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Original Article

Movement integration in academic classrooms; a focus on secondary students' experiences

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Abstract:
Physical activity during scheduled classroom time has been referred to as movement integration, and it can be implemented through movement breaks or academically infused activities. The movement integration strategy merges activities that are intentionally physical, at any level of intensity, into content-specific academic lessons with the goal of reaching academic learning outcomes in the classroom. However, most of the evidence of classroom-based physical activity interventions has been derived from primary school settings. Therefore, in this article, we focus on students in secondary education with the aim of describing their experiences of movement integration in the academic classroom. The empirical data consist of nonparticipant observations of seven academic lessons in secondary classrooms followed by focus group discussions with participating students (N = 21). Transcriptions of the student focus group interviews and classroom observations were thematically analysed following a four-step procedure. Our findings revealed that students considered movement integration an enjoyable and innovative pedagogical approach that interrupted their sedentary learning in classrooms. Students also indicated that physical activity should be integrated into the teaching and learning of the subject and that it is important for the teacher to have a positive attitude. Students' academic well-being and learning were also affected. These students reported that the movement portion of the lessons helped them to feel more alert, focused, and better able to concentrate on what the teacher was discussing in class. As movement integration has positive implications for secondary students, we extend previous findings on primary students. Furthermore, this study underlines these students' positive experiences and that subject teachers on the secondary level should consider integrating movement in their teaching practices.
Key Words: **classroom physical activity, secondary school, student voice, physical active lessons, adolescent**

Introduction

Given that children and adolescents spend most of their time in school sedentary within academic classrooms, there is a need to focus the commitment of school culture on not only students' academic learning but also their physical health. Although schools are a perfect environment to promote children's physical activity (PA), governments and other organizations can highlight the importance of implementing PA policies in schools (Tammelin et al., 2012). Increasing evidence of the positive association between PA and academic achievement in elementary and secondary school students supports this momentum (Burns et al., 2020; Ogrodnik et al., 2020; Wassenaar et al., 2020). PA during the school day (beyond physical education) is one component of the widely advocated international whole-of-school model to help students increase PA levels, decrease sedentary behaviours, and develop lifelong PA habits (McMullen et al., 2015). Therefore, schools can provide PA opportunities during regularly scheduled classroom time, a strategy known as movement integration (MI). This instructional strategy merges activities that are intentionally physical, at any level of intensity, into content-specific academic lessons with the goal of reaching academic learning outcomes in the classroom without forfeiting PA time. MI during academic lessons can include using movement breaks during lessons, teaching academic content through movement, and providing regularly occurring transitions (e.g., between and during lessons) to increase movement opportunities (Webster et al., 2015). Vazou et al. (2020) reviewed existing research and developed a typology of MI interventions that could help researchers more systematically investigate the effects of MI in the future. Thus, this study can be described as teacher-driven research implementing PA as a movement break from instruction or in the form of academically infused activities, with a focus on secondary students' experiences according to their voices and our observations.

Movement integration in academic classrooms

A wide range of MI interventions have been reported over the last decade, and the accumulation of data on MI interventions has increased. Recent systematic reviews and meta-analyses of classroom-based PA interventions (Bedard et al., 2019; Daly-Smith et al., 2018; Martin & Murtagh, 2017; Masini et al., 2020; Michael et al., 2019; Norris et al., 2020; Vetter et al., 2020; Watson et al., 2017) showed a positive effect on

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lesson-time PA and educational outcomes (improved on-task or reduced off-task classroom behaviours) and a small effect on general PA and overall educational outcomes. Thus, Watson et al. (2017) concluded that classroom-based PA interventions can be a low-cost, practical, and time-sensitive way to increase PA throughout the school day. Bedard et al. (2019) suggested the effect was slightly larger in preschool-aged children than in primary- or middle-school-aged children. However, substantial variations in critical design features; intervention content, duration, and intensity; and outcome measures between their work and the original studies make drawing conclusive inferences problematic (Chim et al., 2021). Furthermore, most of the evidence of classroom-based PA interventions has been derived from primary school settings, which was particularly obvious in recent reviews: Bedard et al. (2019; 24 of 25 studies in primary settings); Daly-Smith et al. (2018; 17 of 18); Martin and Murtagh (2017; 15 of 15); Marttinen et al. (2017; 19 of 21); Norris et al. (2020; 39 of 42); Watson et al. (2017; 37 of 39); and Vetter et al. (2020; 11 of 11). Although some of the same original studies were reported in the reviews, the findings indicated a need to expand the research into the secondary school environment.

