

Teachers' Experiences of the Potential of Flipped Classrooms: A Research Study of Dance Movements Including Students with Different Educational Needs

Balli Lelingeⁱ
Malmö University

Abstract

The pedagogical approach in the flipped classroom (FC) reverses traditional in-class lectures by delivering content instructions outside the classroom followed by practice as homework. Although several studies develop the FC model in science, technology, engineering, mathematics (STEM), and Higher Education or High School, few educational studies for inclusive education at primary school levels are conducted. From a teachers' perspective, this small-scale research project explored the potential of the FC approach in one Swedish primary school (n=25), including ten students with different educational needs. This study aims to investigate how FC contributes to students' ability to discern and perform choreographed dance movements to music in Physical Education and Health (PEH) according to the teachers' views. The data collection contained teachers' PowerPoint presentations of two dance lessons for colleagues, pre-and post-meeting, and three delayed post-interviews with four teachers. Descriptive and content analysis methods were used to analyse the data. The results provide evidence for a potential advantage that the FC supports a general structure of inclusive education. However, there is a risk that students with different educational needs spend more time out of school hours to reach the same level as other students, which requires further investigation.

Keywords: Flipped Classroom, Inclusive Learning, Teachers' Perspectives, Primary School Level.

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ⁱ **Balli Lelinge**, Assist. Prof, Dr., Faculty of Education and Society, Department of School Development and Leadership, Malmö University, ORCID: 0000-0003-2435-0913

Email: balli.lelinge@mau.se

INTRODUCTION

As technological advances increase, it places new demands on using technology in K-12 classrooms to develop powerful teaching models for students' equal rights. A shift from teacher-centred education to more student-centred education is needed. One example of digital instruction, technology-enhanced pedagogy, and a student-centred focus is the flipped classroom (FC) (Abdul Kader, 2020; Sam's & Bergmann, 2013). According to Arslan (2020), this paves the way for the FC to become a progressive educational model. FC is based on the teacher creating instructions for the upcoming lesson for the students to participate in. The most prominent pedagogical artefacts that FC relies on are videos, reading texts, written instructions, and other resources from the classroom. The students are expected to acquire conceptual knowledge through the given pre-class material to prepare for the in-class activity. During the in-class time, it is assumed that the students can show understanding of the material through their active involvement in the collaborative activities instead of being passive listeners to traditional lectures (Butt, 2014). These instructions are usually given a few days prior to the lesson. According to Pelger and Ljungqvist (2018) and Sam's and Bergmann (2013), FC is a blended model of learning that increases interaction and contact between teachers and students. According to Osguthorpe and Graham (2003), FC is most likely used differently depending on the teacher, content taught (Hwang *et al.*, 2015), and which digital resources were used in the past. Teacher can devote class time to various activity learning between students and spends less time introducing the task to the class and instead increases the students' active learning and enabling collaboration with the classmates (DeLozier & Rhodes, 2017; Lucznik *et al.*, 2020).

Three systematic reviews compared the effects of the FC and ordinary teaching models on student performance (Lo & Hew, 2017; Strelan, *et al.*, 2020; Van Alten *et al.*, 2019). Findings were similar regarding the learning achievement across disciplines and education levels. Students who have the opportunity to work with the FC model achieve significantly higher outcomes than those in traditional classrooms. Strelan, *et al.* (2020) stressed that it is worth implementing FC, but careful attention should be given to how exactly this is done. Their reviews also show that FC effects are relatively weak in the STEM field and that the most substantial results are within the humanities. Since FC contributes to active and individualized learning in the pre-class phase, it also helps the teacher know how much students perform concerning the content at the in-class phase. Sam's and Bergmann (2013) believe that FC offers students to apply the knowledge gained at a deeper level while sharing their ideas and offering different perspectives on the content through collaboration with their peers. Similarly, Larcara (2015) explore that peer interaction and collaboration are the most beneficial aspects of FC compared to traditional lectures.

Although there is limited research conducted on FC for students with different educational needs, there are indications that it can be beneficial for such learners (Altemueller & Lindquist, 2017; Lin *et al.*, 2018; Needham-Beck & Aujla, 2021). Focusing on the use of FC for learners with special educational needs, Brewer and Movahedazarhouligh (2019) investigated FC learning in special education in two undergraduate courses. The learning model encouraged students' problem-based learning, and digital instructions resulted in fewer misunderstandings regarding the content compared with instructions given face-to-face. Though there are still challenges regarding the 'take-away' transitions of FC approaches, the model could be used to offer student-active learning with a focus on learner responsibility and empowerment where learners are encouraged 'to take charge of their own learning' (*ibid.*, p.140). Altemueller and Lindquist's (2017) review pointed out that FC promotes a positive peer spirit for students to help each other achieve the lesson's goal. However, despite the encouraging student focus, the teacher's views of experiencing FC have not been explicitly researched (Hultén & Larsson, 2018), which this study referring to.

