article

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Flipped learning – Why teachers flip and what are their worries?

Marika Toivola

Abstract. *Flipped learning (FL) in mathematics has recently attracted considerable interest around the world. It raises the question of whether humanist perspectives, such as freedom, dignity, and potential of humans, should have a higher profile in teaching and students' learning in mathematics. This article has used data collected from an open questionnaire where 33 Finnish teachers illustrate why they flip their learning culture in the first place and what are they worries about flipping. The main aim of this article is to offer theoretical and emotional support for teachers' enthusiasm to change their learning culture in a more student centred approach and raises the discussion about what flipped learning really is. What are its pedagogical assumptions? After strengthening our theoretical understanding about why flipped learning seems to be functioning so well we can also better understand what is central in the approach to what we are trying to achieve by applying it.*

Key words. *Collaborative learning, differentiation, Finland, Flipped classroom, Flipped learning, self-regulation.*

Abstract. *Il Flipped learning (FL) in matematica ha recentemente riscosso grande interesse a livello mondiale.*

Ci si pone l'interrogativo se valori quali la libertà, la dignità e il potenziale umano debbano avere un maggior rilievo nell'insegnamento e nell'apprendimento della matematica.

Il presente articolo si basa su un questionario aperto nel quale 33 insegnanti finlandesi illustrano il motivo per cui capovolgono il loro habitus di insegnamento in primo luogo e quali sono i loro dubbi a tal proposito.

Lo scopo principale di questo articolo è quello di fornire sostegno teorico ed emotivo agli insegnanti al fine di favorire un cambiamento nel modo di apprendimento che divenga più centrato sul discente e al contempo fa emergere la discussione su cosa si intenda realmente per Flipped Learning e su quali siano i suoi presupposti pedagogici.

Key words. *Collaborative learning, differentiation, Finland, Flipped classroom, Flipped learning, self-regulation.*

Introduction

These days, Flipped Learning (FL) fascinates many teachers who are trying to change their learning culture to a more student-centered learning approach. The ideology of flipping has started to develop from a method of teaching known as flipped classroom (FC). FC is seen as a concrete step to change the dynamic of class and step out of the

more traditional learning culture, in which class time is typically spent on direct instructional guidance, while the most higher-order tasks are done as homework, outside the classroom. However, FC does not guarantee a learner-centered learning culture because it simply puts the focus on moving tasks in space and time, rather than on increasing engagement, autonomy or student centeredness (Abeysekera & Dawson, 2015). In this article, FL is neither a synonym for FC nor the same as FC from students' point of view. Instead, FL is understood as flipping not only the actions in a classroom, but also many of the teachers' pedagogical assumptions about teaching and learning (Toivola & Silfverberg, 2015). In conclusion, in this article FL is understood as an ideology of learning, not a method of teaching.

Since 2007, Chemistry teachers Bergmann and Sams are widely known as pioneers of flipped classroom (FC), when their students started to watch recorded lectures at home and do exercises in class under supervision. Their story presented here illustrates the nature of flipping as a continuously developing learning culture. In the first book of Bergmann and Sams "Flip Your Classroom: Reach Every Student in Every Class Every Day" published 2012, their ideology of flipping got a name Flipped-Mastery model as a purpose to differentiate it from the more traditional FC which was typically connected to learning videos. The name of their second book "Flipped learning: Gateway to Student Engagement" (2014) illustrates a further development of flipping ideology and how flipped classroom as a teaching method is not enough for reverse to meet the student centered learning culture. Here are some quotations where Begmann and Sams (2012) describe how the process of flipping has transformed not only actions in their classrooms but also their thinking about education: "The best analogy [for teacher] we can come up with is the role of a supportive coach. We are there to encourage our students along the road of learning. They need a coach who can come alongside them and guide them in the discovery of knowledge. … Learning is no longer imposition on their freedom but rather a challenge to be unpacked and explored. As the teacher gives up the control of the learning process, the students take the reins, and the educational process becomes their own. ... Our classes have become laboratories of learning where the entire focus of the classroom is on what students have or have not learned. No longer do we present material, provide a few extra learning opportunities, to give a test, and hope for the best. Instead, students come to class with the express purpose of learning. We provide them with all the tools and materials to learn, and we support them by helping them to develop a plan for how and when they will learn. The rest is up to the student. ... When learning becomes the central point of the classroom, the students must work just hard as the teacher. This means their minds are engaged, not just passively exposed to information."