The same trend with a focus on primary students was noted when Grao-Cruces et al. (2020) reviewed levels of PA during school hours in children and adolescents; 23 of 29 studies were developed in primary schools. Although the study results were heterogeneous, the researchers concluded that higher levels of PA during school hours were more evident in children than in adolescents. Thus, they suggested it is most common to sit during academic activities in secondary schools, whereas in primary schools, the environment is more favourable to active learning and students move more during noncurricular breaks. This finding in the school context is also true in general, because PA levels appear to decline as children become adolescents (Kämppi et al., 2018; Kokko et al., 2021). Similarly, McMichan et al. (2017) reviewed classroom-based PA and sedentary behaviour interventions in adolescents, including nine studies where the participants' mean age ranged from 12.0 years to 15.3 years. The researchers concluded that classroom-based PA interventions had no significant or meaningful effect on PA or sedentary behaviours in early secondary school adolescents. The evidence of this result was limited due to a lack of studies and the methodological differences in designs and outcomes. However, some contextual differences in secondary classrooms may impact classroom PA. Secondary subject teachers typically teach in discipline-specific areas and may have fewer opportunities to use PA in transitions between subjects, or they may teach a subject that typically does not involve movement (Lomsdal et al., 2022; Romar et al., 2020). Similarly, secondary subject teachers may feel they do not have time to implement classroom PA because they only meet each group of students for a portion of the day (Warehime et al., 2019).

Schools face major challenges in adopting and implementing MI in academic classrooms. Reviews of the implementation of MI in classroom teaching (Daly-Smith et al., 2021; Marttinen et al., 2017; Michael et al., 2019; Turner et al., 2019; Vazou et al., 2020) and of PA policies in schools (Mulhearn et al., 2010; Nathan et al., 2018; Naylor et al., 2015) have identified time; the availability or quality of resources; a supportive school climate; contextual appropriateness; authentic training; and teachers' beliefs, motivation, knowledge, and skills as factors repeatedly reported to be impeding policy implementation. However, several reviews have emphasized a need for more knowledge about secondary-level education (Marttinen et al., 2017; Mulhearn et al., 2020).

Despite the implementation challenges, the abilities to identify and understand the benefits of MI are related to an increased likelihood of teachers to implement MI in academic classrooms. Often, teachers' positive attitudes towards MI are linked with their experiences of student joy and excitement (Dyrstad et al., 2018; Finn & McInis, 2014; Goh et al., 2017; Martin & Murtagh, 2017; Marttinen et al., 2017; McLellan et al., 2022; Mullins et al., 2019; Vazou et al., 2020). Teachers have also reported that MI provided new social learning opportunities where teachers and their students were able to interact as well as that reciprocal learning between students occurred (Lerum et al., 2019; Øien & Solheim, 2019). Furthermore, teachers felt MI had to make sense and its implementation had to be based on students' current moods and a dynamic need for a break from the academic material (Stjerne Knudsen et al., 2019). Finally, Warehime et al. (2019) noted that secondary teachers reported behavioural improvements as their primary reason for using MI. However, there is a need to move beyond the teachers' and researchers' views that dominate the current literature, which might present a limited understanding of MI implementation in academic classrooms.

Students' active engagement in MI will provide sensory–motor, affective, and intersubjective experiences with the subject matter, thus shaping their cognitive learning processes and opening their minds to new insights (Lasthein Madsen et al., 2020). Therefore, a few existing studies about students' voices have provided more depth and complemented the existing knowledge base about MI in academic classrooms. As already reported regarding teachers' MI experiences, students also indicated they enjoyed the MI in classrooms (Bedard et al., 2019; Dyrstad et al., 2018; Finn & McInis, 2014; Howie et al., 2014; Mazzoli et al., 2019; McMullen et al., 2019; Uibu et al., 2022), even to the extent that students enjoyed the MI lessons more than the sedentary versions of the same lessons (Gammon et al., 2019; van den Berg et al., 2019). Students also perceived that they could learn while moving and that the MI helped them feel more alert, focused, and better able to concentrate after the exercise than before it (Finn & McInis, 2014; Howie et al., 2014; Martin & Murtagh, 2017; Mavilidi et al., 2021; McMullen et al., 2019). Additionally, students made connections between the MI in classrooms and its potential health benefits (Dyrstad et al., 2018; Howie et al., 2014; McMullen et al., 2019). Importantly, individual differences exist between students, and some students do not like to be physically active and would rather do less demanding tasks (Mazzoli et al., 2019). These student findings about MI are similar to the existing literature