Aim of the study

By referring to the teachers' views, the aim is to investigate how FC contributes to students' ability to discern and perform choreographed dance movements to music in Physical Education and Health (PEH) in fourth grade. The research questions (RQ) were:

RQ1: How do teachers experience students' access to the content in inclusive flipped learning?

RQ2: What content was made discernible for the students by offering material prior to the lesson?

RQ3: How do teachers communicate their experiences of the flipped classroom to other teachers?

METHODOLOGY AND FRAMEWORK

Physical Education and Health in the Swedish curriculum context

When dance is scheduled in the subject of Physical Education and Health (PEH) in the Swedish curriculum context, it is mainly about learning how to perform different steps to music and to copy movements (Swedish National Agency for Education [SNAE], 2018, p. 50). The activities are defined as 'dance and movements to music' (SNAE 2018, p. 49). In the PEH syllabus, dance movements are structured according to the purpose of the exercise. They are a form of training and warming up to music, pace, and rhythm in games (Lundvall & Meckbach, 2007; Mattsson, 2016), or for the purpose of assessing movement. The teacher's goal is not primarily to conduct a dance intervention in which students acquire a specific artistic form (Mattsson, 2016). Rather, it is to investigate how the FC can support teachers' teaching design to increase dancing skills in the subject of PEH.

The teachers' choice of the learning objective for the instructions of the current study was related to the curriculum goal and the core content of the subject: 'Teaching in physical education and health should aim to develop students' all-round movement capacity and an interest in being physically active...' (SNAE, 2018, p. 48).

Thematic analysis

Castleberry and Nolen (2018) consider that thematic analysis can build reliability and credibility when researchers need to identify, analyse, and report patterns (themes) within the collected data (p. 808). Thematic analysis is a descriptive method that helps reduce data and makes it more flexible to interpret. The first step is to find a meaningful way to compile and organise the results (Castleberry & Nolen, 2018; Larsen, 2017). In this study teachers' conversations and discussions in the teacher group we transcribed, and analysed video-recorded PowerPoint presentations. To become intimately acquainted with data it has to be read and reread. In qualitative research, data must be aggregated into a small number of themes, 'about five to seven' according to Creswell and Creswell (2017, p. 245). To strengthen trustworthiness, the selected themes were discussed with senior researchers at seminars. This external review of the thematic process aimed to ensure transparency and increase credibility, which according to Silverman (2011, p. 360) is about motivating why one draws the conclusions one makes. The teachers participating in this study were also able to contribute to the article-writing process through reviewing the interpretations made.

Improvement science as a framework for teachers' professional development

This study is based on data collected during a larger practice-based professional development project involving an entire school (Lelinge, 2022; Lelinge & Alwall, 2022.)

Stemming from the field of healthcare, improvement science has recently been adapted as a research approach in applied school research (Christensson, 2018; Holmqvist Olander, 2015). By linking research questions directly to identified needs for improvement, the implementation phase is minimised. According to Langley et al. (2009), there are two principles of improvement: ‘Knowing why you need to improve and having a way to get feedback to let you know if the improvement is happening’ (p. 16). Improvement science is often used as a collaborative process (Lewis, 2015) in which a team of teachers plans, enacts, and examines an intended improvement to instruction (Lewis & Hurd, 2011). Improvement science treats implementation and setting as important sources of information (Lewis, 2015), through an iterative plan-do-study-act (PDSA) cycle.

Although the improvement science framework is rarely used in educational research, its aims promote the improvement efforts of teachers’ collaborative professional development. In this research study, teachers defined a problem question, that is the development of dancing skills and movements to music in Grade 4. The research presented here is based on data of teachers’ experiences of using the flipped classroom model to promote higher participation and students’ preparation before the in-class lesson.

Participants

This study was part of a two-year practice-based school development research project undertaken in a large city in Sweden between the academic years 2017–2019. The overall goal was to develop different collaborative learning models to increase teachers’ content knowledge and inquiry-based learning and develop their inclusive classroom environment.

A group of six teachers were the participants of the study. The teachers’ details are presented in Table 1. The teachers’ experiences were closely linked to their teaching of students.

Table 1. Overview of the participating teachers.

