a lot more than that. In a conversation in a Facebook group for flipped classroom, one comment from a teacher and moderator was “I think that a definition of flipped classroom is a lot broader than what many people
think. Most reports and essays that I read are far too narrow in limiting flipped classroom to a specific method, namely the film” (K. Brånebäck, personal communication, September 16, 2015).

Flipped classroom is not exactly a conventional method with a start and a stop like a lecture, instead it’s more of a mental deconstruction of the teacher’s usual way to teach; the flip is not only for the students (skolvärlden.se, 2013). Deconstructing what the student should learn makes it much easier to apply a flip or a change in your teaching. One cannot narrow it down to merely watching a film before class. Instead, the teacher should see it as a process of learning in small steps.

One problem with flipped classroom is that there is very little theorizing about the method and not enough research done (Abeysekera & Dawson, 2015). However, that also makes it more interesting. One can find a lot of different methods and approaches for flipped classroom, but almost no theoretical work. There is however research on cognitive load and modality principle that could prove a benefit to using flipped classroom (Mattis, 2014) and in these theories, we can see the benefits of flipped classroom and other educational methods.

Love, Hodge, Grandgenett & Swifts review of literature shows that there is a great potential for implementing flipped classroom, but also a shortage of research and documentation (2013).

To strengthen Abeysekera & Dawson’s statement that flipped classroom is undertheorized, the authors searched ERIC database in 2013 and found eight articles and only two peer reviewed articles that used flipped classroom in their title, abstract or keyword (2015). As of today, 2016, a search at ERIC gives 30 articles that is peer reviewed and available at ERIC, and 41 articles available as full text on the database.

Abeysekera & Dawson explain that sharing the same space as traditional learning, there are also collaborative tasks, making these students coming prepared to the lecture instead of what is the case in a traditional schooling (2015). First, there is a preparatory aspect, followed by time on task, after which comes repetition and reflection. During the two first steps where the student is only being given an introduction and a task very few can learn in-depth, pointing at superficial learning. In the third stage, the student’s actual learning takes place. But without the time on task and a proper introduction, the third stage is of no use. Consequently, without this necessary combination no in-depth learning will occur. This is the fundamental on flipped classroom.

Time on task
A broadened view on flipped classroom leads to more time on task in school with your teacher and with your classmates. From Barkers point of view, flipped classroom is letting the teaching part in front of the chalkboard change place with the time at home. In the classroom this creates time for tasks and the teacher is assigned a new roll for organizing the students time on tasks (Barker, 2013). Barker also explains that even if films are often a central part of flipped classroom, the main point is not about films to him. Barker describes how he abandoned monologue teaching by the master desk and instead adopted a dialog centred schooling with the students in the centre. Instead of students only listening to the teacher’s information, now the teacher can offer a structured way for discussion and tasks from a specific starting point, this being the core of flipped classroom (Barker, 2013). The starting point is what the teacher present for the students. How to get them prepared, or what the teacher prepare the students with.
When deconstructing flipped classroom in a more theoretical point of view, Naccarato & Karakok argue that flipped classroom is a subset of blended learning (Naccarato & Karakok, 2015). Blended learning however often involves reduced classroom and face-to-face time; in this aspect flipped classroom differs from blended learning. A flipped classroom model does not reduce the time in school with teacher or time on tasks. Its construction instead gives the students more face-to-face time with the teacher and since the students are prepared, they will have more time for tasks in contact with the teacher and their classmates.

To do a straight forward comparison between a traditional lecture and a flipped classroom lecture is difficult; first, one must understand the different possibilities that flipped classroom points at (Naccarato & Karakok, 2015). What a ‘flipping teacher’ has in mind can differ greatly from time to time and many different possibilities unfold when flipping the classroom. This is of importance to consider before comparing and testing for quantifiable results. The question should be in what way flipped classroom is an improvement for this specific objective? Testing the results of flipped classroom can otherwise be misleading. Testing students with final exams did not show any differences comparing flipped classroom and traditional education in testing for procedural and conceptual problems. Other teachers witness that flipped classroom students outperform students with traditional education, both in exams and in homework (Naccarato & Karakok, 2015).

Cognitive load and modality principle

Flipped classroom is not a replacement method for traditional education. Instead, it should give a combination or mixture of traditional time on task, often with an electronical method for preparing before class. This could activate the students both in class and outside school in their homes (Mattis, 2014). Once again, one can see that a result of flipped classroom is more time on task for the students. When the task of learning is considered complex, it might have been derived from two possibilities. One is that the student did not had enough prior experience in the area or was not well prepared, the other is that time to be able to reason about the assignment in class is of importance. Mattis showed that lack in experience and knowledge is of less significance and that the time factor, meaning time on task in class with teacher and friends, is the major factor deciding success or failure (2014)

Mattis believes that flipped classroom provide benefits in the classroom. But it should also benefit educational outcomes. That the latter is however not yet fully understood because of the shortage in studies that show the outcomes of flipped classroom (Mattis, 2014).

Cognitive load and the duality principle are concepts that could put some proof to stating that flipped classroom can help student achieving more. Cognitive load is the information that the student is trying to process with her working memory at the time. Cognitive load theory (a rough explanation) says that the working memory is limited. And the easiest way to learn/process information is to divide the “chunks” of information into memorable parts of information. By not adjusting the workload accordingly, working memory will not be able to process all of the information. When there is a dual cognitive intake, let us say an explanatory film with both audio and graphical inputs, the modality principle explains that in using both graphic and audio we use dual cognitive channels to process and assimilate the information, which is of advantage for learning. Another example, when you are describing how to solve an equation on a tutorial you should use audio for
explana
tion instead of text. Then the student would use both audio and graphic, hence dual cogni-
tive channels are used. Flipped classroom could have benefits in the crosslink between cognitive
intake and modality principle. The student can cognitively process more information at a higher
rate (Mattis, 2014).

Assets and outcomes
Today western civilization has increased rapidly in technological tools for education. Today a
teacher has to be a lot more than during the last century. A modern teacher is expected to have tools
and knowledge to design and build an interesting learning environment that can inspire students
and implement new technology. And this should be fitted for all type of students in the school
community (Sahin, Cavlazoglu, & Ynus, 2014).

Even though the flipped classroom model can be to an advantage and disadvantage, one has to see
it from two perspectives; the two most important individuals in school are at same time the teacher
as well as the student. From the teacher’s perspective, Sahin, Cavlazoglu, & Ynus mean that a
higher student’s success and commitment will result in satisfaction with the teacher (2014). Natu-
really, this comes without saying. When changing classroom pedagogics, it could be from more than
one reason. The change could be a student’s attitudes, making ripples for their final result, but it
can also affect the final result directly, or for the teacher and principal relation. Brunsel & Horejsi
conducted a research, in which both teachers that used the flipped classroom model improved their
own satisfaction and their students’ scores on standardised test. More important, Brunsel & Horejsi
view the change to a better attitude with the students, which proved to make a change in 80 % of
the students (2013, Sahin, Cavlazoglu, & Ynus, 2014). Love, Hodge, Grandgenett & Swifts review
also proves similar results, the students that participated did not only learn the necessary skills from
their course, the students also enjoyed their classes more that non-flipped classroom students
(2013).

Sahin, Cavlazoglu, & Ynus implicate that when flipping the classroom, this affects more than the
students test scores. Firstly, a younger generation of students approves the use of technology in
their education. Secondly, they do not name it time on task as one can read in other scientific
papers, they name it instead doing homework in class. But being prepared helps both teachers and
the students, teachers get confirmed when students are prepared for class. Third, when students
have an easy way of getting prepared, their background information on the subject has a chance to
be wider and deeper. And the result is that harder tasks can be more easily decoded, due to their
wider background information on the topic (Sahin, Cavlazoglu, & Ynus, 2014).

Summary
If one would do a master checklist for flipping a classroom, it would become sprawling wide be-
cause even if there are only three stages, every stage can be fitted differently to every class, teacher,
subject and purpose. A master checklist for flipped classroom can be deconstructed into three parts
if one disregards the above mentioned variables.

• Preparation
• Time on task, time in class
• Consolidate knowledge
Firstly, the preparation aspect consists not only of film. This is the part where the teacher deconstructs what will be learned (skolvärlden.se, 2013) (The Flipped Classroom Will Redefine the Role of Educators, 2013) (K. Brånebäck, personal communication, September 16, 2015). In this part of the flip, the teacher choose how the students will be preparing to fit the central parts of the coming class or lecture. Key elements are how to incorporate theory, concepts and enthusiasm to prepare the students in the best manners before time on task.

Secondly, the preparation part should lead to the tasks. For the student this part usually takes place after class, often at home without teachers and friends for discussions or peer reviews of students work tasks regardless of whether the assignment is a theoretical task to work on alone or in group projects. Now the classroom has flipped from a monologue to elaborative central discussion on tasks and the ability to work along with other students. In this part, students are affected in a positive manner (Brunsell & Horejsi, 2013, Sahin, Cavlazoglu, & Ynus, 2014) (Love, Hodge, Grandgenett, & Swift, 2013).

Thirdly, repetition is called the mother of all learning. Letting the students test and review themselves is a form of repetition. A test can also be repetition. In this part of flipped classroom one cannot say if the student benefits or not, at least not for now. This part is undertheorized, and even if flipped classroom students achieve the same results as non-flipped classroom students, more research is needed (Love, Hodge, Grandgenett, & Swift, 2013) (Abeysekera & Dawson, 2015).

The flipped classroom is giving the students an easy way to access background information before class, which helps the student making generally harder tasks more decodable and shortens the distance of experience and knowledge to the student. It also gives the student a positive attitude towards their schooling. And so far, that’s all we know.
Method

The project

With the agreement of a teacher in upper secondary school, she changed her way of teaching mathematics to a flipped classroom model in one of her classes. The observation part took place during a six-week period. During this period, both focus group interviews and direct participation observation was done.

A daily communication was held between the class teacher and the master thesis student (from now on called researcher) during the six-week period. In these communications, the researcher was informed of upcoming teachings and the researcher had the possibility to request tweaking’s of the teaching method if necessary.

The researcher attended all classes in mathematics in the selected class and some of their physics classes. The researcher focused on finding relevant material for the focus group interviews and also to communicate with the students in a direct participation and observing manner.

The observation part ended after the six-week period. No more contact with the class was held after that point. The rest of the project was focused on transcribing, analysing and writing the report of the master thesis project.

Methods for amass data

Five different methods were used to collect data for this project. First, this is a qualitative study. Therefore, using questionnaire and analysing statistics in small groups will not give a just image of students in a broader group. Second, the methods are selected to give a just and broad picture of student’s attitudes toward a change of pedagogies from a traditional view to a flipped classroom view. Third, the idea of this study is to see if one can discern positive and negative attitudes in the change of pedagogies.

Focus groups interviews

Theory

Wibeck gives her distinction on focus groups (2010, p. 25) “Focus groups can be a type of group interview, but not all group interviews are focus groups”. Focus groups are a research technology; the main reason of a focus group is to collect data through a group of people that are stimulated to discuss a certain subject, decided by the researcher or scientist (Wibeck, 2010). Focus groups are not what a researcher can observe in a natural discussion when observing the participants. The discussion still needs a moderator to decide the subject and to stimulate the conversation if it should be called a focus group (Wibeck, 2010).

The focus group interview has its potential in exploiting the conversation between the participants in order to collect data (Kitzinger, 1995). This helps the researcher to understand the participant’s everyday communication with different contexts such as jokes, teasing, arguing and support (Kitzinger, 1995). For the researcher it is of importance to understand and get close to this kind of communication, it is hard to get a grasp of this specific material in single interviews or questionnaire. A focus group interview opens a window for everyday thoughts and discussions from the participants.
Kitzinger also opens for two potentials where focus groups could be to advantage over other research methods in social science. First, the focus group interview strengthens the individual to attend who otherwise would feel intimidated to be interviewed themselves. Second, focus group interviews can encourage individuals that feel they have nothing to say to speak and communicate if invigorated by other participants (1995).

A way of describing the difference between a standard group interview and a focused group interview might be that: a group interview is not a spontaneous act and a focus group interview is even less spontaneous. But there can be spontaneous discussions in a focus group interviews as well in a group interview. Morgan says that there are different opinions on whether a focus group should be separated from group interviews (1996, Wibeck, 2010). Focus groups are a narrower technology for collecting data. A group interview can have a wide variety of goals while the research is being done. The group interview can also be a wider range of its type; it could for example be a formal interview in a field research. In a focus group, the goal is unique for every interview. Different forms of goals are demanding specific group participant and the stimuli tool are chosen specifically by the researcher. When doing a market research, the group should have the same sociocultural background for example, but for a different social science research, the group is custom for that assignment. For example, when interviewing students in a class, the students do not have to have the same socioeconomic background but will instead be of the same age and tutored by the same teacher in a subject etc. Therefore, they have a strong connection. The purpose of the focus group interview is specific and therefore the participants are chosen to aim that specific intention. The most common recommendation is that the participants are homogenous in their background, but it can also be effective to have a non-homogenous group to see the diversity of perspectives (Kitzinger, 1995).