about whole-school PA promotion, where students have indicated that PA helps increase their motivation and focus through its cognitive, emotional, and physical health benefits (Erwin et al., 2013; Holt et al., 2019; Martin et al., 2022; van den Berg et al., 2018). Although the majority of student voice research has focused on primary students, Gammon et al. (2019) noted no changes in lower secondary students PA levels during school time as a result of MI in academic classrooms. These students also noted that the MI was fun and helped learning, although they commented that some students messed around more and did not focus on their work. However, to the best of our knowledge, it is still unknown how upper secondary school students value MI, and more research is needed overall in secondary schools regarding MI classrooms. Therefore, the aim of this study was to describe students' MI experiences in secondary academic classrooms based on their participation in the lessons included in the Learning by Moving project for preservice subject teachers.

Methods

Context

In the Finnish context, teachers at the secondary level (Grades 7–12) are specialized subject teachers, and this level was the focus of our study. Secondary school teachers, also called subject teachers, complete a major and one or two minors in academic teaching subjects and a substantial minor in pedagogy, which is needed for qualification to teach in secondary schools. This study was conducted at a Finnish university where, as part of their pedagogical studies, preservice subject teachers (PSTs) were required to take a five-credit course on pedagogy in which they participated in an integrated approach titled Learning by Moving as one part of the pedagogical course. The goal of this part of the course was to introduce PA promotion into the required teacher preparation (for more information, see Author, 2020). The course also had a university-based component, a tutor support component, and a student teaching component. The PSTs participated in one half-day workshop intended to provide them with a background to change their attitudes and behaviours towards MI in secondary-level academic classrooms. In addition, they received help from mentors with lesson planning. The second and third authors were preservice PE teachers, and each acted as mentors for one group of PSTs with five or six members. During their student-teaching practice, PSTs were expected to teach two lessons with MI elements.

MI during academic classrooms

We randomly observed seven classroom lessons in English, Physics, Social Studies, History, and Swedish; four lessons were from the lower-secondary (LS; Grades 8 and 9) and three were from the upper secondary (US; see Table 1) levels. The class sizes varied from seven to 22 students. The lessons were spread out during the school day, including the first lesson of the school day, a lesson before or after lunch, and the last lesson of the school day. The length of the academic lessons varied from 45 to 75 min. During one lesson, the PST used MI as a brain break and the other PST had PA integrated into the subject during their classroom instruction. The length of PA for the whole class varied from 4 to 15 min during most lessons. In contrast, PA was continuously integrated into one lesson, and during another lesson, the PA time was individual for the students.

Table 1.
The observed lessons with MI

Subject	Grade	Time of day	Lesson length	Length of PA moment	Type of activity	Teacher role	Total students	Students interviewed
English	Upper Secondary	Frist lesson	75 min	15 min	Subject integrated	Active and inactive	21	3 males
English	Upper Secondary	After lunch	45 min	4 min	Brain break	Active	14	1 female 2 males
English	Grade 9	Before lunch	55 min	10 min	Subject integrated	Inactive	17	2 males 2 females
Physicis	Grade 8	Last lesson	55 min	15 min	Subject integrated	Active	12	2 females 1 male
Social Studies	Grade 9	Frist lesson	60 min	13 min	Subject integrated	Inactive	21	2 females 1 male
History	Upper Secondary	Last lesson	75 min	Individually based	Subject integrated	Active and inactive	7	2 females
Swedish	Grade 9	Before lunch	55 min	An active lesson	Subject integrated	Inactive	22	2 females 1 male

The teachers implemented MI into a lesson with one to four physically active elements. Most common was that the teachers integrated PA where the students worked in groups, but the students also had individual tasks and worked in pairs. Technical aids were used in two lessons: In one lesson, the students watched a video with exercises for a brain break, and during another lesson, students used their phones to measure different decibel levels. The teacher was either actively participating in the MI or was inactive.