Participants	Age	Sex	Certified/uncertified	Teacher’s degree	Teaching subject	Work experience in years (Current school)
TA	36	Male	Yes	19	History and English as a foreign language	10 (1)
TB	26	Female	Yes	4–6	Swedish language, mathematics, science subjects and in English as a foreign language	3 (1)
TC	26	Male	No	4–6	Religion and history	1 (1)
TD	26	Female	Yes	K–3	Swedish language, mathematics, English English as a foreign language, and civics	3 (1)
Leisure time teacher	20	Male	No	K–3	No subject teaching. Supporting leisure time work	1 (2)
IT-pedagogue	32	Male	No	K–4	4 (4)	

Notes: The number in brackets are the number of years that the participants had been employed at the current school in spring 2018. The number before the brackets shows the total number of years as a certified or uncertified teacher. Teachers A, B, C, and D are abbreviated as TA, TB, TC, and TD.

Although student data were not collected in this study, the students were also an important part of the study. Studying teachers' experiences with the FC model in an inclusive school setting required a class with students with special educational needs.

There were 25 participating Grade 4 students, with an average age of 11 years, and including 13 females and 12 males. The students were shown a dance video choreography as a teaching element in the PEH subject. The instructions were shared three days in advance on a common platform. One main goal of the study was to examine what teachers focus on when sharing their experiences of teaching and learning through the flipped model with other colleagues, and how they discuss heterogeneous students. Four of the students had an Assessment of Education, Health and Care need program and six had special educational adjustments due to concentration difficulties. This means that ten of the students were identified as students with special educational needs included in an ordinary school setting.

Data collection

For the present research study data were collected during April–May 2018. There were five collegial teacher meetings where the author of this study participated as a 'critical friend.' Each meeting lasted for two hours. Of the six participating teachers, three agreed to participate in the delayed follow-up interviews. Two interviews (with TA and TB) were done by telephone.

12 months after the project ended, using a semi-structured approach (Larsen, 2017), and lasting approximately 25 minutes each. An unstructured interview lasting about 9 minutes took place with TC in the classroom at the school where he was employed, six months after the study ended. All transcripts were then sent back to each teacher for checking prior to thematic analysis. No changes were required by the teachers.

All students had access to a Chromebook for the in-class activity so they could watch, follow, and support each other during the dance video instruction. The teacher divided the students into five groups that were scattered throughout the training hall.

Two lessons were conducted in the same class lasting for 60 minutes each time. They were video-recorded and transcribed verbatim. The layout for both PowerPoint presentations was similar and included: 1. Teachers shared and described the aim of the lesson (approx. 15 min) with 15 other colleagues. 2. The results of their PowerPoint presentations were analysed with colleagues and researcher (approx. 15 min). 3. After the collegial discussions, the teacher teams further discussed and planned for the next lesson (approx. 15 min). 4. During the last 10–15 minutes, the team discussed how they intended to develop the lesson and redesign it based on the merits and disadvantages discussed.

After completing the first lesson, the teachers shared their experiences with their colleagues through a PowerPoint presentation consisting of four frozen images and eleven video sequences that lasted between one and six seconds. The lesson began together with the students with a review of the dance, rules of the activity and the use of the Chromebooks. The presentations showed images and video sequences of students working together in different groups. All groups had their Chromebooks to help them follow the dance choreography. It could be seen how the students studied the dance instructions together, guided each other, shared feedback and monitored the process (in Chromebooks) in different ways to master the object of learning. In the last video sequence in the teachers' PowerPoint, the students stood in rows on the floor and performed movements to the music (lasting for 85 seconds). The lesson ended with a short class discussion where the students briefly reflected on the in-class activity and how they had experienced the process. During the teachers' lesson-planning they decided to use flipped classroom and a prior pre-class activity containing a short video-instructed choreography. The video was bought and downloaded, with supplementary written information. The dance instruction was published on the students' Google Classroom three days before the in-class activity and consisted of video-recorded choreography (3 minutes, 17 seconds). Simplified

choreography was done by a commercial material purchased to be used during the PEH lessons and performed by six students (not from the current school) aged 10–14 years.

Ethical considerations

The researcher was responsible for the validity and trustworthiness of the study and gave careful attention to research transparency and obtaining informed consent from participants (Swedish Research Council, 2017). The Swedish Research Council's guideline for Good Research Practice (2017) emphasises the obligation of researchers to follow the Good Research Practice guidelines, i.e., not to act in personal interest or to influence or manipulate participants in any way. Good research is characterised by systematic work shared with the participants, and there should be no conflicts of interest, or concerns with methods or reliability.