Using focus group interview for amass data, the researcher can get the same insight in social science studies as if the researcher would do in-depth interviews, but in a shorter period of time (Kosny, 2003). Working with focus group interviews in a class under a shorter time span with a specific subject is more advantageous than doing in depth interviews because the researcher can get a deeper comprehension of the student’s attitudes towards the course curriculum during the often short time span of a course.

There are both advantages and disadvantage using group technologies when collecting data. In focus group interviews there is, even if aiming for a specific goal, questions that have to be taken in consideration. For example, what is a desirable group size for this specific aim? One opinion is that the participant could be swayed by the other participants if the group is too big (Kosny, 2003). If the group is too small, let say a triad, every member of that small group might feel a little more affinity, but it can also result in other behaviours. One person in a group of three could start to mediate between the other two members and we lose that person’s perspective. Such behaviour could shift along the members of a group (Wibeck, 2010).

General characteristics for small to larger groups are quite important to take into consideration when forming groups. The smaller the group is the less anonymous a person can be. In the bigger group, it might be easier to blend in by not presenting a strong opinion, or one that contradicts the group. In a smaller group, it is easier to present an opinion and also get feedback and discuss the
topic or a single participant’s opinion without feeling singled out. In the smaller group, it is easier to get accepted and given feedback for your opinion and the other participants can get a more realistic picture. If a larger group is of choice, the physical distance gets bigger, and that affects the group in communication and structure. Large groups could result in that communication through eye contact, and thereby the feedback process that is important for the participant’s self-esteem in the group, might be hindered. Structures in larger groups are also of importance. For example, in a larger group, one is more likely to be interrupted which can hold a less dominant speaker back. Structure and communication are intertwined, for example in smaller groups all members can easily discuss without the help of a moderator to stimulate the discussion but in a larger group the moderator might need to assist in forming a fair group structure (Svedberg, 2012).

While doing research under a short period of time in a small class, the researcher can benefit from using naturally existing groups for more than one reason. First, if the participants are strangers to each other and already naturally shy they can easily be taciturn and the more naturally strong speakers will tend to overpower the other participants (Wibeck, 2010). Second, the recruitment is easier. Third, if using already existing groups, one can find interactions that are almost of a natural kind, as if it would be in a family (Wibeck, 2010).

Focus group interviews are suitable for this study because they analyse the content in the participant’s dialog, such as attitude. They can at the same time be used to analyse how interaction takes place among the participants (Överlien, Aronsson, & Hydén, 2005). This speaks for how important the interaction is to get accuracy and authenticity of the result. This also gives the moderator a chance to learn the participant’s language (Frith, 2000, Överlien, Aronsson, & Hydén, 2005). The importance of using the participant’s language will be revised under informal interviews further on.

Procedure
Fundamental questions that needs to be answered before setting up the study are: Is focus group interviews the right way to tackle this problem? How many groups should be used? and How many students is a suitable number in each group? Next step is to carry out your study, recruit participants and hold the interviews. The interviews are easily recorded and filmed. If not filmed one should take notes on changing body language of the participants. This is an important part; in the discussions between the participants you will see changes in facial expressions and body language. The last part is to transcribe and analyse your material. For social science projects, transcribing word by word is to prefer.

A typical focus group interview could start with an explanation of where the interest in the study lies. It should be made clear early on that the participant’s answers have no right or wrong. Then the moderator presents the focus of today’s group interview. If the subject to discuss is of sensitive nature, or outside the comfort zone it might be good to remind the participants of the values that was presented in the beginning of the interview.

Informal interviews
The informal interview does not have the structure of an organised sitting down type of interview where the interviewer acts as leader. Instead, the interviewer gets close to the interviewees by
socialising with them. One could say it’s comparative to being a participating observer. It is a conversation that is not structured in an interview kind of way. It also differs from other types of conversations where an interviewer or researcher needs to get close to the interviewee to get the trust needed to be able to ask personal and provocative questions.

In this project, the language by the researcher is adapted during the focus group interviews so that the communication is at the level of the participant’s language. Hammersly & Atkinson explains that asking questions about behaviour that sets you as a researcher outside of the group will only show that you are not acceptable, (1987, Kullberg, 2004) thereby alienating yourself from the group or individual. You should not have to ask straightforward questions says Hammersly & Atkinson if you are accepted in the group, the conversation itself will give answers to your questions (1987, Kullberg, 2004). This behaviour is often coupled to subjects outside the community, for example not accepted behaviour in the bigger collective outside your group of interest. The more progressive talks or questions have to wait until you are familiar with the group or individual. If using a more progressive attitude one can risk of being ejected early in the study (Kullberg, 2004).

A progressive attitude in one’s oration or questions can also have the opposite effect, it can happen that an individual lets his or her guard down, he or she can take over and start to narrate the interview for you (Kullberg, 2004).

The informal interview takes place in the classroom or other places commonly used by the student. In this project, informal interviews were held at the same time as usual teaching took place. Most of this conversation technology was used in the focus group interviews, where the interviewer shifted the language between having a progressive and a moderate attitude. This led to participants having discussions on their own and questions asked amongst themselves.

**Direct participation and observation**

When observing a school class and at the same time being part of the class as a helper or teacher (but with the possibility to withdraw for a more classical observation), one could call it direct participation and observation. Participating observation has its function in learning the behaviour and development in a class from the student’s view. The advantage for this research method is that the researcher can be part of and communicate with the group or class and make observations from their perspective (Kullberg, 2004).

The ability for the researcher to get close to the students is an important factor. Participation observation will not give a just picture of the class if the researcher fails to achieve this objective. Henriksson & Månsson in Svenson & Starrin describes the importance of making the social distance short between the researcher and the students and also to present the researcher’s rank at the same level as the students in a social context (1996, Kullberg, 2004). These factors should be considered concerning how a researcher speaks during informal interviews. If not accepted, the researcher will be alienated and the students might push away or present a charade.

In this study, using participating observation as a tool, I reminded the students that I the researcher, was there to work with them and to understand their attitude change while their teacher flipped the classroom.
When working with direct participating and observation it is impossible to observe everything in a class. For example, Spradley gives a list for guidance when observing (1980, Kullberg, 2004, s.104).

1. Space: The physical location or locations
2. Participants: The persons involved
3. Activity: The related actions the participants perform
4. Object: The physical objects in the room
5. Action: Occasional actions individuals do
6. Event: The related activities the participants perform
7. Time: What happens over time
8. Goals: What the participants are trying to achieve
9. Attitude: The attitudes and feelings that are perceived and expressed

From this list only the last point would be in focus during this study. Other parts were also observed, but the main focus on the participant’s attitudes during the change to flipped classroom.

When observing the participants from the focus groups and the other students in class the goal is to be as neutral to the ongoing process as possible. This is difficult as the researcher sometimes has the role of a student, and sometimes of a teacher assistant helping the students with their tasks. The chance of being secluded if not helping the student is quite high; therefore, the most natural way is to act as an assistant to the students at the same time as observing. One benefit of acting as both researcher and assistant is that one gets the possibility to confabulate with the students. In those talks, similar to informal interviews, it’s easier to talk about attitude towards school and the researcher can get information from students outside the focus group interviews.

Observing classroom by video
What happens when you put a camera in a classroom? Will the students play a charade for you? Is it an exact copy of the reality?

Bjørndal explains the benefit of using video recording as observational tool: “With the help of recordings, a researcher can view the complex correlation between verbal and nonverbal communication” (Bjørndal, 2005, p. 72). Using video recordings when observing helps the researcher to catch the process that’s going on in a classroom, either its verbal or kinesics. It helps us to slow down our intake of impressions when observing. Video observations will give the researcher a broader foundation for reflection and analysis (Bjørndal, 2005).

But are video observations a copy of the reality, or will the students play a charade for you? If you walk into a classroom with a big video camera, there will be some change in behaviour! Using a small camera or a laptop might be less intimidating for the participants (P. Andrews, personal communication, October 15, 2015). A smaller camera or a laptop that is more familiar to the observed students compared to a bigger rig that would change the usual environment in the classroom is to prefer.

Other factors that can present a false reality could be if the observed situation is for some reason of sensitive nature. Is the observer or researcher known to the class or just an extra person taking
notes in the classroom? Do the students trust the observer? How used are the students to an observer in the class? All the above are valid questions. The trust issue connects both with the informal interview and with direct participation observation. If the researcher can connect with individuals in class at the same level in a social context, and also in his or her language, then this factor could be reduced. It can also make the students feel more comfortable being observed if they have the ability to discuss with the researcher and be reminded of what the researcher is doing in contrast to the researcher being seen as an outsider to the class or group. When observing with camera, protected identities and cultural rules can also be a problem. One last reminder is that some situations can be extra sensitive to the students, for example if the student has to present a task outside of the group as an individual. The student can no longer hide within the group and is therefore more vulnerable to the citation, especially being recorded by video.

In this study, the video observation did not start when the flipped classroom was introduced. Instead, video filming did only appear the last two weeks. As negative criticism one can wonder what’s been missed in the beginning? Probably one could have seen enthusiasm from the students when exposed to a new teaching method. But a more interesting view can be observed when flipped classroom is not new to them. And the observer and his purpose are known to the students. Therefore, postponing video observation gave a more honest picture of the dynamics in the classroom.

**Analyse student tasks and E-checks**

To analyse written tasks could be a summative valuation. Instead of only searching for right and wrong answers, one can look for structure in the student’s mathematical solutions. Could one see a difference in conceptual and procedural understanding?

In the student’s solutions, their structure will be evaluated first on a difference in workflow. How do they asses the task from start to finish. Second, is there a notable change between non-flipped and flipped classroom.

In the next paragraph, the Swedish word [genomgång] is used for the first time in this report, under background information in the result part the reader will get a total clarification to why this word doesn’t translate. For now, it clarifies as a lecture with tasks lead by the class teacher.

The following task was done in the later stage of this project. In the last two weeks the teacher changed from flipped classroom to a more traditional view with [genomgång] followed by tasks, and after a week change back to flipped classroom. There following was the reason for collecting this material at the end of the study. In the end the student won’t see flipped classroom as something new and exciting, and probably the student will only see it as a normal teaching method and not be biased by it.

E-check is a short test; it gives the student the opportunity to indicate knowledge for the lowest passing grade. E-checks will be explained more thoroughly in background information in the result part and discussed under reflection/discussion.

**Standards**

What is ethics for an observing researcher? Firstly, having good ethics demands having respect for the students and others involved in your work. That means, letting the individual that’s being
observed control her own thoughts, feelings and characteristics and that only she decides on who can take part of her inner thoughts (Bjørndal, 2005). That zone described by Bjørndal is very fragile. To be respectful you have to be more responsive the deeper you get in that zone. Your ethical view should be based on different factors. Below are six examples that Bjørndal brings to attention (2005, p. 141).

1. What should be observed
2. What’s the purpose with the observation
3. Where should observation take part
4. How is the observation being performed
5. To what extend or how much should be observed
6. How should the material be stored

These six questions should be considered before the actual observation takes place. This is the fundamental base for ethnographic observing. If not having a plan for your work, it can be difficult to see or feel whether you have crossed that line and a strong response from the students could be about you instead of your study. A quote from the artist and author Auliq Ice: “Keep an eye on your responses. Strong responses are about you more than them”. This can be a reminder if you see an intense, aggressive or strong response. It can be a true response but it can also be that you are too strong or aggressive in that person’s zone. In this case it can be wise to back off and do a reasonableness check.

Secondly, in the physical location of observing, one has to remember that this is the student’s workspace. Therefore, the observer must let the student have the opportunity to camouflage themselves in their environment. If not, you as a researcher could interfere with the student’s zone that Bjørndal explained above. If being too aggressive the student can react with a strong response that is not always sincere or truthful.