The intensity of the active moments varied. However, during all MI lessons, sitting was interrupted, and during some lessons, students were more physically active by running or performing more demanding movements. Examples of fast-paced activities were when students were running stairs or competing in relays.

The classroom size affected the intensity of the PA elements. Some classrooms were spacious and allowed students to move freely, whereas others were cramped and required the PST to plan more to integrate PA successfully.

Data collection

Given the aim of the study, we used qualitative observation and interview data collection methods to get close to the secondary school students. We observed their actions and engagement with different PSTs in secondary education where movement was integrated. The purpose of nonparticipant observation of lessons was to provide us with a chance to "live" the lessons and compare student interviews with what actually took place. We created an observation schedule prior to beginning our observations. Although unsystematic in nature, the observations were loosely based on previous research on MI (Webster et al., 2015), and each observation focused on the MI type, length, and intensity; teacher engagement; student participation and enjoyment; the physical space; and students' behaviour after the MI. We started the observations according to this schedule and filled it in by checking whether predetermined areas matched what happened in the lesson. When relevant, we took field notes on interesting observations, such as students' comments about PA and observable student behaviours. The students in the laboratory school were used to having additional persons in the classroom; however, the researcher there chose to sit at the back of the class during their observations to distract the students as little as possible. Thus, by observing classroom teaching where PSTs incorporated MI elements, we studied the students in an authentic environment, and the observations provided glimpses into the classroom context as seen from our perspectives.

We used semistructured focus group interviews to determine students' perspectives of MI. A focus group interview is a controlled group discussion on a specific topic (Ruane, 2006). By holding a focus group interview instead of personal interviews, it is possible to increase the number of participants, which means that more voices can be heard. When more people are included, the research covers a greater variety of opinions and experiences (Denscombe, 2018).

After the MI lessons, the researcher briefly introduced herself to the whole class before gathering the interview respondents. The other students in the class left, and we used the classroom to interview our respondents. After the observation, we interviewed two to four students. Within each student group, we strived to have as heterogeneous a selection as possible by selecting the students in different ways. One researcher used random selection, and the other relied mainly on volunteer students. On one occasion, the cooperating subject teacher selected students who could conceivably have varying experiences of the MI in the classroom lesson.

In the semistructured interviews, the researcher had an outline of questions for the students to answer. For example, broad categories of questions were related to how difficult the MI was, the frequency of MI, the students' feelings after the MI, the students' enjoyment of the MI, suggestions for the teacher, and what the students thought their classmates experienced. In addition, the interview questions were based on field notes from our lesson observations. Using probing questions and asking for examples was a way to encourage the students to go into further detail (Kvale & Brinkman, 2014). Each interview lasted 5–17 min. All interviews were audiotaped and transcribed verbatim. The second author observed three lessons, and the third author observed four lessons. The students who participated in the interviews had obtained written parental consent and gave their own consent to participate in the interview and have it recorded.

Data analysis

Transcriptions of the student focus group interviews and classroom observations were thematically analysed following a four-step procedure (Braun & Clarke, 2012). The first step involved the second and third authors reading the transcripts thoroughly multiple times to obtain an initial impression of the data. The second step entailed identifying and sorting the categories and subthemes that emerged from the data. In the third step, similar ideas were collated to form themes that were reviewed, discussed, and revised in collaboration between the first three authors. This step also involved defining and naming themes. For the fourth step, previous research on student experiences of MI in primary schools was drawn upon to interpret our findings, and verbatim direct quotes were also selected for use in the presentation of our results. We clearly described our research methods and implementation and used an interview guide and observation schedule to ensure trustworthiness. Methodological and researcher triangulation combined with the use of the verbatim transcriptions of data confirmed our methodological rigor, credibility, and transferability (Patton, 2014).

Results

Two main themes were generated that related to the structure and student experiences of MI. The theme of MI structure included students' views about the amount and length of the MI and their views about organization and content. The theme of student experiences dealt with students' perceptions of their emotions, learning, and concentration in connection with MI in classroom teaching.