Information about the research was provided to the participating teachers by the author of this article. It was clearly stated that there was no interest in personal data in this research. Teachers were informed that they had the right to withdraw before the process was finished. Participating teachers signed a consent form, where the aim of the study was clearly stated. They were assured of anonymity and that no video-recorded sequences would be shared. Information about the aim of the research was provided to the parents and their children, both verbally and in information letters, by the participating teachers, principal of the school and author of this article. The information letter defined the focus of the study, i.e., on teachers' collaborative professional development, development of teaching design, and their experiences of students' learning outcomes. Data were analysed and used by the teachers to improve their knowledge of how to develop their students' dance abilities, and not shared in any context outside of the school.

Data analysis

Data analysis was carried out in three stages. The first stage was related to RQ1. The unit of analysis contained teachers' PowerPoint presentations of two dance lessons for colleagues, pre- and post-meeting, and three delayed post-interview transcripts analysed together using thematic qualitative analysis (Castleberry & Nolen, 2018; Creswell & Creswell 2017). Teachers' viewpoints and experiences of two FC lessons in the subject of PEH (dance and movements to music), provided rich material for thematic analysis. Thematic analysis was carried out using a process of thematic coding to answer RQ1, with each theme exemplified by extracts from participants. The themes were subsequently shared and discussed, in, e.g., higher seminars, before being applied in this article. The following themes were embedded in the selected extracts: students' personal development, technical equipment, fewer student conflicts, developmental instructions, and a safe and inclusive working environment.

The second stage (RQ2) referred to aspects of the content (video choreography) that were discernible for the students. Aspects analysed in the in-class activity were divided into four groups: movement of arms, hips, legs, and room position.

RQ3 focused on teachers' collaborative experiences, and teaching colleagues' reflections were added in the extracts. Analysis units comprised teachers' collaborative lesson plans, PowerPoints presented to other teachers, collegial discussion of the FC design, and three post- interview transcripts.

RESULTS

The results are presented based on the research questions.

Teachers' experiences of content accessibility for all students

In addition to general approaches, three specific themes emerged, namely, peer-to-peer feedback, use of technology, and peer collaboration for increased equality.

General approaches

TA believed that the subject, PEH, in some natural way created a 'safe environment' because everybody had access to the same support, artefacts and instructions:

Excerpt 1:

TA: Many were at the same [knowledge] level. /.../ The students' previous knowledge was fairly even. Nobody felt that they were at some disadvantage level or superior level. I think it became a, a safe environment – maybe because we worked with such a theme [dance].

On several occasions, the teachers returned in their discussions to the lesson design. The teachers considered the flipped model a vital component to achieve the lesson objectives. They felt it contributed to student knowledge and the way in which small group collaborations fostered peer responsibility. In excerpt 1, TB experienced that the flipped model provided more inclusive opportunities and contributed to ensuring equality between students.

Excerpt 2:

TB: I note that they have experienced that the digitised dance lesson has been much more advantageous in terms of personalising the object of learning. They were able to distinguish that those [peers] that have extra customisations were not negatively treated by their peers. This depended on the activity, that according to the teachers had an inclusive approach in itself where everyone had the same access to the same tool, namely the Chromebook and the dance [instructions] in Google Classroom three days before the in-class activity.

TA: And there were fewer conflicts and irritation because they did not have to wait for each other.

TB described less irritation and conflict between the students. She attributed this to students being able to practice dance movements at their own pace in the small groups which then reduced possible irritations that can occur when waiting for others.

Peer-to-peer feedback

After the first lesson, the teachers wanted to observe the feedback students had given each other and focus more on content knowledge about how to use muscles and movements in a more technical way. Teachers believed that these elements need to be highlighted for the students to understand the dance as a whole, the different movements and which muscles they need to train to perform the dance choreography best. From the teachers' viewpoint, it seemed that the instructions together with the flipped model provided a universal structure that allowed the students to learn from each other.

Excerpt 3:

TA: With the help of the computer, they could decide for themselves how quickly or slowly they wanted to study the movements on their own Chromebooks. If they wanted to pull down

the pace of the dance, see the steps more easily and work out at a slower beat and then increase the pace.

TB: Everyone doesn't have to be doing the same movements; everyone doesn't have to listen to exactly the same instruction at the same time or be quiet at the same time. I think of those who have been diagnosed [with concentration difficulties] and say or do things impulsively.

Use of technology

The teachers discussed how students needed to imitate the dance by watching it on their Chromebooks, and help each other develop the necessary skills. Students worked with the beat (pace), rhythm, coordination, and body control synchrony in every sequence with their peers. An explanation for the increased inclusion of all peers correlates with students being given responsibility for the task, and for educating and guiding each other – this could be a critical reason for students achieving the object of learning.

Excerpt 4:

TB: The inclusion of those students in need of additional adaptations became replaced by the model. The whole class was now using the computer which the students with additional adaptations often used.