Thirdly, in this master thesis, observation both from focus group interviews and by doing an ethnographic study with focus on participating in the student’s daily school life, the first to bring to surface was to get the students trust. I tried to achieve this by being honest and by often reminding the students of my focus in their class and of what I want to observe. That seemed to me an ethic path and a way to respect the students. By trusting my instincts, I knew how far to push without intruding on the student’s personal zone. No material from the interviews, transcripts or notes were exposed to people outside the project. Parts of transcripts where discussed with my supervisors and before publication all names of the participants, teachers and the school were replaced with synonyms.
Result
The result in this study will be presented in this way: Background information, focus group interview, observations in classroom by eye and video and then tasks and E-checks. The focus group interviews are the bigger part of the study therefore it will come first. I have separated the attitudes from focus group interviews into six parts. All of them have their own subtitle.

Background information

Attitudes
In the study a vast amount of data was collected and in such multitude of information there are different layers. These layers I will call attitudes. An attitude is not a fact but rather a feeling for, or opinion of the student’s daily studies in mathematics.

The different attitudes that were observed in the focus group interviews will be presented with their own sub heading. Later in the chapter, material from the classroom and E-checks will be presented in its own headings. The interviews are done in two groups, the first with the purpose of lifting the question and the second to top up if there is a lack of information. Alternatively, the second group can end a topic if there was no more information to extract on the subject.

For the uninitiated, an E-check is a small test, no more than 60 minutes long. The word E-check is colloquial language and the specific word is unique to Swedish schools. At an E-check, the student can show that they have the basic knowledge of a chapter or piece of the course for achieving the lowest passing grade. All students then have the ability to self-correct their E-checks in class with the teacher. A self-correction is as follows; the teacher collects the test, takes a photocopy of them and then hands the copies back to the students and reviews the test for the class.

Group information
The information in this report is gathered from the school form of Upper secondary school. All program/orientations are three years long in Sweden. The specific group of students in the current study are on their third year and their orientation is science of nature and technology. This gives the students a greater training in subjects as Mathematics, Physics, Chemistry and Biology apart from the other compulsory topics of upper secondary school. This specific class has not been exposed to flipped classroom before. After contact with their teacher in mathematics and physics, she presented the idea to try flipped classroom if a majority of the class accepted it. The class voted on whether they would use flipped classroom in their mathematics course or not. The votes were almost uniform for a yes.

The focus group interviews are focused on their mathematics education; it is their last mathematics course; a few additional questions are gathered from one physics class. When observing by eye and being a part of the class, what is called being direct participating observer, the information is also gathered during their mathematics class with an additional observation from a physics class. Video recordings of the class were done in math class.

Eight interviews where done in total, four each with two groups. The first group had four male members and the second group had four female members. The composition of the groups as homogenous female or male groups were not actively chosen by me but rather how the groups
appeared when asked for interest in class. One of the participants from the second group only participated in one interview. That student realised that she had to resign the interviews because she needed time for her own studies.

One of the participants, Lukas, in group one, has multiple learning disorders. He has the diagnosis Dyslexia and Adhd. This separates him from the group because he has to use different methods to assimilate information. It should be considered for the analysis of the results. If his attitude is significantly different from the group, I will present his view after the groups collective attitude. That is of reason with learning disabilities that give symptoms that separate him from the collective way of learning.

John G(1) means John from group one and Betty G(2) meanings Betty from group two. In the appendix a transcription example from one interview can be found. All interviews are in Swedish as it is the native language of the students interviewed. The interviewer did adjust his language to create a feeling of affinity with the participants in the groups. In the presentation, quotes are first presented translated and then in the original language. Names are pseudonyms. [o] marks an inaudible word from the recorded interview. When a participant refers to Klara, they mean their mathematics teacher.

**Language problems**

The Swedish word *genomgång* has no clear equivalent in the English language and a straight forward translation is thereby difficult. The explanation for the word genomgång is; at the beginning of a class the teacher will present today’s material to work with such as formulas and tasks. In order to make the tasks intelligible and workable the teacher often derives the right formulas for the students to be able to solve the given tasks. After the theory, the teacher gives the students a couple of easy to intermediate examples. One could argue that it is a briefing, review or lecture, but briefing is more of an opportunity to create a reflection before a happening. Review is more of an option to be given feedback on already made tasks. Lecture is the closest we can come to genomgång but it’s not the same. In a lecture, the information moves only one way and the lecturer does not have the same contact with her students. Therefore, the word genomgång is unique to Swedish vocabulary and will not be translated. It will be presented as [genomgång] in the translated quotes.

There are no clear questions for the groups. It’s more a twenty-minute talk where the moderator tries to stimulate a discussion between the participants on their daily school day.

Translating quotes are not an easy task. Swedish language has many proverbs that are hard to translate. And a majority of the language in focus group interviews are colloquial language which is even harder to translate in a decent manner. I have done my best to translate as understandably and honestly that I could. To give an example: in Swedish one could say “klockrent” which means “it’s perfect”. But to translate it to English literally it would be “clock clean” and that has not the same meaning/significance. I have therefore translated to the best of my knowledge from Swedish to English so that for example “klockrent” translates to “spot on” a translation what I believe will give the reader a more correct understanding of the mind-set of the student.
Focus group interviews

Attitude 1: the change to flipped classroom

The first question is to understand how the participants feel during the change from traditional learning to flipped classroom. The attitude can be orientated in three directions. First, we have the preparation aspect, second we have harder tasks under class time, and last we have a more homogeneous workload.

Preparation aspect

It became clear that being forced to come prepared to class everyday had some drawbacks but also some positive effects. Josef G(1) gives his point of view:

It is a good idea. It should work theoretically. It’s like to be given a small piece of what we are going to do in class. Something to think about before the lesson. And then it’s easier to understand the lesson.

Int1


Betty G(2) reinforces Josef’s statement with:

I think it’s almost better to do some preparatory tasks before class because, then we know approximately what we are going to work with.

Int1

jag tycker det nästan är bättre att ha lite förberedelseuppgifter för att, så man vet ungefär vad man ska jobba med.

The majority of the group did feel some positive effects in forcing themselves to prepare before class. The first interview did only have seven members, divided in two groups. In the second interview Noelle G(2) the eight member, explain that she doesn’t work at home and that she don’t know if she has understood the information correct in the films. Noelle G(1):

I feel that I’m not sure if I have understood what they have said in the film.

Int2

Så ja jag har känt såhär att ibland har jag verkligen inte förstått det dom har sagt i filmen.

This is a problem; Noelle should understand that the learning is not completed just by watching the films; it should only prepare her for class. Summarizing the groups attitude; they feel that it is for their own good to be prepared before class. But for Noelle it’s not clear what the films are for.

Also Lukas has his own dilemma about working at home. Because of his short window to focus, he feels easily tired and explains that he has his own methods for learning. Lukas G(1):
I kind of fall asleep when listening to the film because it’s boring if you know what I mean. Boring like, but yes it’s a good way to learn. I learn better if I’m allowed to work [o] I have my diagnoses AdHd and stuff like that. It can be tuff to stay focused.

Int1

For Lukas it’s much more of a task only to change his way of learning. That separates him from the group. Even if it could be of advantage for him, it’s not certain that it helps. His view of changing to flipped classroom is that he can see it as a good model, but it will demand more energy of him to progress with it.

**Harder task aspect**
One role of flipped classroom model is the ability to focus on tasks rather than having [genomgång]. In the interviews, eliminating the typical [genomgång], which according to the students is 25-30 minutes long, giving an actual time on task of about 10 minutes before a new [genomgång] takes place, could give the students more time on tasks. The harder tasks in the textbook are what the student’s calls for in their learning. Anna G(2) and Sara G(2) explains why [genomgång] is an obstacle that holds back work with harder tasks during class:

I think it is like this, [genomgång] takes about 25 to 30 minutes and then it’s do these pages in the book and after 10 minutes we break for a new [genomgång].

Int3
Så tycker jag att det är såhär genomgångar tar typ 25 ibland nästan 30 minuter och sen är det liksom så räknar ni dom här sidorna i boken och så måste jag avbryta er om 10 minuter för då måste vi gå igenom en ny grej.

Sara G(2) fills in with:

And then we don’t have time for the harder ones.

Int3
Och så hinner man inte med dom svåraste.

Daniel and Josef sums up two of the three orientations so far. Daniel G(1):

I think flipped classroom has a great potential. When everyone is in the loop that you should do something before class and we get the chance to go through some more advanced tasks in class, then I think it’s very good and positive.

Int1
Jag tror det här med flipped classroom har en stor potential. Då alla är med på
Josef G(1) continues:

Yes now we have time to work with tasks at once if we have a shorter [genomgång]. Given that you have already learned something before class.

Annatara (1) says:

Jaa man hinner nu också jobba med uppgifter på en gång om man har kortare visning. Om man har lärt sig innan man kommer dit.

Anna and Sara explain why they don’t have time to work with the more advanced tasks in class (with non-flipped classroom) and Daniel and Josef sorts out how flipped classroom could help in this case. Clearly four of the students, two from each group, recognise that being prepared for class gives them the opportunity to work with the harder tasks. Here one can see that there is a correlation between being prepared and to have time to work with harder tasks in class. If not having time in class with the teacher and classmates the harder tasks are left for later work at home and often saved to do just before tests.

**Homogenous workload**

When flipping the classroom, one benefit could be that the students are learning all the time instead of before tests or exams. Some of the participants are expressing that they are being forced to prepare before class, but that it also helps them to maintain a more consistent workload. Betty G(2) says:

But now we are forced to do a task before the next class [o] sit down with math and we do study more automatically.

Betty G(2) says:

Men nu blir man tvingad också eftersom man har en uppgift till nästa lektion så [o] sätta sig ned matten och så blir det mer automatiskt att man pluggar det.

Sara G(2) agrees:

Little every day.

Daniel explains a situation when he thinks flipped classroom had helped instead of a [genomgång].

Daniel G(1):

Then perhaps we had seen a video that explained the thing we did in the circle and gotten a little more time to work with the tasks. I didn’t feel that I had the time to do that. We had a whole page of tasks. The result is that I have to bring them home or save them for next lesson.
Int2
Då kanske vi hade sett en video som tog upp det vi gjorde i cirkeln och fått lite mer tid att jobba med uppgifterna, ja jag kände inte att jag hann med eh vi hade en hel sida där. Jag hann inte med majoriteten av dom uppgifterna. Det resulterar i att jag antingen får ta dom hemma eller nästa lektion [o].

And later in other interviews he comes back to the same statement:

It feels like I have studied more maths during the weeks.

Int3
Aaaaa, det känns ju som att jag har pluggat mer matte under veckorna.

Before I saved a lot until the last week.

Int3
Asså ibland förut har jag sparat en hel del till sista veckan.

Now it’s more continuous.

Int3
nu blir det mer kontinuerligt.

What all the students agree on, is that it helps them to do a little studying every day. Clearly this is common knowledge for all teachers that studying everyday rather than days before a test will help the student in hers learning goals. Daniel G(1) expresses clearly how this helps him to work with all tasks during time in school.

**Summarizing attitude 1**

Five of the students are positive to change the way that they are tutored. One student doesn’t feel any difference and one student don’t like change at all. The last student has severe learning disorders that could influence his feeling about change. Four students link the act of being prepared before class to the chance of working with the harder tasks in front of their teacher. In class, they can get the help and feedback they need. Three students are experiencing that they work even more with their mathematics course now.

**Attitude 2: watching films before class**

Watching preparation films before class can, from the outside look like an easy task. From the student’s perspective however, it’s a sacrifice of time and it also changes the status quo. It’s clear that all the participants see a positive outcome of it. But it also appears to be that even if the student sees benefits from watching movies, there is some inertia in the group. Half of the students express that the movies are clear and easy to follow. One individual brings up that in a [genomgång] you only have time for a finite number of questions.
Clear and easy
The participants think the films are clear and easy, no issues to locate and watch them. They give a gasp of what to comprehend before class and the opportunity to have a [genomgång] more than one time. Daniel G(1):

I didn’t feel any problems watching the films. They did give me a good entry level of knowledge, they often explain a task and you get a picture of how it works. For the most part.

Int1

Anna G(2):

I think it’s relative easy to follow the films.

Int1
Jag tycker det är relativt lätt att följa med i dom här filmerna.

Betty G(2):

Mmm it’s also nice with a film, when you don’t understand you can pause and watch again.

Int1
Mmm sen är det skönt med film också, när man inte fattar så kan man pausa och spola tillbaks liksom.

Sara G(2) gives her explanation for why she thinks it helps her:

Yes, in an [genomgång] it could be that, you have asked five times and still don’t understand, then you will not ask a sixth time, but now you can watch again and again, and then you will watch until you really understand.

Int1
Ja det är lite såhär ibland kan det vara på föreläsning och så har man frågat fem gånger och fattar fortfarande inte då kanske man inte frågar en sjätte gång, men här kan man ba titta om och om igen så då vill man se till att man verkligen fattar.