MI structure

Amount and length of MI

Many students pointed out that it is not typical to have PA elements in academic classrooms. They noted that they had more PA integrated into the classroom teaching in primary school, and one female student (English 3, LS) said, "In primary school, we had [PA] quite often, but not in secondary school." A male student (English 3, LS) noted, "With our regular teachers, we very rarely have physically active lessons, but with student teachers, we have [MI] more often." In addition, the subject and the length of the lesson was an important issue:

> We often have enough breaks during these long lessons, but we usually do not have [them] during these short lessons. These long lessons we, I have at least had it so that you stand up and do some like light exercises just to get your blood circulation going. (male student, English 2, US)

The students in this study wanted to have more PA during classroom teaching. A female student (English 3, LS) said, "I would probably like more [PA] because you sit for quite a long time, and it's a bit boring to just sit," and a male student (English 2, US) noted, "I really think it's good; I really mean it." According to the students, the most important aspect of MI is that they get a break from sitting: "It would take maybe 2 min, that we are now not in such a hurry to get through any course that we do not have time to take like, 2 min per lesson for it" (female student, English 2, US). Likewise, another female student (History, US) said, "We get up for a minute, and then we walk around. And even then, it helps, even though we do not specifically have an activity thing, but we just get up." During the observation of an English lesson, we saw that PA implementation was more about interrupting sitting than reaching a high pulse level: "The students get up and attach their texts to the wall. Then they walk around and read each other's texts" (field note, English 1, US). Another example was from the social studies lesson where students had "coffee breaks" and walked around the classroom to discuss the lesson with other students.

Although many students had positive views of MI, some were sceptical of integrating PA into classroom teaching. A male student (English 1, US) said, "I do not really have an opinion about it," and another male student (English, G1) added, "Not me either, I do not know if I would like [MI]; you still do something during the recess. You walk then and do what you want." One female student (Swedish, LS) suggested having "a brain break sometimes but not that it should be like that on a daily basis." This uncertainty could be seen during the History (US) lesson when we observed that the students asked the teacher why they would run up the stairs: "First, they questioned why they should run. Once they did, it was laughter and smiles" (field note). This points to the fact that not all students are identical, as one female student (History, US) noted, "Overall, it [MI] is probably quite well accepted. But then there are always those who oppose a little, cool kids; they are in all classes."

Most students mentioned that morning is the optimal time for MI in the classroom. According to several of them, it is needed for the students to wake up: "Maybe in these morning lessons, you should maybe anyway have a break in the middle of the lesson where you do some physical activities that you become more active in class as you wake up a little" (male student, English 1, US). Having MI during the last lesson of the day was also determined to be a good time. One female student (History, US) said, "Yes, especially as it is the last lesson. It's four [o'clock], so you're probably starting to get pretty tired."

Organization and content

In the interview after the students had participated in a lesson with MI elements, they pointed out that the exercises had been easy to perform. The fact that the instructions were clear was thought to facilitate the students' execution of the exercises. A female student (Social Studies, LS) said, "And it was good instructions, so you knew well what to do." In addition, the MI exercises during active parts of the lesson were not exhausting, according to the students. A female student (History, US) said, "So they are not very physically demanding. That it is clear that if we would have had to run up and down the stairs many, many times so then it would have been exhausting, but it is not so." Similarly, another female student (Swedish, LS) pointed out that the exercise are "not too demanding tasks. Like you have to run or move a lot, things you can do at a moderate pace." Our observations showed that most MI moments were calm and aimed at interrupting sedentary behaviour. Only three of the lessons included MI elements that were faster paced or where the students used their whole bodies to perform the tasks.

Although one male student (English 3, LS) explained that "all variations in teaching is always welcomed," several students expressed PA should be integrated into the teaching and learning of the subject.

> You can tie it into learning as well. So it does not have to be that, now we stop what we are learning and think about achieving something else. But we can kind of wrap it in both, like we get movement and go through the content in the lesson at the same time. (female student, English 2, US)

According to our observations, PA was integrated into the content of all lessons except one, whereas PA was not integrated into the content of one English lesson.