TC emphasised that the structure and preparations for the digitalised dance instruction provided all students with the same learning opportunities.

Excerpt 5:

TC: In the classroom, these students can be seen in specific ways; we give them [e.g.] headphones, different materials adapted to their level. In this case [lesson], after all, nothing was specially adapted, everyone had the same digital tools. I think when you give the same adjustments to all students, it doesn't become something special for one or three students – because now /.../.

The pre-class activities and guidelines that the teachers had placed on the Google Classroom three days before the lesson had an impact on the students' learning environment. The teachers highlighted how computer-based study enhanced their learning and made it more efficient using the new approach.

Excerpt 6:

TC: The students developed their skills much faster than when the teacher himself led the dance activity.

TB: I think it became perfect that they [the students] could see the movie [dance instructions on the video] themselves and could pause and watch over and over again.

The teachers argued that the digital instructions elucidated and increased students' dancing skills faster than when a teacher led the dance element in the PEH lesson in person. This new approach also ensured that the goal of the activity was achieved. When the teachers shared their experiences after the second lesson, they described how they had varied the lesson from the first one. They had started the lesson by explaining the skills the students were expected to develop during the dance activity. They went through all the dance steps before the lesson started, which was the part that the students would assess in the matrix at the end of the lesson. Their PowerPoint presentation contained a short (4 min 7 sec) video sequence where students in their groups imitated the dance movements by watching their Chromebooks. Unlike the first lesson, the teachers had divided the

sequences into seven learning areas: knowledge requirements, the matrix for self-assessment, training with peer feedback, dance, appreciation in the matrix, and summarising the lesson.

Peer collaboration for increased equality

In the PowerPoint presentation, the teachers described how students had been seen prior to the lesson practising the dance together on breaks. Sharing the instructions three days in advance of the lessons seems to have promoted an inclusive learning perspective outside the actual lesson with the students discussing the different parts of the dance before the lesson in their peer groups. This appeared to have helped speed up the distinction between the different steps, and increased students' understanding of the choreography. There is no evidence that all students practised the dance during the breaks, but the teachers' report suggests that the task engaged several students before the lessons.

Content offered prior to the lesson at school

The second research question set out to describe what the students were offered to discern during the lessons. These aspects are identified here based on the different sources the students received: video clip, written instructions, and teachers' lesson instructions.

Video clip

The main source for the students was the video clip (3 min 17 sec), which includes movements of arms, hips, and legs as well as placement in the room. The choreography shared with the students encouraged them to simultaneously master the movements needed in the foreground and background. Students needed to distinguish the positioning of the arms: whether a rigid formation was needed or if they should move their arms in a horizontal or vertical line. In the same way, they needed to distinguish the movement patterns of the hips, related to formations of the arms and legs, simultaneously and synchronously with the music and their peer group. The analysis of the material focusing on what aspects were made discernible, both separately and simultaneously in patterns of movements. The analysis identified both single movements and movement series, and how they were repeated in different ways. Results of the analysis show how complex the dance is and how many different patterns were made discernible during a short amount of time.

The choreography requires students to discern and master movements synchronously with other dancers as well as knowing where to be positioned in the room. The analysis shows that the dance choreography is complex, with several different movements and variations, presenting a definite challenge for students with special educational needs and probably difficult for all students to master during an ordinary lesson.

Written instructions

The second material for the students to discern the content taught was text describing the dance sequence. Themes and rhythm were described on the left side of the page, while on the right side, movements and pace were presented. Students were able to distinguish between two different verses, repeated in two different places and always one after the other. Likewise, students could distinguish between a two-beat or an eight-beat pace and rhythm. On five occasions, a reference part was repeated based on written instructions for the students to understand and distinguish between small nuanced differences with each new reference part. For example, the original reference was to swing sideways with wide legs, arms above the head and swinging in the air; spin on the spot – first in one direction then the other – and finish with the arms crossed. The next time the reference part appeared, the students distinguished that they should not have their arms crossed.

Students needed to discern three major elements that frame the entire choreography. They were given two verses and something called 'bridge', which requires discerning several different steps at the same time, while simultaneously making big handshakes above the head, big crosses with the

arms, putting hands on their thighs, swaying sideways and jumping with one fist in the air. In addition, the students also distinguished that the choreography has introductory and concluding parts that are similar and a robot dance track, termed 'freestyle' in the written material. The students could read and follow the manual-based instructions while also being able to see how the steps could be carried out by following the video.