Four of the students clearly expressed that the movies were easy to follow and that they helped them. Three of the participants didn’t see watching them as negative. With the boys, there is a little more inertia to watch films before class even if it helps them to avoid homework after class.

Inertia
Half of the participants feel some resistance watching films to prepare. Josef feels that it’s connected to his earlier experience in school. Josef G(1):
I think it’s more like a habit. It’s easier to do what you are use too. If you just get started maybe it will turn out well.

Erik G(1) on the same issue in a later interview:

One have developed one’s own style, so maybe one is not used to it, I don’t know.

If one had it from preschool, I think that it would be much better.

Josef explains that he forgets to watch the films a day before and instead has to watch them in the morning before school and therefore feels a little stressed by them. Josef G(1):

I have never remembered to watch the films the day before; I have always done it in the morning perhaps that is why I fell stressed.

One day when they don’t have flipped classroom method with a film before class he answers. Josef G(1):

I think it’s very nice (laughter). It’s getting less. It gets stressful if one has forgotten to do the task, I mean watch the film before class, then you get stressed in the morning, and I have to watch the film to understand the class.

Three students see problems with watching films before class. Noelle gives her point of view; this is after one week without Flipped classroom. Noelle G(2):
I think the hard part with watching films is that you can’t ask questions in that manner, I have felt that sometimes I haven’t understood what they have said in the film, but it’s nice the day after when Klara brings it up. But sometimes it’s hard to explain or ask questions.

Int2
Jag tycker det svåra med asså att kolla på film och så är att man asså inte kan ställa frågor på det sättet, så ja jag har känt såhär att ibland har jag verkligen inte förstått det dom har sagt i filmen, så men det är skönt liksom dagen efter när Klara tar upp det så men a ja vet inte ibland blir det lite svårt att förklara, ställa frågor eller så.

Sara G(2) answers to Noelle’s statement after one week without Flipped classroom:

I don’t really know [o] same all over [o], don’t think it’s different it is like Noelle said, now you could also ask questions, what should happen if we did like this? There and now when she did bring it up, but if I had. I may have not asked those questions if I had watched the films and then got to school the day after, then I would have felt that it didn’t matter [o].

Int2
Jag vet inte riktigt [o] lika överallt, [o] tror inte nån skillnad men det är som Noelle sa nu kunde man ställa frågor också men vad händer om man skulle göra såhär? Sådär och nu när hon väl tog upp det men om jag hade, jag kanske inte hade ställt dom frågorna om jag hade kollat på en film och sen kommit till skolan dagen efter då hade mer varit såhär a men det spelar ingen roll [o].

Clearly, there are some problems watching the films before class. It covers forgetting to watch the films, being unaccustomed to do a task before class and not understanding the meaning of being prepared. Noelle did have the belief that the films are the learning point and not the class itself.

Lukas and Daniel
Lukas feels it is hard to do this kind of home tasks because he sees his free time as more important than school. But he still agrees that it helps him to use interactive media to learn instead of books. And Daniel have an understanding in what Lukas claims about orality. Lukas G(1):

One thing that is interesting, yesterday I watched math films and did notice that I learn much more from the short ones that only was 4-5 minutes rather than 10-12 minutes. One can keep the interest. Short films, most people can’t hold the interest for 12 minutes. One gets bored.
filmer dom flesta orkar inte sitta och koncentrera sig på 12 minuter faktafilmer. Man tröttnar.

And later on, after a week of holiday he explains why he missed to watch the film:

I didn’t spend a thought on those films, I only thought about how to use the holiday full on.

Int2
Jag hade själv inte ens en tanke att man skulle ge sig på dom där mattevideorna, jag bara nå nu utnyttjar jag lovet till min fullo.

And in the next interview he reinforces his statement by:

If you have time. Time is something... [o]. I rather spend my time out of school with friends and doing something that I enjoy than sitting down and listening to math films all day long.

Int3
Om man har tid. Tid är någonting man.. [o]. Man spenderar ju hellre tiden på fritiden att umgås med kompisar och att kanske göra något man kanske själv tycker är kul än att sitta och lyssna på mattevideos hela dagen lång.

This is a contradiction to what Lukas says in earlier interviews, if one reads the quote from interview one and compare them to interview two and three. The student Lukas is saying that it takes less time to watch films in order to learn than reading, and due to the observation in class, the student has a window of fifteen to ten minutes of concentration. One shall have in mind that this student has severe learning disabilities when reading his quotes. He also explains why one could benefit from watching films rather than reading. Lukas G(1):

But think of it like this, you sit and read a text, then you don’t get the same, one cannot mediate in text the same as when you talk. You can conjugate words in different ways and emphasize them in a certain way that makes them more important in the context. And that you cannot do in texts. Therefore, I think that films are more adaptable for understanding what is important or not.

Int1
Men tänk såhär, du sitter där och bara läser en text, då får du inte samma, man kan inte förmedla i text samma som när man pratar. Man kan böja ordet på olika sätt och framhäva ord på vissa sätt så att dom blir mer viktiga i sammanhanget. Och det kan man inte göra i texter. Därför tycker jag själv att filmer är bättre anpassade för att man lättare förstår vad som är viktigare och mindre viktigt.

Daniel also agrees with Lukas in this matter/case, he sees that verbal communication can have a wider group of receivers. Daniel G(1):
It can depend on the teacher in the film. The person that teaches. If one reads a text, there could be people that don’t understand but in a film the teacher can explain more widely, yes describe further.

Lukas means that a short film could help him in his learning but changing the educational work for him is difficult. He also sees that it intrudes with his free time outside of school, and he is forced to change his conventional way of studying. Daniel explains the importance of verbal or audible communication in a student’s perspective. What Daniel means is that if the teacher that makes the films is connected to the class, she can adapt her language and severity to her class.

**Summarizing attitude 2**
All of the students in the groups believe in using films before class to be prepared. But for the class’ high-performer Josef, it gives him some stress. Noelle feels that the film is the learning point and not the class afterwards. Some of the students feel that they learn from the films and other discover what questions they need to ask in class after they have seen the films. Lukas sees a benefit but has a hard time to change his conventional way of studying. With his background, it should only be natural to feel some fear connected to change in learned patterns. To summarize, the students are both positive and ambivalent. Their response changes back and forth between the first and last interview.

**Attitude 3: your own responsibilities**
How will the student’s responsibility change when exposed to flipped classroom? Within the group, there are some differences. It’s quite hard to see if there is a change in responsibility towards their school work. “You always have some responsibility, at least in school!” Says one of the interviewed students. Some of the participants think that they take more responsibility when they watch the films before class. And their motivation is less homework after class and that they can focus on harder tasks during class with help from classmates and teacher. But is that an act of responsibility?

*Sara and Noelle*
Not all the girls think that flipped classroom make them take more responsibility about their schooling.
One of the girls and some of the students in class forget or do not care to watch the film. Noelle that only participated in one interview has a strictly different feeling about flipped classroom. It’s quite clear that she does not feel more responsibility at all. She sounds a bit unconcerned in her answer on whether or not she prepares herself. Noelle G(2):

> Started to use it, only because, look at it [o] I didn’t use it before but now this week I have started. I cannot tell you how it will work out [o] and so.

Börjat använda det, bara för att liksom, kolla sähär [o] jag använde det inte förut
All of the participants have one thing in common, they all feel that you have to take some responsibility in school to be able to learn. Sara G(2) explains:

If you do not, if you don’t listen you could be in school all day without learning anything, if u do not care.

It demands that you do things on your own and work independently otherwise it will not work.

Clearly, the students feel responsible for their schooling overall. But if flipped classroom is changing that or not is not clear. A majority of the participants in the interviews feels that they are taking more responsibility when flipped classroom method is used. And that is because of their preparation homework before class. Some participants don’t think that the method is working for them, and they neglect it.

Daniel and Lukas
Two of the more striking and conflicting attitudes is Daniel’s and Lukas’s quotes. Daniel starts with explaining how this kind of act can help him in the long run. As the majority of the group, he also thinks that to take the responsibility of being prepared before class can help! For him, it’s natural to make a change and adjust. Here he explains how doing so helps him in the longer run. This shows that he is retentive to change his responsibility to being prepared before class. Daniel G(1):

And then you can, if I have tasks left to do one should not save them until the time before the test and do those tasks. But if one does them a little time before you will keep up with your education. One has time to do the tasks during math class.

This makes some of the students take responsibility outside school and for Daniel it seems to be more natural. Daniel G(1):
I am used to work with homework at home, same thing with essay writing, I’m not that much of a writer during class, I tend to talk with friends and things like that but when I come home, that’s when I get the majority of my work done. That helps, I think my own work adapts well to flipped classroom.

And he also feels that it is natural to take on more responsibility if the teacher asks for it. Daniel G:

When you are asked to watch the films, you take more responsibility because you are watching them before class. I’m a person with bad foresight, before without flipped classroom I saved a lot of tasks, but now flipped classroom helps me to work more, eh, yes not to save all the tasks till the end.

For Lukas on the other hand, its goes against what he is used too, that could be an effect of his learning disabilities. Lukas doesn’t see that being given homework before class makes him more likely to do it. He thinks that the time in school is strictly separated from the time outside of school. Lukas G:

I think that it is, I think [o] I need to see a difference between spare time and school. After school I should not do something with, [o] it doesn’t give any more time to study. It’s better for most that there is a little more time for lecture and then fifteen minutes before to watch the film.

In the second interview after a short holiday a majority of the class had forgotten to watch the film before class, Lukas’s answer is short and clear. Lukas G:

You don’t want to study when on leave.
The second day after the leave their teacher pointed out that it’s their own responsibility to watch the films and Lukas address his answer. Lukas G(1):

Not really [o] some people may think that one should take responsibility for one-self.

He also wants to defend his way of thinking by exemplifying that it was a democratic decision by the class to try flipped classroom and that he was the only one against it. Lukas G(1):

But myself, I wasn’t really part of this, I didn’t want it. I didn’t want this principle that you should. I didn’t choose this thing where we should study everything before class, I was voted down. Therefore, I think we should have [genomgång] also, and those who don’t feel like studying at home can get a chance all the same.

Summarising attitude 3

First, most of the students take at least a minimum of responsibility for their schoolwork. That flipped classroom would change that attitude is unclear. At the more extreme opposites one can see either a student who plans and tries to use all the tools given and understands that it’s his or her responsibility to alternate his or her schooling, or a student who holds on to old patterns and disregards the change. Nevertheless, it’s clear that a majority of the participants think that school is their own responsibility regardless of being exposed to flipped classroom or not.

Attitude 4: learning quicker and more thorough

When it comes to quicker and more thorough learning, none of the participants can point out a certain model that helps them more or less. All of the participants believe that ordinary schooling is working fine, meaning that with the typical lesson of [genomgång] and then work with tasks depending of time, learning works just fine! But they also see the benefit of flipped classroom, being prepared and having more time to work on harder tasks in class close to teacher and friends.

In their own discussions, the students wonder if not flipped classroom works better for harder tasks. We can see that the participating students might be bias here. Why would they believe that it works better for harder tasks rather than intermediate ones? They see a connection between being prepared
for class and having more time on task. With more time on task, they believe that working with the harder tasks helps them in both conceptual and procedural understanding.

A smaller group have been using the preparation films for some repetition before tests. For them the benefit of using these films in more than one way is quite obvious.

Using E-checks is also a way on improving the acquisition of knowledge. All participants are positive to E-checks.

Lukas agrees that even if he doesn’t like the change, the films can help him to learn in a shorter time. But the films have to be interesting, and not just mathematics if he is to use them.

**Harder tasks**

There is a belief among the boys that flipped classroom could work better for more complex tasks. If they are bias is hard to say. Later more of the boys in the group explain that preparing from reading or watching films is the same for them, but it must be added that they are also high achievers in their class. Erik points out some of their views. Erik G(1):

> It maybe works better at the university later on. When it’s more difficult things to understand.

> Det kanske funkar bättre på universitetet sen. Så här lite svårare saker man måste förstå.

Erik also explains that he has a belief that he will learn more in-depth if using flipped classroom. Erik G(1):

> But I believe that you learn more in-depth maybe, if one uses your way.

> Men jag tror att man lär sig mer från grunden kanske, om man använder ditt sätt.

> Yes, if one watch film or reads beforehand.

> Aaa om man kollar på film innan eller läser.

When asked how he preferred to get ready for math class he answered:

> In that case read, Mm.

> I såna fall läsa. Mm.

At the end of the interview, Josef states that with harder tasks, one must have a deeper understanding to comprehend. Josef G(1):
Sometimes tasks are harder and then you have to understand why it’s in a certain way.