In 2014, the Flipped Learning Network, which is a professional learning community for educators using FL (has over 28 000 members on its social media site www.flippedclassroom.org), and Pearson's School Achievement Services (Yarbro, Arfstrom, McKnight, & McKnight, 2014) defined FL as a "pedagogical approach in which direct instruction moves from the group learning space to the individual learning

space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter". They also identify four components that support students' engagement, which are generally known as the four pillars of F-L-I-P (Flexible Environment, Learning Culture, Intentional Content, and Professional Educators). Later in the same year Chen et al. (2014) offered three additional letters, P-E-D (Progressive Activities, Engaging Experiences, and Diversified Platforms), to the F-L-I-P schema to emphasize the activities-oriented nature of FL. They criticized F-L-I-P of focusing 'existing knowledge assimilation' rather than 'new knowledge discovery and creation'.

Like the name Flipped-Mastery model illustrates FL has raised the basic tenants of *mastery learning* (Bloom, 1968; Carrol, 1963) by re-considering and evaluating processes. Already almost a half century ago Bloom argued that the level of learning determined based on teacher conceptions of the average skill level of the group will be poorly fit to 80% of the students. Mastery Learning is very logical, fascinating and is one of the most highly investigated teaching methods over these years. However, it has also been the subject of high criticism and many mastery programs have been reconsidering the more traditional way of teaching due to the level of commitment required by the teacher and the difficulty in managing the classroom of individual learners (Guskey & Pigott, 1988). In FL, *Self-paced learning* and *scaffolding* are placed at the center of the learning culture as well as ICT is harness to support learning. The time will show if FL succeeds in taking up the gauntlet of mastery learning.

Even though the FL movement was created from teachers' common sense thinking and enthusiasm to just jump into the new learning culture, rather than from educational theory found in literature, in their study Toivola and Silfverberg (2015) have shown that the target of FL is closely linked to classical research questions about education. However, these questions are not easy for teachers to comprehend because they are questioning the role of the teacher. The main aim of this article is to offer theoretical as well as emotional support to teachers in their developing process of FL. As data for this study an open questionnaire has been used, in which 33 teachers have answered. When a teacher flips the learning culture he or she is not questioning only the learning culture of his or her own but inevitably also the learning culture of other teachers in the same school. For this reason, teachers are worried about the depression caused by the resistance of colleagues as well as the resistance of students and their parents.

The Finnish context

In Finland, where this research was made, there are more than 10 000 members in a Facebook group where teachers can collaborate and share ideas about flipping. In 2015, the first two-day long summer meeting for flippers was arranged to offer the teachers who were familiar from social media a place for face-to-face collaboration. In the meeting the teachers were enthusiastic to keep short presentations about their learning culture and share their successful as well as unsuccessful practical experiences. There were 60 attendees and 33 from those answered the questionnaire, which have used as a data in this

article. In addition to some background information the questionnaire has only three open questions: What flipped learning means to you? Why you flip? What are your worries in the changing of the learning culture? As a notation, these teachers do not represent the average teachers in Finland. Instead, they are highly motivated to develop their learning culture and joined the course by their own will in the second week of their summer holiday. The summer meeting was held in Mikkeli, which is about three hour drive from Helsinki. The attendees were primary teachers, special class teachers, secondary and upper secondary level teachers, and principals. The following school subjects were represent: mathematics, physics, chemistry, information technology, literature, English, French, religious education, biology, geography and guidance counseling.

The Finnish way of flipping is quite similar with the method of Bergmann and Sams's Flipped-Mastery Classroom which follows the principles of mastery learning connected with modern technology to make a sustainable, reproducible, and manageable environment for learning. Thus, in Finland because of teachers' autonomy and lack of standardized tests teachers have freedom to concentrate even more to the learner-centered approach (Tangney, 2014), which consists of both constructivist and humanist elements, such as personal growth, increased consciousness, and empowerment.

Teachers' reasons to flip and their worries about flipping

Based on the data the most important reasons for teachers to flip were

(1) differentiation,

(2) motivation and self-regulation, and

(3) collaborative learning.

In the next chapters these reasons and worries connected to them will be opened and theoretical justifications will be discussed. In the final chapters flipped assessment will be introduced and focused on teachers' emotional support.