Teachers' lesson instructions

Both lessons began in a similar way with students sitting in a circle on the floor listening to the teacher's instructions about the content and elements of the dance, as well as the rules of conduct for the task. The big difference between lesson one and two was that during the second lesson, the teacher described the goals of the lesson more clearly based on the requirements of the syllabus. In the second lesson, the teacher also described how the students would need to assess their contribution based on a matrix containing assessment levels ('to some extent', 'relatively well' and 'well') and the four assessment categories (pace, rhythm and flow, movement and coordination). Altogether, the materials show how students were offered different types of learning materials and instructions to enhance their ability to capture the dance movements. The pattern of variation used both contrasts, as different movements were contrasted with each other, as well as description through the written instructions. Generalisation was also used: one movement was separated from changing movement patterns and used in several different sequences. This meant the specific aspect could be separated from its representation in a series of movements, and inserted into new sequences of movements. Finally, fusion was used as the movements were changing, focusing on different parts of the body at the same time as movements were made in the room and in the order of movements in the movement patterns.

Teachers shared collaborative experiences of the flipped classroom model

Six themes revealed what the teachers chose to share: peer-to-peer feedback, content access for all, enhanced interest, the impact of the technology, motivation to stimulate learning outcomes, and explanations of development.

Peer-to-peer feedback

In excerpt 7, TA discussed students' spontaneous feedback with the other teachers. This feedback had surprised him in a positive way. He emphasised the power of the flipped model where all students can participate equally in the activity. He also realised that the lesson setup was giving him more time to observe and support the students.

Excerpt 7:

TA: What surprised me most was that they split up within the groups; where someone was sitting on the floor watching the dance movements, and others try to imitate the movements. Synchronically they give each other feedback on the movements and how to develop. And this was nothing that I have told them to do. /.../ I think it is easier to get more people starting to like this. It is also easier for me to see what they are doing. Otherwise, I have to be an active dancer, encourage them and have eyes on my back to see that all students are on the right moves.

The support and guidance of the group developed during the in-class activity while students were in their comfort zone. The teacher noted that he could use his time to observe the students when the flipped digital model was used prior to the lesson. This meant that more time could be given to help students who needed different types of support.

Content access for all

Teaching colleagues were positive about the inclusive nature of the lesson. They commented that everyone was dancing, moving rhythmically and synchronically with the other dancers, in time to the music: 'I just think it was incredibly good. The whole thing. I thought it was amazing!' (One of the other teachers). After the teachers presented and shared the second lesson, a colleague expressed: 'This form of learning model clearly showed that the students supported each other and learned from the better ones.' Another colleague said: 'I think you have a model here for peer response that the whole school could benefit from and take after! And something we can start with already in preschool so that they get in the habit of giving each other feedback [that can] become a way for our [school] to systematically work.'

Enhanced interest

The teachers discussed their planning and experiences after the lesson.

Excerpt 8:

TC: When we presented our first lesson, the students had access to digital tools [Chromebooks] to learn the dance /.../ we saw that this was benefiting the students /.../ that they could take the time they needed to learn the dance [at home]. There were also fewer conflicts between them [in the lesson].

TB: This time, we wanted to focus on the peers' response, how such peer-to-peer response looks, how it works inside each group and if the students have any supporting pep-talk afterwards.

During their PowerPoint presentation, one colleague expressed: 'I think it would have been great if the whole school had been able to teach like this [using the flipped classroom model] and actively work with the students' feedback. It is just like everyone has created this together and then showed it. It is great! What great inspiration!'

Impact of the technology

At the end of the second presentation, the teachers discussed whether the iterative PDSA model, containing the digital approach in flipped learning, had taken more planning time than their regular lessons. According to TB and TC, it had taken more time to film and edit their presentations, but the extra time taken was not significant. TC explained: 'Sure it takes a little bit more time in the beginning, but then you become an expert on it and then it goes faster.' The video-recorded material meant that teachers were able to study how they began the lesson, how they introduced the object of learning once all students were aware of the instructions, and whether the intended objectives had been achieved. This flipped approach developed the students' dance abilities more than the teachers could have imagined.

Motivation to stimulate learning outcomes

All three teachers emphasised the students' sense of engagement, responsibility, and awareness of the object of learning. TB and TA share their beliefs about students' in-depth knowledge in excerpt 9.

Excerpt 9:

TB: Through the flipped classroom, the students become more inspired to deepen their dance knowledge.

TA: They even stood out in the corridor and practice before the lesson! It felt like it was a deeper knowledge than just learning and then forgetting about it /.../ They were happy when they saw that they could.

The teachers continued to reflect on how students perceived the choreography of the dance and how they mastered the dance instructions to perform the whole dance synchronically with their peers at the end of the lesson.

Excerpt 10

TA: The method helped the students gain a deeper knowledge of movement and rhythm. /.../ and purely in terms of subject matter it was developing for their motor skills and dance skills, the movement to music /.../ and handling the computer and the video-instructions.