Int1
Ibland är det vissa svårare saker som man måste förstå varför det blir just det.

[O]
And Erik agrees with the quote above. Erik G(1):

I think if it’s harder problems then this method is better.

Int1
Jag tänker att ju svårare det är desto bättre är den här metoden.

From three of the boys it’s clear that harder tasks give them a motivation for focus and concentration. They have a believe that flipped classroom can help them with the harder tasks. It is however difficult to say whether they are bias or not as they have little to compare with. They all do harder and more intermediate tasks without major problems, both with flipped and non-flipped classroom.

In the second group, the ideas about learning more from flipped classroom are diverse. No one really thinks that flipped classroom is helpful in working with the harder tasks. They all think that being prepared for class is only natural. They can see that having time for harder tasks is helping them to understanding and learn. Betty prefers [genomgång] rather than being given extra time on tasks. Betty G(2):

I agree, but considering how my efforts I math class have payed, I don’t think it has something to do with flipped classroom that I’m having a hard time to pass the course but I need more time to learn, [o] [genomgång] is better for me, but the idea of being prepared before class is really good.

Int1
Jag håller med men asså, men med tanke på hur det har gått för mig i mattekurserna, jag tror inte det har nånting att göra med flipped classroom att jag inte klarar den här kursen men ämm jag behöver mer tid på mig att lära mig, det är ju det [o] genomgångar är bättre för mig faktiskt, men det jag asså tanken att vara förbered innan lektionen börjar och sådär tycker jag är jättebra.

Anna thinks that films or no films makes no difference in the ability to understand. Anna G(1):

For me it doesn’t make a difference if she uploads a movie for me or use a [genomgång] because I understand either way, I’m not the type that ask questions, because I understand. For me it would probability not make a difference.

Int2
Asså för mig spelar det inte så stor roll om hon har om hon lägger ut en film och förklarar eller en genomgång för att jag förstår liksom alltså jag är inte den som
Sara doesn’t have a clear view on whether flipped classroom makes her learn faster and more in-depth or not. But in interview two she commented that one cannot ask your teacher questions while you look at a film. Her comment is have already noted in Attitude 2: watching films before class. I repeat it for clarity. Sara G(2):

I may not have asked those questions if I had watched the films and then gone to school the day after, then I would have felt that it didn’t matter [o].

Int2
Jag kanske inte hade ställt dom frågorna om jag hade kollat på en film och sen kommit till skolan dagen efter då hade mer varit såhär a men det spelar ingen roll [o].

Sara doesn’t mean that watching the films makes you ask more relevant questions for comprehension of the subject. But this is an interesting point that could be explained in future research. Could a student ask a more investigative question if prepared from a film and given time to reflect, rather than asking questions during a [genomgång]?

To sum it up, the boys think that they can see a correlation between being prepared and doing work on harder tasks that helps them to obtain both a conceptual and procedural knowledge. The girls are more ambivalent about whether flipped classroom will help them with the harder tasks or not.

Repetition
What is the mother of all learning? Clearly almost every student does some repetition before a test. This group is using the preparation films both for preparation before class and for repetition the days before the test. The interesting thing about the following quotes is that there has been no instructions from the teacher or the researcher to do so. Betty G(2):

Yes, I watched those films many times before the test.

Int2
Ja, jag kollade på dom där filmerna hur många gånger som helst innan asså a inför provet.

Anna G(2):

Me too.

Int2
Det gjorde jag också.

Sara G(2):

The day before.
To summarize, the student’s themselves came up with a way of using the material for learning through repetition.

**E-checks**

The students all like the idea of an E-check. They think that it helps them to learn instead of only being judged by a test. Due to the nature of self-correction within the E-check, the students are provided with four benefits. First, one can see whether or not one has understood the concept. Josef G(1) explains:

> I think that it’s good, it gives you information, you don’t have to study for the test but you see for yourself if there is something you don’t understand.

Int4

> Jag tycker det är en bra, man lär sig, man behöver ju inte plugga till det men om man gör något fel så vet man ju vad man ska göra för att fatta.

Daniel G(1) continues:

> You can see that you understand.

Int4

> Man ser att man hänger med.

Second, the students see their own mistakes when they are doing the self-correction in class with their teacher. Erik G(1):

> Yes, it feels better for me. I can also see if I have done something wrong.

Int4

> Ja, det känns bättre själv också för då kanske man ser vad man gjort för fel.

Lukas G(1) explains why self-correction could be a benefit:

> I think it’s better to review the mistakes with a teacher, then she can explain. Otherwise, one sits there and [o] oh no I don’t understand what I have done wrong. I know that I have done a mistake but cannot do the right calculation. Then maybe the teacher can help out.

Int4


The whole group agrees that it’s helpful to actually see an explanation of the calculations in the E-checks instead of just a number or character written with a red pen on their tests.
Third, with only a number or letter grade being handed back as the results of a test, it’s difficult to see where any improvements on the students’ part should be focused. The students need the direct feedback to learn. Only being given the answers does not help. Betty and Anna explain how it is without E-checks. Betty G(2):

Otherwise, you write the test, get a grade and don’t have the chance to check it.

Int3
annars blir det att man skriver provet så får man ett betyg utan att få chansen att liksom kolla igenom.

Anna G(2):

Yes, I mean that Klara has already posted the answers online, when you leave the classroom after a test you can check the correct answers. After a test I feel, No I don’t want to do that and I still don’t remember what I wrote on the test anyway.

Int3
a men ja menar Klara har ju ändå gjort hon har ju lagt upp såhär a men uträkningarna till provet ligger uppe redan nu när man precis har skrivit klart provet så att man får gå in själv och kolla, då känner jag såhär nej det vill inte jag göra jag kommer knappt ihåg vad jag skrivit liksom.

Fourth, the possibility to get do a test that assures that you have passed the minimum acceptable level of comprehension the course before the final test for higher grades makes some of the students feel less stressed about tests and exams. Anna G(2):

As you say, you get the chance to repeat and feel safe, that you at least have an E for grade.

Int3
som du säger att man ändå får liksom repetera och typ såhär och ändå känna sig säker med att man kanske har E i alla fall.

Both Betty and Sara say that they need more time for the more abstract questions on the tests and if they already have proven that they have the knowledge of grade E on the course, they can go directly to the more abstract questions. Betty G(2):

Mm but [o] because it’s often the harder tasks that you have to give more time, and if you already have done the E-tasks for the grade E earlier on, you have more time for the harder tasks.

Int3
Mmm men [o] för det är ofta dom svåra uppgifterna man behöver lite mer tid till
och då kan man liksom ha gjort E-uppgifterna tidigare så har man mer tid på dom svårare nivåerna

Sara G(2) agrees:

Then you don’t need to put energy on them [o].

Int3
da behöver man inte lägga krut på dom liksom [o].

All the participants can see a positive outcome from the concept of E-checks. They are encompassing the ability to see for yourself that you understand, seeing your own mistakes, being given direct feedback in class but at the same time on an individual level and the capability to calm student that are stressed about exams.

Lukas

Earlier in the interview, Lukas said that using short films help him; especially short films help him concentrate. When asked what he learns fastest from he answered. Lukas G(1)

It’s the films for sure. Because I have severe dyslexia, I get more out of the films than by reading. If it’s a film or something that interests me, it’s on the spot. Then I understand everything and I learn quickly, but only if I have an interest in the film [o]. 5 minutes is no problem, one can keep the focus up, and you learn quickly.

Int1

Lukas G(1) adds a comment:

For sure, to combine with a teacher next to me or close by. It happens [o]

Int1
Helt klart att kombinera med att en lärare står bredvid eller i närheten. Det sker [o].

Again, we repeat that watching films can help Lukas more than reading does. But we are also seeing that Lukas is negative to change even if he believes that it helps him. In Attitude two we can recall that Lukas don’t want to use time outside of school for studies or preparation.

Summarising attitude 4

The boys believe that flipped classroom could help with their learning, if flipped classroom will give them more time on tasks and especially on tasks that are more complex. The girls see it from
a more individualistic point of view; they see that their own personal learning style is more im-
portant than a learning method. Only the girls are using the preparation films to review and repeat
before a test. Positive comments about E-checks are: an insight to the students’ own level of
understanding, a chance to see own mistakes, direct feedback and lesser stress for passing math
class. Lukas thinks that flipped classroom could help, but has a hard time doing the transition.

**Attitude 5: the problems with flipped classroom**

Eight clearly negative attitudes have come to light during the focus group interviews. Positive and
negative attitudes do however shift during the interviews. Some of the students see positive effects
when using flipped classroom and the same students also see that they could perform negative
using flipped classroom. In the quotes from the focus group interviews one can read some of them
clearly and others more discursively. To be clear, the structure within the master thesis change in
this part. Every negative attitude will get its own subtitle; under each subtitle, one problem will be
presented either from the group as a whole, or by an individual.

**Length**

Lukas has a learning disorder; He has a short window of focus. In his own words he can learn
quickly from watching films but the length of the films is of major significance. We have seen this
quote from “attitude 2: watching films before class” before but of importance I present it in this
chapter again. He is the only one in the focus groups that points out that the length of the films is
crucial.

Lukas G(1):

One thing that is interesting, yesterday I watched math films and did notice that
I learn much more from the short ones that only was 4-5 minutes rather than 10-
12 minutes. One can keep the interest. Short films, most people can’t hold the
interest for 12 minutes. One gets bored.

**Other than their own teacher**

Some of the flipped classroom films that the class have seen are not done by their own teacher.
Problem or not, some of the participants thinks that it’s not perfect. Their own teacher can adapt to
the class with it’s specific needs. This is hard to see from the transcripts, but the reason for the
student’s to discuss it is of importance. In the first interview, Josef starts to talk about it when the
group is discussing how flipped classroom feels. Josef G(1):

We have watched different films, and it’s not only Klara that has made the films.
We have watched YouTube of different teachers.
Sara express that the film is easier to understand if their own teacher has made it. The teacher can with ease explain more thoroughly in the classroom if the students didn’t understand some crucial part of the film. Sara G(2):

I think it’s easier to understand when Klara show us the films that she has made, show and explain, that is simpler, easier than reading.

Contact with audience
Contact with the listener has a special word in Swedish that can’t be translated. I use [åhörarkontakt] for “contact with the audience” in the English quote. Lukas feels that having contact with the speaker, in this case his teacher when she speaks directly to the class, is much more comfortable. Lukas G(1):

[o] Traditionally it’s more pleasant to get a live experience, it’s easier. Then you get [åhörarkontakt] and that it’s not possible with a film and it make my interest to grow.

Noelle has a similar attitude that the teacher should have contact with her audience. She believes that the teacher adapts her way of speaking to her specific class. Noelle G(2):

[o] teachers often adapt their language to their class and the knowledge of the class, and that makes a difference from the film or to read. I think Klara adapts hear language to us students well and if we ask a question she can adapt her answer to us in a way that makes sense for our understanding.
Forgetting to prepare

One participant often recur that he forgets to prepare for the next day’s class. Josef says that he feels a relive the week that they don’t have flipped classroom. We have already seen this quote in Attitude 2: watching films before class. Josef G(1):

I think it’s very nice (laughter). It’s getting less [o]. It gets stressful if one has forgot to do the task I mean watch the film before class, then one gets stressed in the morning, and I have to watch the film to understand the class.

Int3
Jag tycker det är väldigt skönt (skratt). Det blir mindre [o]. Det blir stressigt om typ har glömt att göra uppgiften innan eller asså typ kolla på videon innan, då blir man ju stressad på morgonen, oj jag måste kolla på videon för att fatta lektionen.

The participants in group two often say that they think it’s a problem when students in the class don’t use the films to be prepared. One quote from Sara when she feels frustration about some students don’t prepare when she does, and the teacher is doing a [genomgång] because the lack of prepared students. Sara G(2):

But it’s that I mean, if the teacher says that we will not have a [genomgång] then those who didn’t prepare will learn the hard way. And they will have to prepare and take their own responsibility, I think that would be better.

Int3
Men det är det jag menar att om man säger att vi kommer inte ha någon genomgång då kommer dom som inte har förberett sig dom kommer få lära sig den hård vägen liksom att dom måste förbereda sig och i så fall skulle det liksom så får dom ta sitt ansvar för att liksom jag tycker i alla fall att det skulle vara bättre.

Forgetting or if it is something else is hard to say. But some of the students feels that it has to be more consistent, and that being prepared should have value.