Dirretentiation and the quality to the students' zone of proximal development

Differentiation is a buzzword in today's educational community. Twenty teachers out of 33 said differentiation to be the most important reason to flip. "*Both the weak and gifted are benefiting in FL. The students have possibility to practice those skills, in particular, which they need at that moment.*" Even though self-paced learning delights teachers it also distresses. "*If I let students self-pace their learning, what happens if the next teacher won't? Do the students get over the minimum requirements of the curriculum? How much will be enough? Do we have time to go through all?*"

Because the teacher could neither be able to affect the heterogeneity in the class nor to choose the level of learning suitable for all the students, the teacher just stops to act like he or she could. In FL the teacher lets the students differentiate their own styles and goals of learning by themselves. The students simply have the possibility to start to learn from a level which is best fitting their own *zone of proximal development* (ZPD) at the moment.

The teacher role is to impact the quality of the students' ZPD.

In his theory, Valsiner expands the ZPD to include two additional zones of interaction: the *zone of free movement* (ZFM) and the *zone of promoted action* (ZPA) (see Fig. 1). ZFM is a socio-culturally determined function of what the students are allowed by the teacher and not prohibited by the learning culture they have engaged. Whereas ZPA defines a set of actions in the environment by which the teacher attempts to persuade students to act in a certain way. In figure (see Fig.1), Toivola and Sifverberg (2015) illustrate the quality of students' ZPD in FL by using the *illusionary zone of promoted action* (IZ) first launched by Blanton's et al. (2005). As opposite the Blanton et al., who use IZ as a diagnostic tool for visualizing the teacher's own ZPD, Toivola and Silfverberg use IZ as a zone which students can achieve without the teacher's promotion if students' spontaneous performance is allowed. However, this point of view does not exclude IZ as a tool for visualizing the teachers' own ZPD too. Bergmann and Sams (2012) comment, "Our classes have become laboratories of learning", is excellent manifestation of IZ especially from the teacher's perspective.

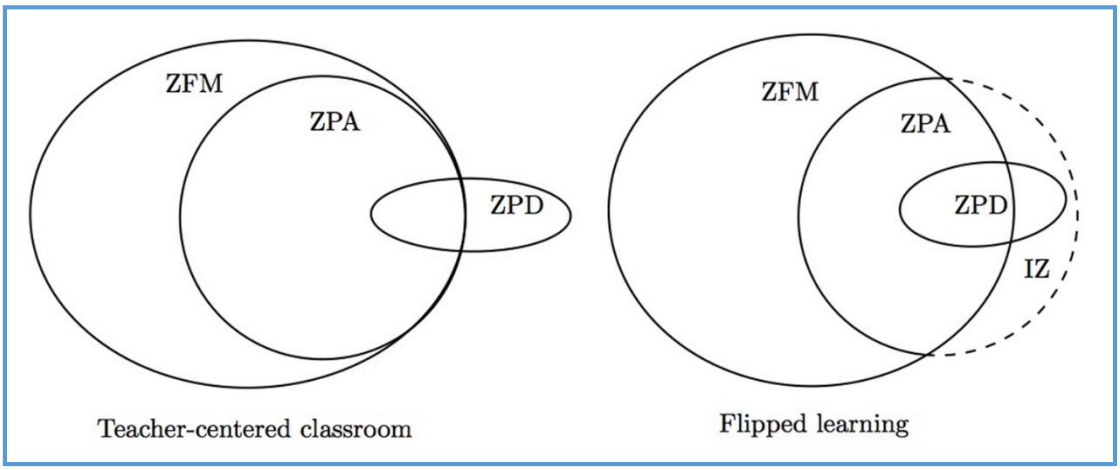

Fig. 1 - The zone of proximal development (ZPD), the zone of free movement (ZFM) and the zone of promoted action (ZPA) in a traditional teaching context (adapted from Oerter (1992)) and in a flipped learning context (the authors' interpretation by exploiting Blanton's et al. (2005) illusionary zone of promoted action (IZ)). (Toivola & Silfverberg, 2015)

Student's ZPD is not fully contained in ZFM/ZPA complex as a result of teacher's decisions about what he or she allows the student to do in situations of a different kind. For example, if a teacher does not allow students to participate during exercises, he or she undoubtedly excludes the students' possibility for reciprocal scaffolding (will be explained in the next chapter). This does not mean that teacher should never use individual seatwork exercises. Instead, the purpose is to illustrate how some distinctive teachers' instructional choices will reflect the students' learning environment. There is no doubt that sometimes for example direct instruction has a place also in FL, however, the place neither needs to be in the classroom nor in a whole-class setting. In FL teacher

promotes the quality of students ZPD and the potential of students' development by the increased autonomy of the students and by focusing on them as individuals not a homogenous group. In other words, the teacher offers tools of different kind for learning (ZPA) and everything is not mentioned to everyone. What the teacher offers is an option and the student are free to choose differently as long as their choices serve learning. In FL, teachers were released from the duty that all should learn the same matters at the same time.