Explanations of development

TC was convinced that three things played a unique role in the outcomes of the object of learning. First, students received dance instructions three days in advance so they could train themselves as often as they wanted, wherever they wanted. Second, through this lesson plan, they were given more responsibility to help each other achieve the outcome of one unit, and complete the dance choreography before the lesson was over. Third, the students guided each other to master the whole dance, ensuring that they were more receptive to learning than when the teacher was nagging them.

The teachers' discussion indicated that the students' feedback to each other had a critical impact on the object of learning, which helped develop their dance skills: 'You might try counting between the steps' and 'Watch the movie right there, they jump like that, you can practice a bit more on it, ok' (students' voices through the teachers' reflections).

DISCUSSION

This study analysed teachers' experiences of making content accessible for all students in an inclusive school setting. Focusing on the first RQ, three specific themes were revealed: use of technology, peer-to-peer feedback, and peer collaboration for increased equality, within a broad perspective of content accessibility for all students. Based on these assumptions, the teachers continued to design a learning situation aiming to enact their intentions during their lessons. They chose to use the FC model. Finally, their experiences were articulated and shared among their colleagues in the follow-up sessions. In this discussion, the results from the analyses are discussed in relation to previous research.

When Brewer and Movahedazarhouli (2019) investigated the use of flipped learning in special education in two undergraduate courses, they emphasised that the model encouraged students to use problem-based learning. They were able to state that the model's digital instructions led to fewer misunderstandings about content. In this study, there were no misunderstandings regarding the objectives. According to the teachers, this was related to the design of the lesson and that the students received the same instructions on a common platform several days before the lesson, in the form of short video instruction (dance choreography) and supplementary written instructions. TA believes this learning approach created a 'safe [learning] environment' (Excerpt 1) for all students. Brewer and Movahedazarhouli (2019) concluded that the FC offers student-active learning, where students take great responsibility for their own learning together with others. Teachers in the present study returned on several occasions to how the flipped model seemed to have affected the students' collaboration and promotion of an inclusive learning atmosphere. TA believes that an important part of this experience has to do with the subject, where dance and movement to music challenged all students in a similar way, '(...) the flipped model provided more inclusive opportunities and contributed to increased equality between the students' (Excerpt 1).

I have depicted how several studies (cf. Lo & Hew 2017; Lin et al., 2018; Aidinopoulou & Sampson, 2017; Strelan et al., 2020; Van Alten et al., 2019) have described the flipped model in higher education and STEM fields, but that there is limited information about how it works from a special didactic educational perspective. This study contributes to knowledge of how Grade 4 teachers experience the flipped approach and see it contributing to increased equality in the student group, with the students guiding and supporting each other to master their dance skills. Students' access to Chromebooks during the group activity strengthened their dancing and commitment to what and how the movements should be performed.

In excerpts 1–4, the teachers expressed how the flipped environmental tools contributed to increased inclusion of all students. According to the teachers, this was one of many reasons that correlate with greater responsibility for the task and for educating and guiding each other. These findings are encouraging and show the critical value of the flipped learning model. First, guidance through a short video (choreography) and written instructions where the movements, tempo and rhythm were in the foreground, created a safe environment. Second, the need for a well-planned active learning approach supports a universal general structure (Excerpt 3) of an inclusive classroom context that benefits both individuals and groups (Lelinge, 2022). Third, more time was given to achieve the objectives and tasks that enable students to learn by doing (Strelan et al., 2020). Finally, the results also indicate that teachers paid more attention to lesson design, where both the flipped model and the collaborative improvement science model have a prominent place.

The teachers highlighted how the process contributed to high satisfaction and effectiveness in relation to the specific learning objectives. It is reasonable to assume that the step-by-step process of the PDSA cycle contributed to teachers' shared understanding of the flipped classroom and encouraged an increasingly positive attitude regarding an inclusive classroom environment (cf. Hultén & Larsson, 2018). This study identified valuable knowledge that teachers acquired using the flipped learning model (Altemueller & Lindquist, 2017) for inclusive learning.

Regardless of special needs, all students had the same opportunities and plenty of time to prepare at home and in hallways with their classmates before the lesson. Results show that students' critical responses regarding content understanding (cf. Hwang *et al.*, 2015) allowed for creative (cf. Lucznik *et al.*, 2020) and immediate feedback between the students. This also fits with teachers' willingness to change the balance from a teacher-student relationship to a peer-to-peer relationship (Herreid & Schiller, 2013). The teachers found the flipped model was effective for flexible learning (Excerpt 8), and having many opportunities to repeat the content prior to the classroom activity gave all students access to the object of learning. Needham-Back and Aujla's (2020) study showed that it is important to create high quality and systematic training possibilities for young dancers with disabilities. It is also essential to equip students with dancing skills for the confidence to access training. In the present study, the teachers valued the peer-to-peer feedback and saw it as playing a significant role in achieving the objectives.