How the teacher values the films

From the chapter above one can see that there is a little concern about student’s participation in the flipped classroom or not. One student highlights that it could be a combination from both the teacher and some of the students. Regardless of which or a combination this could be of importance for the student result in math class. Anna G(2):

Yes, exactly what I feel, it is a combination of that Klara maybe do not value those films super high and nor do the students.

Int1
Ja precis det jag känner e att asså det är en combo av att Klara kanske inte alltid värderar dom här videosarna jätte högt och att eleverna inte heller gör det.
Some student doesn’t work at home

We have already met Lukas. He has no energy to focus on schoolwork at home or he believes that schoolwork is done in school and not outside. If school should be compared to work, he is right.

Lukas G(1):

When I am in school, at least regarding writing tasks, all have their own presentations or similar tasks, then I just let it go. In year 2 and 3 I put full focus on tasks that I like to get ahead. When I come home I want to have my free time, I’m more social with friends at home than in school in most cases.

Noelle has a similar impression of her own studies! This is how she expresses her own personality when it comes to studying. Noelle G(2):

Mmm the thing is how you are as a person, but me, I cannot study at home even doe I have done it a couple of days now, I feel it’s a small difference, but sitting and watch film without concentrating and to know that Klara is going to bring this to surface tomorrow. I watch the film but do not concentrate that is how I am.

Betty is expressing a concern that flipped classroom doesn’t help her to cope in math class. In more than one interview, she explains that even if she watches the films repeatedly sometimes she still doesn’t understand and she needs a [genomgång]. Betty G(2):

Some tasks that I don’t understand, then I would like a [genomgång].
Yes, it seems like I don’t have the understanding even if I watch the films. But I don’t know.

Int3
Aah jag verkar inte ha koll på det alls även fast jag kollar på videosar jag vet inte men asså ja.

She also feels that having a [genomgång] is more relaxed than preparing the day before and try to understand. She can see that flipped classroom and being prepared is positive but it’s not working for her. The following quote we have seen already in Attitude 4: learning quicker and more thorough. Betty G(2):

I agree, but considering how my efforts I math class has gone, I don’t think it has something to do with flipped classroom that I’m having a hard time to pass the course but I need more time to learn, [o] [genomgång] is better for me, but the idea of being prepared before class is really good.

Int1
Jag håller med men asså, men med tanke på hur det har gått för mig i mattekurserna, jag tror inte det har nånting att göra med flipped classroom att jag inte klarar den här kursen men ämm jag behöver mer tid på mig att lära mig, det är ju det [o] genomgångar är bättre för mig faktiskt, men det jag asså tanken att vara förbered innan lektionen börjar och sådär tycker jag är jättebra.

Betty also expressed that one day not having to be prepared and instead sit and listen to a [genomgång] was comfortable. Betty G(2):

Yes, I liked it with a [genomgång].

Int3
Ja men jag tyckte det var ganska skönt på genomgång.

Both procedural and conceptual understanding
Listening to how student’s tackles task reveals what structure they prefer. When asking what they learn fastest from Josef and Erik both preferred to read the theory and then working with easy tasks. All quotes down are from same discussion. Josef G(1):

I think I prefer to read.

Int1
Jag tror att jag föredrar att läsa.

Erik G(1):

Then to do the task is next.

Int1
Sen så att göra talet det är nästa
Josef G(1):

Yes to read and then an example task

Int1
Ja att läsa sen att få ett exempel på en lätt uppgift.

Lukas has a similar preferred structure. We have seen this in Attitude 4: learning quicker and more thorough. Lukas G(1):

Absolutely, to combine with a teacher standing next to me or close by. It happens [o]

Int1
Helt klart att kombinera med att en lärare står bredvid eller i närheten. Det sker [o].

Josef, Erik and Lukas prefer a similar structure. First, read or receive a [genomgång] for conceptual understanding and then working on tasks for procedural understanding. Lukas prefers being supervised by his teacher, but besides that, there aren’t any differences. But they are different students. Both Josef and Erik are high achievers and Lukas with his learning disorders have a much shorter window of focus and ability to work in class.

Summarising attitude 5
To sum up this attitude, one can see that short films are positive for learning, films in the students first language, teacher contact with the students, students forget or skipping to prepare, teachers view on the method, some students don’t work at home or outside school, some don’t think it help at all and the ability to train the students both in conceptual and procedural understanding. All this point to the minimum that have to be considered. This is the student’s view of flipped classroom after eight weeks when emphasising on negative views and attitudes.

Attitude 6: how the student’s want to do it
One thing is clear; variation is a key! No student prefers to use only one method, only reading, listening or only work with tasks. Films for preparing for math class should be short and have examples. We have heard from Lukas earlier that using shorter films he can focus true the whole films. Josef believes that a more complex concept need more time to be understood, but he also gives the idea that examples is needed to comprehend the information. Both the concept and the procedure need to be explained in the films to fully assimilate the knowledge. To be clear, I use same structure as in chapter above. Each significant positive attitude that the participants presented will get their own subtitle, under each subtitle one positive attitude on how the group or individual want to be exposed to flipped classroom.

Both theory and examples in multi variation of films
Josef and Erik did discuss that to understand a complex area, the films have to be longer and include more examples. What they came to is that a complex area needs a longer film and that the understanding comes from examples not only the theory. First, they need theory and then example tasks. Josef G(1):
And some of them are longer. A few was in English. Some was longer and some was shorter, but the length depends of how hard it was to understand, you need more examples.

Int1
Och det är några som är längre. Någon var på engelska. Någon var längre någon var kortare men längden beror mest på hur svårt det är att fatta, man behöver mer exempel och så där.

To only present procedural or conceptual material is not what they believe will help them.

Films on the student’s language
Betty reflects over that the Swedish films that her own teacher was easier to follow and understand. Betty G(2):

Yes, the Swedish films was a lot easier than the rest, it was some from Khan Academy. And those was harder because of the speed in them and the language was English.

Int1
Jaa asså dom svenska filmerna är ju mycket lättare än dom som, det har varit några från Khan Academy. Och dom är lite svårare för dom går ganska fort och det är på engelska.

If using the student’s second language, you give the student two tasks rather than one.

Continuity
Sara wants to try flipped classroom with more continuity. She has a belief to try other pedagogic instruments. It could take her to the harder and complex tasks right away in class instead of using time with her teacher to do the basic tasks. Sara G(2):

But if I think of how it could work if one goes all out. Then if everyone had got their introduction to the subject before class, we could skip the easier tasks if we do them at home, we could work with the harder tasks in class, those are the ones I need help with. Now I get home with two tasks that I didn’t have time to do in class. Those are the hardest ones, and maybe I don’t understand those and need Klaras help. It would be better if I could do them in class.

Int1
Men om jag asså om jag tänker hur jag tror att det skulle kunna fungera om man gjorde det liksom fullt ut, då om man liksom har fått en introduktion innan man kommer till lektionen då kanske man kan hoppa över dom lättaste uppgifterna liksom på lektionen för då har man redan gjort det hemma och då hinner man med dom svåraste uppgifterna på lektionen, dom uppgifterna som man oftast behöver mest hjälp med, nu blir det det liksom att jag kommer hem med två
uppgifter och det är dom svåraste och då kanske jag inte klarar dom för jag behöver Klaras hjälp liksom. Så då nu blir det skulle vara bra om man han med dom svåraste uppgifterna på lektionen.

Sara is frustrated of the absence of continuity; this is her first time for her as well as her teacher is performing flipped classroom.

**Learn through harder tasks**

All the participants have the belief that they learn from solving the harder tasks. Even though the need to start from the beginning. But the process can be helped by preparing themselves before math class. Erik, Josef and Daniel all appreciate the harder tasks. All of them say that it helps them to focus. And no one of them bring up that it should stress them. Daniel G(1):

If it’s harder, one gets more focused, then you want to understand. If it’s relative easy it happens that I only check the book.

Int4
Om det är något svårare så blir man fokuserad, då vill man förstå det. Om det är det ganska enkelt så händer det att kollar upp det i boken.

**E-checks and self-correction of tests**

All the participants feel that doing self-correction test helps them to learn. Their own idea is that it gives them direct feedback when doing so. Anna G(2):

It seems to be logical to do so, that you understand what you are doing wrong and learn that way.

Int3
Asså det verkar ju ganska logiskt att man gör så, att man förstår vad man gör fel och att man liksom då på det sättet liksom lär sig det.

**Variation**

When asking how they would prefer to study, I am asked a question right back to me from one participant in group one. His question to me is as clear that it could be. Erik G(1):

Isn’t it good to vary?

Int2
Är det inte bra att variera?

Erik also refers to working as a professional, later in the interview.

In your professional life you work a lot in groups, mostly anyway.

Int2
I arbetslivet jobbar man mycket i grupp. För det mesta.

Daniel in group one marks that he appreciates that his teacher makes small variations even in the flipped classroom. Daniel G(1):
I like that Klara has done some variation when it comes to flipped classroom, sometimes she gives us a quiz and other times a film, and if it’s a quiz we can review it, try to sit with Josef and discuss the questions and that gives us a good picture on what’s coming on next class. Some variation on the preparing tasks.

Even if you as a teacher have chosen a specific method, your students are going to appreciate if you blend your learning.

Summarising Attitude 6
Lukas has his own favourite way to learn. It could be paired to his learning disabilities. But the rest of the group seem to prefer a variation of [genomgång], flipped classroom, discussing and working with tasks both by themselves and in groups. Something that binds attitude 5 and 6 together is that there almost opposites. One thing is clear, the bigger part of students does not like monotonous teaching and other part of the students don’t like big changes.

Attitude on tasks in notebooks, filmed observation and E-checks
The collected data of this six-week study consists of classroom observations and interviews with students, collected tasks and E-checks and filmed material of students in classroom situations. Tasks from seven students that participated in all interviews were collected and photographed for later analyse. E-checks were collected and photographed in the same way for later analysis. In addition, seven lessons where filmed and later analysed. The purpose of the physical data collection from tasks and E-checks is to examine whether it is possible to see academic improvement in the student’s way of working and in academic progress.

Tasks and E-checks
When analysing tasks that the students have been doing in class and at home, no evident difference in structure or handwriting could be pointed out. This is a very brief analysis and not all of the students did the exact same tasks which means that the material for comparison is not ideal. Some have done similar tasks but others did different tasks.

Only high achievers did the harder tasks and other students that are not high achievers did the intermediate tasks. When the students were asked about how they worked with these tasks there were no major difference, they tried to do all of them in class regardless of whether flipped classroom method was ongoing or not. If they did not have time to do the tasks in class, they did them at home. Tasks that they did not have the knowledge to solve at home, they were forced to work with in class with the help from teacher or friend, if there was time. This is a problem for the more intermediate students that cannot get help at home or have problems understanding how or what to learn when it comes to the harder tasks. The intermediate students had to ask for help concerning certain tasks and appreciated the extra time on task available when flipping the classroom.
E-checks is analysed in a similar manner. All students do the same E-checks, which include the same tasks, and are judged equally. If the students pass the lower limit, they get at least the lowest passing grade for that element of the course.

It was not possible to see a difference in handwriting or structure between E-checks that were done during the time that the class was exposed to flipped classroom compared to not-flipped classroom. The students like the E-checks because they complete the easier part of the course if they pass them. This is brought to surface by the students during the focus group interviews. E-checks helps in making the students more relaxed about the final exam, but they don’t prove any further academic achievements.

Filming the classroom
When filming a classroom, it is important not to intervene with the students too much but at the same time be clear about that there is a camera in the room. If possible one should try to minimize the spatial change that the camera brings to the classroom to avoid room for the students to play charades or other type of unnatural behaviour in front of the camera. All students gave their consent to being filmed and all students are over 18 years old. When filming, a small laptop was placed at the back of the classroom pointing forward. The small camera and the laptop are familiar objects in a Swedish classroom of today.

Of the seven lessons that were filmed, four were with flipped classroom and three were with non-flipped classroom. Two of the flipped classroom lessons had reviews from the preparation material and the other two lessons did not. From the non-flipped classroom lessons, all had [genomgång] of around 18-20 minutes followed by time to work on given tasks.

Two new discoveries were made. First, some of the students were unfocused during the [genomgång] and made small talk with bench mates and were twisting and turning. When having a review from the preparation material it seemed like the students where more focused and concentrated and less small talk was observed. Second, when working with tasks it looks like the students are asking and helping each other more when the classroom has been flipped. They work with similar tasks as they would with non-flipped classroom. The students collaborate more during flipped classroom and turn more to each other for help but also involves the teacher when needed.