Motivation and self-regulation is connected to teachers control

24 teachers mentioned the purpose to flip is to increase motivation. According to them, the motivation rinses if students are allowed to take ownership of their own learning process and take responsibility of their learning. From students' point of view, flipping demands students to control their learning by taking responsibility for the pace of study, the mastery of the content, and coming to class prepared (Bergmann & Sams, 2012; Moore, Gillett, & Steele, 2014). However, eight of these teachers also felt they struggle with how to best help students achieve self-regulation in their learning. "*What if do students not self-regulate? How can I help passive and lacy students? What happens to those students who are unwilling to do anything by themselves?*"

Guiding students to become autonomous learners is neither an easy or a fast task. Demetry (2010) for example noticed that 10-15% of the students has lack of self-regulation in FL. That still suggests than an impressive 85-90% of the students did self-regulate. Nevertheless what is self-regulation and how to support it? Learning to self-regulate the learning process is connected with the teacher's conception of humanity and his or her perception of the student as a person (Koro, 1993). Finnish teachers try to respond to this demand by focusing on joy of learning and school satisfaction (15 answers of 33) as well as rising the students' self-esteem by offering more feelings about success and less comparison between classmates (5 answers). Purposely teachers who flip also concentrate on great learning environment where everyone feel good and where no one is left behind.

To support self-regulation students are allowed to take more control and responsibility of their own learning. In figure (see Fig. 2), Toivola and Silfverberg (2015) illustrate how self-regulation is connected to teachers' control. Students who are overly controlled by the teacher not only lose initiative, but also learn less. Self-regulation in learning and students' intrinsic motivation seem to increase when students have an opportunity to decide when they need personal guidance, encouraging feedback or non-authoritarian cooperation (Deci & Ryan, 1985; 2000). To be an autonomous learner, the student should be the leader, designer and implementer of the learning process, which means not only in *organizational* and *procedural choices* but also in *cognitive choices* (Stefanou, Perencevich, Di Cintio, & Turner, 2004). However, it is not easy for the teachers to give learning hands on students and stop prevent students from making pedagogically poor

choices.

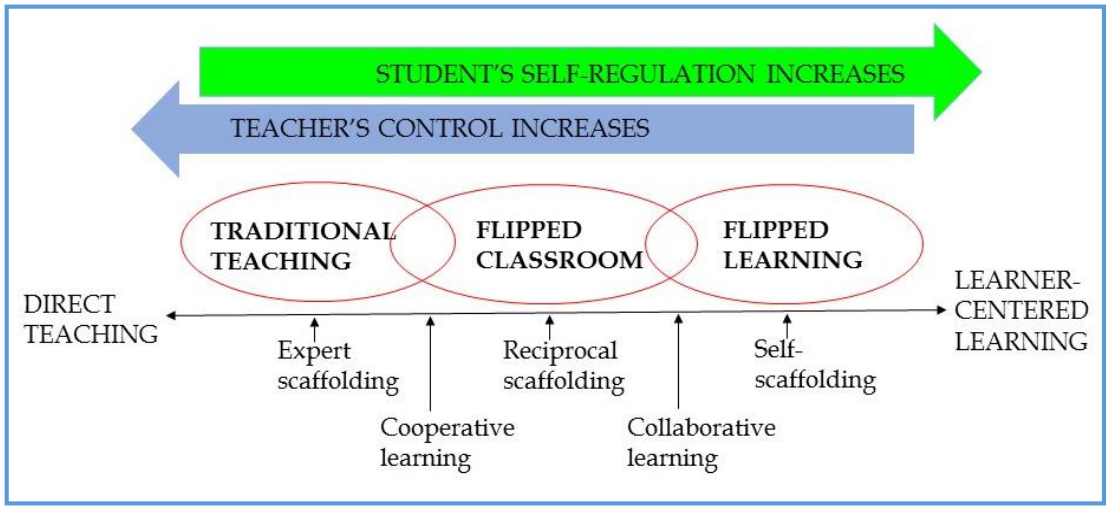

Fig. 2 - The dimensional view of the changes when switching from direct teaching to learner-centered learning. (Toivola & Silfverberg, 2015)