The findings emphasised teachers' awareness of using the improvement science collaborative PDSA step-by-step approach (Lewis, 2015) by using the flipped classroom model (Pelger & Ljungqvist, 2018; Sams & Bergmann, 2013) to create an environment where all students belong regardless of learning difficulties and special educational needs. The communication and video instructions in this study increased the students' collaborative learning and interaction opportunities in the physical classroom environment as well as their digital skills. It is reasonable to assume that the teachers' curiosity about digitalising the dance element in the subject of PEH, through the FC model, was an essential part of enhancing students' skills, movements, rhythm, pace, and coordination attitudes. The teachers also highlighted the significance of their interest in the students' peer assessment (student feedback) for the learning outcomes (Excerpt 7). This was a substantial contribution as almost all students were able to perform most of the choreography at the end of the second lesson (cf. Van Alten *et al.*, 2019).

Teachers who shared their experiences of the FC model with their colleagues emphasised six themes: peer-to-peer feedback, content access for all, enhanced interest, the impact of the technology, motivation to stimulate learning outcomes, and explanations of development. One theme that seemed particularly important was the need for motivation to achieve learning outcomes. No data were collected about the amount of time each child took to learn the steps, but it could be assumed that students with special educational needs spent more time learning the sequences than other students. It might be easier for students to prepare by themselves and learn without the stressful comparison of how fast other students are learning the same dance pattern. One main goal was to examine what teachers focus on when they share their experiences of the flipped model with colleagues, and how they discuss the diverse group of students. It became clear from the results that it is more advantageous to personalise the object of learning (TB, Excerpt 2). Students with special educational needs were not negatively treated by their peers. The teachers made the important assumption that this was related to the in-class activity and its inclusive approach. Every student has the same access to the same tools (Excerpt 10), and this leads to high levels of satisfaction. One of the teachers that took part in reviewing the study's results emphasised that the learning model needs to be discussed further with all colleagues at the school so that, '[Here we have] a model that the whole school could benefit from and take after [and] something we can start with already in preschool so that they get in the habit of giving each other feedback [that can] become a way for our [school] to systematically work.'

Several colleagues shared their views with the teachers after their PowerPoint presentations. These colleagues expressed a highly positive outlook on the impact of the flipped model on student collaboration, performance, and responsibilities. They were amazed at the inclusive and collaborative atmosphere that was described. Some colleagues provided specific comments on the sequences that the teaching team analysed during follow-up discussion. Comments about all students dancing, moving rhythmically and synchronously with the other dancers and in time with the music, were common. They also appreciated the whole structure and design of the study. The most intriguing comments pertained to how this learning model clearly illustrates that students encourage and support each other, learning through demonstration, pointing, and imitation from those who exhibit more advanced moves and rhythm, aligning with the theory of proximal development and fostering a collaborative learning environment.

Further research is needed to find out if the time spent on the preparation phase is too extensive for students with special educational needs, and to find out how the preparation phase without access to teachers' guidance would impact students' learning opportunities. As the model transfers learning responsibility from teachers to students (Altemueller & Lindquist, 2017), there is a need to study the effect of increased responsibility further and to learn more about outside school time especially for students with special educational needs in inclusive settings when using the digital flipped model.

Implications

Despite this being a small-scale study with limited participants and only one class, it points to several important outcomes regarding digitalised FC lessons, which may have implications for future policies and practice-based professional developments.

From the teachers' views, it seems that the instructions together with the flipped model provided a universal structure that allowed the students to learn from each other. More research is recommended to see if this digital model could be used further to support inclusive classroom settings.

The methodology, although time-consuming, contributes to new opportunities to plan for upcoming dance lessons in the subject of PEH and facilitate content selection in ways that increase students' content knowledge and ensure inclusive practice. A consideration to take into account is the lack of data capturing the flexible time spent by students prior to the in-class activity. Further investigations are needed to determine if students with different educational needs had to spend more time learning the content than the rest of the class, and if the lack of teacher guidance during this

phase had implications for students' learning. If this student needs to spend more time and have more difficulties in learning the content, even if they seem to perform at the same levels as their peers in the following in-class activities, the burden on the student might be too heavy without special adjustments. Therefore, it is recommended that future qualitative studies concerning flipped classrooms, dance education and students with different educational needs should consider students' views in addition to teacher perceptions to give a broader perspective regarding the value of such approaches.

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