Summary
Even though this dataset is too small for statistical analyse, it may give a hint on what to focus on in future interviews. Data from the written tasks did not provide answers for differences in academic achievements between the two teaching methods. The dynamics in class during the flipped classroom model show the students as more focused on the teacher communication and more collaborative with classmates.
Discussion

Novelty

In this study, flipped classroom is a novelty to all participants. A question that should be raised is how that affects the student’s attitudes? Clearly, in the students written tasks no major changes were visible, therefore we couldn’t see evidence for further academic achievement with flipped classroom. But in the focus group interview one could see positive responses from the participants.

Firstly, when coming to a science program in upper secondary school as a master thesis student, the students will have questions about higher education in science and mathematics. I think the students already have a picture of that this is where they will be in a couple of years. This makes them biased. They believe that what you say is correct. Of course, they have their own will, but you as a master thesis student is someone they look up and have faith in. Not all, but a majority.

Second, when presenting the students with a new method for learning they became biased. Not all, but a majority. In this case, the class voted and all but one voted for trying flipped classroom throughout the semester. This might be more of an indication of the class being tired of the status quo in mathematics education, meaning first [genomgång] and then tasks followed by test. Now Klara is mixing her teaching with different tasks and group assignments to inspire her students. But for the six-week study she changed the whole concept.

Third, when using focus group interviews and letting the participants discuss instead of asking them if flipped classroom suits them one could see whether or not there is a bias layer in the student’s attitudes. If they were all deceived by flipped classroom, it would be no bigger difference in their attitudes. A majority would have seen flipped classroom as something superior and behaved overenthusiastic. The focus group interviews indicate that student’s attitudes are widespread. In one corner Lukas is admitting that being prepared is helping him but that he does not approved of the method anyway. Two of the participants do not believe that flipped classroom is helping them to learn, but they use the films for repetition. Others did see that it could help them if school was harder, but their tasks for now are too easy for them so they neglected the method.

What we can see is that new methods can make students biased simply because of the novelty factor. In this master thesis, we explore many layers of attitudes with the students. Therefore, we can single out if one or more is especially biased by this novelty. It would have been clear in the focus group interviews if the students had been overenthusiastic, which would be an indication of bias students. We do not see overenthusiastic students in the interviews. Instead, we see a quite colourful spectrum of attitudes and varied discussions.

Novelty is a shortcoming for this report. Although it is a novelty for the students, we can overlook it because of the wide range of attitudes and that the individuals in the focus group discussions had autonomous ideas.

Standard mathematics education

Standard mathematics education was stereotypical with [genomgång] followed by tasks and a test. Now there is a vast amount of teachers that are changing the game to various types of teaching and learning methods. For example, flipped classroom, blended learning, case problems and many
more. What we can see in forums for mathematics is that teachers are bringing new types of teaching to the classrooms. It is no longer the stereotypical view that what the student performs at the test at the end of the semester is the knowledge learned. Off course, those teachers exist still, but are soon extinct. There is a paradigm shift going on towards more evidence based teaching methods. For researchers and teachers, it is important to look beyond what kind of teaching is the easiest for them, and instead look to what is best for the whole class. Math is not only for those students that have parents with an academic background that can help them. We have many geniuses that have not been allowed to enter higher education because they have only been evaluated by a large summative test at the end of the mathematics course. There is a renascence going on in education and teaching. I hope that we will see more students doing great achievements in mathematics with this new evidence based learning methodology’s.

**Interviewing in groups**

Interviewing in groups without standardised questions seems to work surprisingly well. Viewing the material, it may look like there is no structure at all. In fact, it takes a lot of time to get structure from the material from the focus group interviews compared to standardised interviews with only straight forward questions. Focus group interviews have one of its strengths right there, you get the structure by working with the material. Its other strength is that the method makes it less likely to influence the participants with predetermined opinions. If the group has a similar socio-economic or cultural background, the opinion or attitude will debut in their discussion. On the other hand, there are opinions that a participant could be swayed by the other participants (Kosny, 2003). It could be both in favour for the more extrovert persons or a loss for the discussion. Here the moderator has to use her instincts to not interfere too much but at the same time slow down far too extrovert persons.

**The important stuff**

Factors of great importance that this study points at are varied and no reduced time on tasks and face time with your teacher and classmates. This is the most important result. Variation is key to motivate students. There is more than just that, but having a monologist teaching does only reach out to a very few. And those few are very far from its proximal development zone. These individuals do not need or seldom need to ask for help. Instead, a modern pedagogic should focus on having all the different students work alongside with discussions, group tasks and individual task and then learning communication is everywhere. We can call this a democratic classroom.

What was seen from the filmed observations is that the students focused more during reviews and collaborated more in the classroom when working with tasks. This is a positive change in attitude towards a more democratic classroom when flipping the classroom. This fact is also predicted from earlier research both in (Love, Hodge, Grandgenett, & Swift, 2013) and (Brunsell & Horejsi, 2013 in Sahin, Cavlazoglu, & Ynus, 2014).

The flipped classroom could be a good model for conceptual and procedural understanding. When student experience that tasks are complex it is often something that is missing in their background knowledge. The preparation aspect can shorten the theoretical gap that makes the task feel complex. And more half the students in the focus group interviews did comment on that being prepared is helping them with complex tasks not only by having time to do them in class but that they are better
prepared for the task. These more difficult task are what the students say that they learn more from compared to the intermediate tasks. Mattis derives complexity from not enough experience or background knowledge and the time factor (time on task) (2014). The results of the present study show that flipped classroom gives both more time on the more difficult tasks for to the students and the preparations reduces the gap of knowledge.

Some students want to be rewarded for preparing before class, especially when they see that some do not. Barker explains that when being prepared the reward is that they can explain for other students (2013). In this case, the student that neglect to prepare already have the knowledge or don’t see the tasks as complex. This is of importance for future studies. How should, or should the teacher not reward a student for doing given tasks? One should bear in mind that upper secondary school is not compulsory in Sweden.

Questions to ask
How can teachers ease the transition from traditional teaching to the flipped classroom model? If implementing flipped classroom, should it be with consensus of the students? Are we making ourselves and our students depend on today’s technology? Could we actually consolidate with confidence that both conceptual and procedural understanding will be substantial for the student?

What would happen with the student’s attitudes during a longer period? Would they have achieved more academically? Could the novelty factor be deleted during a longer study? Would flipped classroom only be the new type of [genomgång]? These questions are linked to the novelty factor, and should be raised in a longer study.

A question that has to be asked is what happens when a student is prepared and have time for reflection on conceptual or procedural tasks given before a review in class with their teacher. What kind of question will the student have if compared with [genomgång]? Will this vary?

Conducting this master thesis has brought out more questions than what I started out with. Those above are only a few. More research is needed. What has been observed in this master thesis and in earlier research is that positive attitude towards schooling increases. But we can’t see any academic progress. More research on flipped classroom has to be done if we want to use it as evidence based education technology.
Conclusion

This study is trying to understand what flipped classroom is and to understand the different learning attitudes it gives the eight adolescents that has been participating in the focus group interviews. Clearly, it is more than just letting the student watch movies before class.

Firstly, the beliefs of the students are that; while using flipped classroom they get more time to study the harder questions/tasks that includes both conceptual and procedural knowledge in class with their teacher and classmates to help and discuss their solutions. And that is something the students calls for themselves. Often they feel stranded at home with the harder tasks alone.

Secondly, to implement flipped classroom in our schools we need to let the students feel assured by it. Three of the students interviewed wanted to learn more about how to work with flipped classroom because they did see similar learning capabilities with their traditional education. Their proposal was to implement flipped classroom in early years so that it didn’t feel unsafe to change method after so many years in compulsory school, making it feel more natural to use the method.

Thirdly, three of the interviewed students did feel more confident at the end of the semester even though the national test was only weeks away. The students revealed that the closer they got to a big test (in this case National test in mathematics 4) the more stressed they felt and the harder they focused. This year when using flipped classroom, they answered in the interview that they are more confident and feel less stress from their studies in mathematics.

Fourth, all the students strongly believed that watching preparatory material such as films or quizzes are helping them to understand the subject better. But in a few individuals there are a certain inertia to replace a traditional learning to flipped classroom. One specific student, Lukas could not see the necessity to study at home at all. This could have to do with his learning disorder and that he has a very short window of focus. For this type of behaviour, the school needs to let the student feel safe and that he is going to get the help he needs. More research pointed at this kind of learning orders needs to be done. Lukas shows the opposite to previous studies when flipped classroom shows that students have a positive attitude, this is an important result for future studies.

Fifth, problems arise when changing pedagogics. If the students are already high achievers, they do not bother to change. And if they are struggling with their education it can be distractive for them. This must be given some thought before we refurbish the later part of the student’s education.

Sixth, in this study no further academic achievement were seen in written tasks when flipping the classroom. The student’s achievements were not inferior to pre flipped classroom.

Seventh, variation is a key. No student expressed that they liked or believed in having the same kind of lesson every day. If we remember Erik’s quote on page 46 “Isn’t it good to vary?” his question is very clear and reaches out to all teachers. To motivate students in class, a teacher has to vary their teaching in different manners to inspire and motivate a healthy learning attitude.

Eighth, a small positive change in focus from the students were visible when the teacher had reviews from the preparatory material compared to [genomgång]. The students also seemed to be
supportive to collaborate and discuss with each other on tasks after review from the preparatory material when flipping the classroom.
Acknowledgements

This is the end, or close to the end anyway. This master thesis report could not have been written without the help and support from the persons listed below.

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To my fabulous girlfriend and mother to my two wonderful daredevils, thank you for believing in me and saying that my texts are clear and good every time I ask you to read them, you know how to motivate me.

To Maria, without you my language would be inner city slang mixed with valley girl. Big hugs and thanks.
References


Appendix

Example interview, transcribing’s


Oscar: Alright, tack för att ni kommer igen!
Anna: Det är lugnt
Oscar: Hur gick matteprovet?
Betty: Jag hoppas att det gick bättre än förra gången
Anna: Aah
Betty: det kändes bättre
Anna: Mmm tycker jag också
Betty: Fast eeh aah
Anna: Den här, det här provet var inte lika svårt,
Betty: Nä eller
Anna: tycker jag
Betty: ja, jag skippade A uppgifterna som jag inte
Anna: Aah ja med
Betty: men eeh , jaa
Sara: Jag blev typ eller jag vet inte det gick både bra men det gick inte eller det gick varken eller [o] typ som det varit för mig hela
Betty: du behöver ju inte säga nänting, det är ju ingen som [o]
Sara: Ja men de asså jag känner att kan bättre men jag får liksom ut det riktigt
Oscar: Okej
Sara: aah