The students also expressed that MI could be done in the form of group work and that the exercises should involve the whole body. It also emerged that some of the students liked to have the MI moments outdoors. Furthermore, they felt that MI should preferably become a routine and students should not have the opportunity to choose whether to participate. Finally, the students believed it is important for the teacher to have a positive

attitude about PA and MI. When the teacher has a positive attitude, it has a positive effect on the students' attitudes and behaviours.

Student experiences

Emotions and feelings of well-being

Many students felt that MI made the academic classroom lessons more enjoyable. One female student (Physics, LS) said, "I feel that you do something fun at the same time as you do schoolwork." Similarly, several students mentioned it is boring and uninteresting to sit for a whole lesson: "Yes, and then when you sit like that, how many lessons do we have? Six lessons every day. You sit in the same place and stare into the blackboard. So, it's pretty dull" (female student, Social studies, LS). During most of the observed classroom lessons, the students seemed to have fun during the MI parts: "Happy faces, the students laugh and have fun" (field note, Swedish, LS). For example, during the Physics (LS) lesson, we saw that the students seemed to be having fun and reacted by cheering when the teacher told them about the task.

In addition to the fact that regular lessons were perceived as boring, the students explained that they were tired during lessons with a lot of sitting: "Well, you truly get tired of sitting for 75 consecutive minutes. And so, every lesson" (female student, History, US). Many students also said that they were more alert after the MI: "I feel more lively. Or like, because I was really tired before, but now I'm not as tired" (female student, Swedish, LS). In addition, students felt that they got more energy, and that the PA was refreshing. One male student (English 2, US) said, "For me, it feels most like in the head, the brain, not the body as now this muscle feels good, but as that, yes, the brain … it feels refreshing." Finally, some students felt that they were relaxed after the MI: "Kind of relaxing in a way. [Y]ou sit so tense and think about what to say. Then when you get up, you can relax" (female student, Social Studies, LS).

Learning

Almost all students thought that their learning improved when they were allowed to move compared to when they were sitting.

> It might give you a little more interest if you are moving, so it's a bit like this variation. Maybe it just gives a little more, you take a little more initiative and get a little more motivation to learn, instead of if you have to do some workbook for many days. (Male student, English 1, US)

One male student (English 3, LS) said he believed in PA: "I think I learn better physically [through MI] because I get tired so quickly if I just sit in the same place." Furthermore, one female student (English 3, LS) noted,

> If I move and then go and sit down, then I get a lot done. So, after I have moved, it usually goes well for a while, but then I need to move again and then again and so on.

Even though the students felt that they learned better when they got to move, several pointed out that whether learning was promoted depended on the kind of work in which they were involved. A male student (English 3, LS) explained, "It depends on the task, how it is arranged. So, both [physical activity] and sitting can be just as good." Similarly, a female student (English 2, US) said, "I do not believe we can go through some math theory when we are doing x-jumps on the same x-coordinate and y-coordinate or something. But then in language and such, I actually think it's almost easier."

Concentration

The majority of students experienced that MI in the academic classroom improved their concentration. One female student (English 2, US) explained, "I actually think it helps us to concentrate, because when we sit for so long and when we have many lessons in a row, it is easy to become completely exhausted and not be able to concentrate." Based on our observations, the students were able to concentrate during most of the MI activities: "Everyone provides their results, does not talk to each other" (field note, Physics, LS), and "even after the physically active parts, the students were concentrated and they are very concentrated throughout the lesson" (field note, English 1, US). However, during the English 2 (US) lesson, students had the MI element as the first part and by the end of the lesson, the students' focus and concentration had deteriorated. Correspondingly, a few students noted that PA can decrease concentration: "Sometimes, you become like more absent when you move [...] or it also depends on what you do" (female student, Social Studies, LS).