Quit often based on conversations in social media self-regulation is misunderstood as a synonym with self-study. The Self-regulated learning is not learning in isolation or alone. Instead, the significance of others in the development of self-regulation is explicit in the seminal works of both Piaget and Vygotsky. More recently McCaslin (2009) as well as Volet et al. (2009) highlighted the significance of the individual's metacognitive and scaffolded experiences in social systems and used the term *coregulation* to illustrate a transitional process in the development of self-regulation. Thus, to support self-regulation students should be motivated to collaborate each other.

Fifteen teachers mentioned they do not want to motivate only students but also challenge themselves. They see FL as a tool for modernizing their previous learning culture and grow as a teacher (IZ). With FL, they could see the potential of the students better and have possibility to affect their students' learning attitudes. However, as a total of 17 teacher form 33 were worried about their own role and how qualified they are to support student-centered learning. "*Can I direct learning? The change in the culture of learning is so big that it is challenging for me as a teacher? I have to learn to be active in the different way than in the traditional way of teaching. I really like to be the front of the class. I really like those conversations with all students where I am a leader. Will I be satisfied with a smaller role as a teacher*?"

Collaborative learning culture supports self-regulation

Fourteen teachers mentioned collaborative learning as a purpose to flip. Thus eight of them were also worried about how to promote collaboration. "*How do I promote collaboration at the level of the whole group? Do the individuality and the cooperation come true really? What can I do to help everyone to find a group? How noisy will the class be if there is so much social activity? What will I do with those students who have*

social problems and conduct disorders?" It is clear that collaboration is an important factor in FL but what kind of collaboration? More precisely, what is the teachers' role in collaboration? What kind of collaboration supports self-regulation?

In their research Toivola and Silfverberg (2015) illustrate how the nature of the collaboration depends on teacher (see Fig. 2). With *collaborative learning* they referred to Dillenbourg's (1999) definition as a shared learning situation in which two or more people learn or attempt to learn something together. In contrast, *cooperative learning* focuses on a common or final output. In FL teachers give up control also in the matter of collaboration. Cooperative learning, where students are forced to work collaboratively to fulfil a task offered by the teacher, is perhaps not the best option if the purpose is students' self-regulation. To become self-regulative learners, the students should be the ones who are allowed to use collaboration the way how it best fits in their own needs at the moment to practice their *conceptual thinking* (Kazemi & Stipek, 2001) and to improve their *mathematical identity* (Anderson, 2007) without any obligation set by the teacher. A central but quite often neglected goal in mathematics education is to let students express their own mathematical thinking. Learning to use mathematics as a language is commonly based on imitating the teacher. As with learning any foreign language, only imitating based learning does not seem to be enough to achieve the active skills of using the language of mathematics. Research has shown that when students explain their problem-solving processes it develops their problem-solving strategies, and their metacognitive awareness of what they do and do not understand. Discussion leads to a deeper understanding and has a positive impact on the quality and quantity of learning (Webb et al., 2009).

Four teachers mentioned the ideology of learning to learn and metacognition as a reason to flip. Based on Holton and Clarke (2006) study, metacognition is equivalent to self-scaffolding. They divided scaffolding into three types: *expert scaffolding*, *reciprocal scaffolding*, and *self-scaffolding* which operate in two scaffolding domains: conceptual scaffolding and a heuristic one. Even though there are in FL also presence of expert scaffolding and reciprocal scaffolding, self-scaffolding can be seen as a purpose of collaboration to achieve metacognitive skills. Self-scaffolding is a form of internalized conversation where the students negotiate their epistemic self. Self-scaffolders are aware of, what they know in terms of content knowledge, heuristic knowledge and learning styles. This unique form of thinking, where a student turns the discourse-for-others to a discourse-for-oneself, needs collaboration to develop (Ben-zvi & Sfard, 2007). The conversations in the class are also important for the teacher by offering a window into the social process of students' self-regulation and further offering the hints to better serve students learning (ZPA).