Oscar: Men va, vad är ett bra prov. Alltså när det gått bra är det bara betyget, asså att ni har klarat alla uppgifter ni gjort och full poäng på frågorna.
Anna: Det beror ju på vad för betyg man satsar på?
Betty: Jaa
Anna: Asså jag skulle bli extremt nöjd om jag fick ett C
Betty: haa Ja med
Anna: asså då skulle jag bara Va!
Betty: Jaa, jag satsar bara på godkänt i den här kursen så sålange jag klarar provet blir jag nöjd
Sara: jaa
Anna: Typ
Betty: [o]
Anna: Lite så
Oscar: Klarar sig då då det är ett bra prov?
Anna: Aah
Betty: jaa
Anna: för mig är de det
Betty: Aah
Sara: Mmm
Betty: Särskilt i den här kursen
Anna: aah, det har inte varit så i förra kursen, men just den här kursen har varit riktigt svår
Sara: Mmm jag tycker också den är svår, men asså matte är typ ett utav mina ämnen jag har mest lätt för så men jag försöker få samma betyg som fått tidigare men jag tror inte jag kommer få det [o]
Oscar: Jag tänker på det du sa Sara, det här med att du fick inte ut det du ville
Sara: Mmm
Oscar: Som jag tolkar det så känner du att du har kunskapen för att lösa alla uppgifter som fanns där
Sara: Mmm aah
Oscar: och kanske under en annan situation skulle du ha gjort det
Sara: Mmm och sen också att jag hinner jag hann inte ens titta på sista frågorna liksom, det kände jättejobbig för när jag kolla på den nu imorse så såg jag a men den här hade jag nog kunnat klara om jag
Oscar: [o]
Sara: [o] sitta lite med den liksom [o] asså att man inte hinner visa vad man kan
Oscar: Jaa
Anna: Mmm
Oscar: Känner ni igen er ni andra
Anna: Aah
Betty: Eeh
Sara: Tillexempel jag är ganska säker den sista frågan då var det såhär det vara bara man skulle typ det var primitiv funktion så skulle man skriva den näa derivaten eller tvärt om menar jag så det tror jag dom flesta hade klarat. Det var den dära
Betty: Mhmm
Sara: sista uppgiften och då var det den han inte jag till å
Betty: Ja jag tänkte på den asså 8a
Sara: Mmm ja
Betty: jag tänkte helt rätt men jag skrev inte ned nånting för jag vart så osäker på mig själv
Sara: Mmm
Betty: [o]
Sara: Mmm den var inte asså inte supersvår, det var synd att den låg så långt bak, för den hade jag nog om den hade [o] hann ju inte
Oscar: Ni låter ganska trygga ändå?
Sara: Mmm
Oscar: Att ni ändå är ganska nöjda med
Anna: Aaa men det här är ändå
Betty: Asså
Anna: dom proven som jag är mest [o] gick
Betty: Jaa
Anna: bäst i!
Betty: Eller det här provet och första provet
Anna: Aaa
Betty: tror jag det gick bäst
Sara: Jag håller med
Betty: [o] asså jag vill ja [o] tillbaks
Anna: Nåmen ja
Betty: det kändes typ [o]
Sara: det kännas så aaa
Oscar: tycker ni eller kan, kan Fc hjälpt er? [o] klara av det här provet, och då är det antingen så klarar av att bli godkänd eller bara klarar av att känna ja men det här kan jag faktiskt, asså mer eget
Betty: Ja jag kollade på dom där filmerna hur många gånger som helst innan asså a inför provet.
Anna: Det gjorde jag också
Betty: Ja
Anna: eller i alla fall [o]
Sara: [o] dan innan
Betty: [o] den där bilen den var ju i, i en av filmerna
Anna: Mmm
Betty: annars hade jag inte kunnat den, eller hur många bilar som kom [o]
Anna: Jahaa aaa
Betty: Det var ju en av exempeluppgifterna inför,
Sara: [o]
Betty: typ det var andra sidor bara [o]
Anna: Mmm, aah jo jag kände också igen den uppgiften så att det var också ah
Oscar: Men att kolla på filmerna innan provet, asså som [o] lite som att läsa i boken
Sara: ja
Oscar: tycker ni det, fräschar det upp mer än att bara läsa i boken?
Betty: Jaa
Sara: Jag tycker det är enklare att förstå när Klara liksom visar filmerna som hon har gjort själv, visar och förklarar det är enklare det är enklare än att bara läsa
Anna: Mmm men steg för steg för i boken är det såhär
Betty: Jaa för det är lättare för mig att lyssna på någon än att läsa själv
Sara: Mmm
Anna: Och sen är det såhär, exemplet är såhär halvdana asså det är såhär dom dom man ser ju inte direkt asså steg för steg hur [exemplen i boken är halvdana tolkar jag]
Betty: Neej [Instämmande]
Anna: hur dom går till väga, utan där är det mera såhär a jag vet inte.
Betty: det är typ hur man bör [o] liksom, hoppar över några steg

[I gruppintrjvju tillkommer en fjärde elev Noelle, endast denna gång. ]
Noelle: Sorry
Oscar: Det är lugnt. Välkommen, vi jag ställde just en fråga om Fc kan ha hjälpt dig med tentan?
Dom här filmera
Noelle: Mmm tenta? Provet?
Oscar: ja provet
Noelle: Jaha eeh, asså ja jag har liksom bara nyligen använt det
Oscar: Okej
Elever diskuterar deras erfarenhet av och påverkan av en digital minitextutkastning.

**Noelle:** Börjat använda det, bara för att liksom, kolla såhär [o] jag använde det inte förut så jättemycket men den här senaste veckan liksom har jag börjat så jag vet inte riktigt hur det kommer [o] och så

**Oscar:** Men hur kändes provet?

**Noelle:** Eeh jag gjorde det inte

**Oscar:** Okej

**Noelle:** Jag var sjuk.

**Oscar:** Men ni får en chans att göra om det? I slutet av terminen eller så fort som möjligt eller?

**Noelle:** Så fort som möjligt

**Oscar:** Okej, de e grymt

**Oscar:** Idag när ni kom till skolan, viste ni om att ni inte skulle ha att ni skulle ha en vanlig föreläsning eller vanlig lektion eller vad man kallar det

**Anna:** Ja jag kollade igenom igår.

**Oscar:** Aaa

**Anna:** Mmm

**Betty:** Jag tänkte att jag skulle kolla planeringen men sen glömde jag bort det igår

**Anna:** Aaa men det stod att du var inne. Jag kände såhär a nu är Betty inne

**Betty:** Men jag kollade planeringen typ när jag kom hem igår från skolan men då kollade jag inte om det var några uppgifter

**Anna:** Mja

**Betty:** Och så tänkte jag på det när jag skulle gå och borsta tänderna å nej jag måste kolla uppgifter om det är och sen glömde jag bort det

**Anna:** Mhmm

**Sara:** Men jag kollade och då stod det bara integraler [o]

**Oscar:** Men när ni kom till skolan kändes det

**Sara:** Bra! [o]

**Oscar:** Eller när ni såg det eller var det såhär skönt att slippa kolla på film jag kunde bara gå dit och sätta mig

**Anna:** Faktiskt nej, jag tyckte såhär såhär jag hade förberett för och liksom eeh a men förbereda mig inför liksom

**Oscar:** Lektionen?

**Anna:** Ja, då kände jag såhär jag hade ändå tid för det då kände jag typ att det hade varit bra

**Oscar:** [o]

**Sara:** Jag tyckte det var skönt för vi har haft jag i alla fall [o] också fysik och matte vi har haft så himla mycket sista veckan

**Betty:** Mmm vi har haft hur mycket som helst

**Sara:** så jag ville bara inte plugga jag ville bara såhär [o]. Men det är ju om a det beror ju på att vi haft så himla mycket på sistone annars är det ju inte så jobbigt

**Noelle:** Jag tycker det svåra med asså att kolla på film och så är att man asså inte kan ställa frågor på det sättet, så ja jag har känt såhär att ibland har jag verkligen inte förstått det dom har sagt i filmen, så men det är skönt liksom dagen efter när Klara tar upp det så men a ja vet inte ibland blir det lite svårt att förklara ställa frågor eller så

**Oscar:** Mmm, Men när ni kom till lektionen idag och så hade ni en vanlig lektion för jag antar att det är såhär det har sett ut tidigare

**Anna, Betty:** Mmm
Oscar: Hur kändes det? Var det såhär
Betty: Men jag tror det är just bara med komplexa tal att vi fick en genomgång det tror inte jag annars
?: nej
Anna: Asså för mig spelar det inte så stor roll om hon har om hon lägger ut en film och förklarar eller en genomgång för att jag förstår liksom alltså jag är inte den som typ ställer frågor för att ja jag fattar vad hon gör liksom, så att för mig hade det nog inte spelat så stor roll
Oscar: Men hur upplevde du det? Asså kändes det, var det nånting som var bättre eller sämre var du mer aktiv eller mindre aktiv? [o] eller inte
Anna: Asså, nä jag var nog inte så pigg idag, det hade varit bättre om jag hade kunnat göra det själv igår
Oscar: okej
Anna: för det är lite, men det är lite mer som jag är, jag eeh koncentrerar mig pluggar bättre på egen hand eeh men aah
Betty: Mmm jag är tvärtom jag pluggar bättre i skolan så
Sara: Jag vet inte riktigt [o] lika över allt, [o] tror inte nån skillnad men det är som Noelle sa nu kunde man ställa frågor också men a händer om man skulle göra såhär? Sådär och nu när hon väl tog upp det men om jag hade, jag kanske inte hade ställt dom frågorna om jag hade kollat på en film och sen kommitt till skolan dagen efter då hade mer varit såhär a men det spelar ingen roll [o].
Anna: Det är ju mer om man inte typ förstår någonting, då skulle jag skrivit upp det.
Sara: Absolut, men om man, det bara är en sån liten fundering undrar vad som skulle hända om man gjorde så istället.
Anna: Mmm
Sara: det skulle [o] det är i och försåg bättre på sätt och vis att man har en föreläsning i skolan för då blir det mer att naturlig att fråga
Noelle: [o] asså lärarna ofta anpassar det dom säger efter sin klass och hur mycket dom vet att klassen förstår som kanske är annorlunda från typ en film eller att läsa så jag tycker Klara anpassar det ganska bra för oss eller typ om vi frågar någonting så kan hon förklara det på ett sätt som vi förstår så
Betty: [o] förklara det på ett annat sätt liksom kanske förstår det då hehe om man kollar på filmen 10 gg det är fortfarande samma ord
Gruppen: Mmm
Betty: fattar man inte så fattar man inte
Oscar: Hur, vilket ansvar tycker ni att ni har? Över eran skolgång och det här är bara matematiken bara gymnastik engelska och svenska det är jag inte intresserad av utan när ni kommer till en mattelek tion känner ni inte att ni har något ansvar alls eller känner ni att det här måste jag ha med mig och fixa på alla sätt och vis eller vad.
Betty: Mmm det är ju självklart att ha med sig allt man behöver, känns ju som liksom
Anna: Men det är ju asså det är ju en jättestor asså det är ju viktigt att man själv har den disciplinen så att man själv kan plugga hemma det är det som krävs
Sara: Ja
Anna: och det är viktigt att man är liksom skärpt på lektionerna, asså det beror ju på vad man vill ha för betyg men asså jag skulle typ vilja säga att det krävs även fast man bara vill ha ett E i den här kursen
Betty: Ja absolut
Sara: Mmm, det går så pass fort så man måste ju plugga hemma liksom så då har man ett eget ansvar
Oscar: Mmm
Noelle: Just det här, vi har bara kursen i ett halvår så då är det svårt tempo och man måste asså man måste verkligen förstå allting på lektion, nästa lektion blir nå helt annan sak
Sara: Mmm
Anna: Ja man kan ju inte såhära a men Klara kommer hjälpa mig med det här eller såhära det är klart att hon hjälper en om man frågar men det är inte såhäa att Klara fixar allt
Sara: Nej
Anna: man måste verkligen förstå det på egen hand liksom
Betty eller Noelle: [o] va var det jag skulle säga
Oscar: Tycker ni att erat ansvar har förändrats när Klara har för in Fc.
Sara: Ja lite
Anna: Mmm
Sara: asså då, sen är det det där att det inte är riktigt ibland har vi haft en genomgång även fast man skulle ha kollat på film och då så blir ju inte det ansvaret lika stort liksom men om det hade vart så att vi inte hade haft nån genomgång då måste man ta sitt ansvår och kolla på filmen, gör man inte det så får man ingen genomgång så då måste man ta sitt eget ansvå
Betty: Mmm det blir liksom en extra grej att hålla reda på också
Sara: Mmm jo men förhoppningsvis så blir det då att man inte behöver plugga lika asså lika tal hemma sen om man får mer tid att plugga på lektionen
Anna: Nä men det beror ju också på vad du gjort innan, är du en person som hellre sitter kvar en halvtimme efter liksom skolan och pluggar och sen går hem och skiter i det fullständigt i matten då är ju det en annan grej liksom nu när man liksom måste asså när man måste ta ansvar eller mer ansvar för att se dom där filmerna men.
Oscar: Så om jag, nu har inte du sagt någonting på den här frågan Noelle, men om jag sammanfattar er så det ni svara med är att i och med dom här filmerna så kommer, får ni ett större eget ansvar och då när ni tar det ansvaret och kolla på filminerna så får ni större möjlighet att göra uppgifter på lektionerna som ni kan få direkt feedback av Klara och därav plugga mindre efteråt
Anna, Sara, Betty: Mmm
Oscar: uppfattar jag er tre korrekt då?
Anna: Mmm
Betty: Jaa
Sara: Mmm
Oscar: Noelle håller du med om det här eller vill du lägga till något tycka nåning
Noelle: Mmm asså grejen är a det beror på väldigt mycket hur man är som person men jag känner att asså jag som person jag kan verkligen inte plugga hemma och även om jag asså jag är ju gjort det här några dagar nu och jag känner så här det asså jo det har varit en liten skillnad så men asså jag kan typ sitta jag kan titta på filmen och inte koncentrera mig så mycket och bara a men hon tar upp det här imorgon ändå liksom men då har jag liksom tittat på filmen men ändå inte försökt att förstå så mycket så men det är bara hur jag är som person ja.
Oscar: Tack, åh två frågor kvar. Den ena är den första frågan är vill ni lägga till något i det vi har diskuterat idag, är det någonting jag har missat eller som ni vill förtydliga.
Betty: Nej, tror inte det
Sara: Nej
Anna: Nej jag tror inte det heller faktiskt
Oscar: Sista frågan, kan vi köra samma tid nästa vecka?