Flipped assessment in student-centered learning culture

Five teachers mentioned worry about assessment. If the way we measure our students

does not change, the learning culture will not change either. As sad it is students mainly seem to learn for assessments. It should be remembered that FL does not decrease the heterogeneity of the class. There are still those who have excellent abilities in math and those who do not. However, teachers do not need to close their eyes to heterogeneity either when they measure the students. Otherwise the nature of this article, I give an example of flipped assessment via my own students. Thus, I was a keynote speaker in the summer meeting and in that role suitable to introduce my own learning culture of secondary school mathematics. I have tried to take up the gauntlet to support student centeredness by flipping the assessment, too.

My students may chose three different level tests depending on the credit in students' sight: credit seven, credit eight or nine and credit ten (in Finland credits are from four (fail) to ten). The basic idea is that students decide by themselves which credit they court in math. My role is to help them to achieve their goals. Of course the credits must be earned, but the students are not doing a kind of "cooper test" where the game is blew over and the students are forced to continue to the next subject based on the schedule of the teacher. I do not want to support rote learning either.

There are no mandatory test days in my class. The students will make the test depending on the time of their studies. The students are advised not to read for the math test because if they do so just in the previous evening they will be "cheating" in the test. When the students are cramming for a test, they will store the information into their short-term memory and this way destroy their possibility to see what they really have learned and what they have in their long-term memory. As long as a teacher offers the students a test paper where they can just vomit their knowledge the students continue this culture of rote learning. However, to stop action which has previously lead good credits is not easy for students and sometimes hard for their parents to understand. Students really need to trust that the teacher will not penalize them because of their mistakes.

When the students have made the test, I will just mark with coloured pen the number of exercise where there are some problems. After that, the students are offered precious opportunities to relearn and remediate. The purpose of the test is to help students self-evaluate their learning, it is not a purpose for teachers to evaluate their students. Assessments are used solely to show students what they have mastered and to help them decide what to do next. The students decide how they will correct the wrong answers; with or without the text book and further alone or with the help of classmates or teacher. Because the students are doing the tests in different times I always have time to concentrate on every student as individual and give feedback.

In FL, the teacher gives up the illusion that everyone will learn everything. The flipped assessment continues the same ideology. Instead of feeding the illusion that everyone would have realistic chance to get the highest credit ten in the test, the teacher accepts the fact that not everyone has learnt everything. The purpose is not to bring the students down to earth and to situate them to Gauss curve based on their mathematical ability. Instead

different level tests have been seen as steps to climb higher and higher the mountain of math. It depends on students' ability to understand math as well as their willingness to work how high they will go in their studies. Flipped assessment offers every students possibility to see themselves as true learners of mathematics regardless of their level. As a matter of mathematical identity, it differs if the students have had a possibility to earn credit seven or if they have just shown how far they are from credit ten. Of course I encourage the students to take more advanced test whenever it is appropriate.

We are using mathematics text books, which I have made with another mathematics teacher. The books are published with creative common licence (CC-BY) and made for flipped learning. Everyone can load, use and edit books for free (see more www.flippedlearning.fi). Teachers can edit and enrich the interactive learning materials by adding videos, learning paths, level tests and discussions for example. The students also have possibility to make the math books of their own and take those books with them to the next school level. The students differentiate their learning with three different level exercises: the ground level, intermediate, and advanced. Naturally, students who are practising also the most difficult exercises will take the credit ten test. The final credits to the school report will be decided in collaboration with students. The students will tell me which credit they have earned and why. My role as a teacher is to help students identify their skills with the help of flipped assessment.

Emotional support for teachers

Changing his or her own learning culture is not an easy task for a teacher. The teacher is not questioning only his or her own learning culture but inevitably also the learning culture of other teachers in the same school. In the summer meeting were teachers whose all colleagues in the same school were using FL in math. Thus, the most common was situation where a teacher felt of being a lonely wolf with this ideology of learning. It comes clear that behind every succeed experience there was support by the principal. This support is mandatory because there is a risk for the teacher to burn-out not only for the amount of work at the beginning but also because of depression caused by the opposition. As a total of ten teachers from 33 attendees mentioned they were worried about the resistance of their own colleagues. Two mentioned being worried about the resistance of the principal, four resistance of the parents and seven resistance of the students. Tim is 60-year-old upper secondary school mathematics teacher and I asked him to share his story with us, which is not rare:

"*I started in a new school in a new city almost three years ago. I knew nobody and nobody knew me. It was easy to "do your own thing". The ethos of most schools is that teacher closes the classroom door and is on her/his own. After few weeks of traditional teaching, I made decisions: No more assigned home work. No more using more than half of the lesson explaining homework to those who already mastered them and to those who didn't still get it. Then it was easy to cut frontal teaching to minimum. Soon I added a*

form to monitor the amount of problems students solved. At first it was purely for myself: a tool for seeing what was going on in the classroom. To my surprise, it turned out that walking around the class gave me enough information. Thereafter the form has evolved to a tool for students for monitoring themselves. Students are encouraged to evaluate each problem on a short scale: Did I just copy the answer, or did I learn something, or did I really nail it. I strongly try to make students learn to choose the level of their homework problems. They must be able to analyze and evaluate problems at some level. I can help to pick up problems from the text book, but it is their sole decision, what to do.

I shared my opinions as well as my feelings on the classroom with anyone who listened in the teachers' lobby, but there was very little actual conversation. Teachers seemed to be interested in their families and their own hobbies. It was not a custom to share your opinions about learning and teaching. I was little miserable and felt myself an outsider. Then I found out there was a teacher of another subject (we are more than 40 teachers, a big teacher staff in Finland) using ICT and giving students a freedom of choice with their tasks at home and during lessons. That gave me the possibility to compare our ways of teaching.

There were still very few opportunities to reflect my decisions for arranging my teaching with other math teachers. There was a teacher I knew who was very active in the social media. I wrote some e-mails to him and he encouraged me to carry on. We also discussed the differences of our methods in more detailed way, a thing I couldn't do in at my own school. Later on I participated in a summer meeting where a group of teachers gathered to share their views on subjects like "how to make the student the subject instead of an object at school" and "how to enhance the using of ICT in a way that supports students learning in a new way instead of just digitalizing the old-school-teaching". That summer meeting really made my day.

Then there was a new fall and back to school...

I had a kind of grown to do my own ways of lesson planning and my own way of giving homework and my way of using videos and group work and so on. And I think that the other teachers politely let me do that, but nothing else changed in the school. Then out of the blue, the principal told me he appreciated a lot my input as a teacher and a developer, too. That gave me a lot of new energy to carry on and make a little better every time I had a new class in our 7 week periodic system.

I also started to get feedback from other teachers at our own school and from teachers from other schools via social media. Teachers recalled our discussions, we had long time ago. Teachers asked me to share my material with them (just to look through, but not to use at first). I realized the power of sharing materials and ideas in a Facebook group. Some feedback from the students showed they shared my views of learning math.

There seemed to be a profound change in my way of teaching, and also in the way I see teaching as a whole in these two years. It took a jump to the unknown and a lot of courage to keep in my own path, but it was worth it."

Discussion

Even though the FL movement fascinates many teachers who are trying to change their learning culture to more student-centered learning approach teachers also have worries concerning students as well as the role of their own. The target of FL is closely linked to classical research questions about education but these questions are not easy for teachers to comprehend. Within this article both theoretical and emotional support will be offered to developers. Based on the data of this study, one of the problems in process of changing the learning culture is that the teacher is not strong enough to fight for the depression caused by the resistance of colleagues as well as the resistance of students and their parents. The teacher who flips his or her learning culture inevitably also questioning the learning culture of other teachers at the same school, too. At least in Finland the specific facebook group for flippers is a precious place for collaboration and peer support. It is the place to scare not only practical experiences but also pedagogical opinions. After strengthening our theoretical understanding about why FL seems to be functioning so well we can also understand better what is central in the approach we are trying to achieve by applying it. Pedagogical discussions where the critique is welcome will be needed to develop FL further to support the learning of individuals.

What is perhaps unexpected was that only one teacher out of 33 said that better learning results was her reason to flip. Mainly all of the scientific researches where learning results are compared between the flipped approach and more traditional way of teaching have ended up the conclusion that the learning results are lightly better in the flipped approach. However, the problem with these researches is that flipping is understood as a technical change in teaching, as a method, and not in a learning culture where the focus is on increasing engagement, autonomy and student centeredness.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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About the Author

Marika Toivola
Rauma Teacher Training School of Turku University
I am doing PhD about flipped learning in mathematics.
Finland
E-mail: mrstoivola@gmail.com

https://www.linkedin.com/in/marika-toivola-36000b29
http://www.flippedlearning.fi/

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