Discussion

The aim of this study was to describe students' experiences of MI in secondary academic classrooms based on their participation in lessons included in the Learning by Moving project for PSTs. Generally, the results of this study add new knowledge to the existing literature, which has focused mainly on primary education, and we advance the understanding of MI among secondary students. Our findings, grounded in views voiced by secondary students, show that most students in our study wanted to have more PA in academic classrooms during lower and upper secondary education. They pointed out that they now rarely have physically active lessons and that MI had occurred more often in primary education. Thus, teachers in lower and upper secondary schools do not integrate PA to the same extent as teachers in primary grades. This might be because compared to

classroom teachers in primary grades, subject teachers in secondary education have different priorities for and views of learning as well as a context of higher educational demands (Kämppi et al., 2013; Lomsdal et al., 2022). Subject teachers have strict schedules because they teach several different groups each day; thus, they may shift the responsibility for MI onto other teachers. Furthermore, secondary subject teachers may not be willing to sacrifice classroom time for MI because they believe that PA detracts from academics (Howie et al., 2014; Warehime et al., 2019). However, according to the students, teachers do not lose any learning time by spending some minutes on PA.

Although schools are in a great position to increase adolescents' PA, the structure of a school day in secondary education is often characterized by students mostly sitting sedentary for extended periods in classrooms (Bunketorp et al., 2015; Grao-Cruces et al., 2020), which students in this study indicated is a main reason they want more PA in classroom teaching. The decline in PA and sport participation during adolescence might well contribute to secondary students' wishes for MI (Kämppi et al., 2018; Kokko et al., 2021). These secondary students stated that PA tasks during MI lessons should be easy to perform and not too physically exhausting; thus, the most important message from this study is that students should be allowed and challenged to interrupt long periods of sitting. As Janssen et al. (2014) reported with elementary students, regardless of the intensity of the MI, it has a positive effect compared to students who are not allowed to have MI at all. Therefore, we extend previous research using younger children by showing that secondary students like the variation to sitting that MI in classroom teaching provides (Dyrstad et al., 2018; Martin & Murtagh, 2017; van den Berg et al., 2018).

School days are long in secondary education, and the students in our study wanted to have physically active elements particularly during the first and last lesson of the day, because that is when they are tired. Although the students did not focus on MI's long-term health benefits, it can improve secondary students' academic well-being. Several students stated that it was refreshing to be physically active during their lessons and that they received more energy, as Martin and Murtagh (2017) had already reported regarding younger students feeling energetic when they got to be physically active. In addition, our study showed that students experienced feeling more relaxed by PA, which is also what Mazzoli et al. (2019) concluded in their study.

The students noted that subject teachers play a central role in organizing MI by providing clear instructions for all students to participate and that teachers should create a routine using MI on a regular or daily basis. Therefore, subject teachers' knowledge and beliefs about MI are important because their attitudes will affect students' attitudes (Dyrstad et al., 2018; Finn & McInis, 2014). One way teachers can show a positive attitude is by actively participating in MI activities during academic classes. In addition, students reported that integrating PA into the lesson subject was preferable to taking brain breaks. Thus, these adolescent students can make the connection between PA and the content of a specific subject, and they recognize that engagement in MI will provide affective, sensory-motor, and intersubjective experiences with the subject that will open it to a fuller understanding (Lasthein Madsen et al., 2020). Because teachers play a central role in implementing MI and their beliefs, motivations, knowledge, and skills are factors repeatedly reported to inhibit the implementation of MI (Daly-Smith et al., 2021; Marttinen et al., 2017; Michael et al., 2019; Turner et al., 2019; Vazou et al., 2020), our findings point out the importance of providing support and encouragement for the use of MI to subject teachers both during preservice and in-service teacher education.

Most secondary students in this study thought MI made their academic lessons more enjoyable. Thus, we were able to extend findings from several previous reviews also showing that primary students experienced MI in classroom teaching as something fun (Bedard et al., 2019; Goh et al., 2017; Martin & Murtagh, 2017; Marttinen et al., 2017; Mullins et al., 2019; Uibu et al., 2022; Vazou et al., 2020). Research also has shown that students enjoyed lessons with PA more than sedentary versions of the same lessons (Gammon et al., 2019; van den Berg et al., 2019). Furthermore, classroom teachers (Martin & Murtagh, 2017; McMullen et al., 2016) and PSTs (Authors, 2020) have indicated in previous studies that primary and secondary students perceived MI in the classroom as enjoyable. In addition, secondary students in this study pointed out that it was boring to sit a lot and for a long time. Thus, MI is enjoyable not only for younger children, who naturally move during discovery and learning, but also for adolescents in a different maturation stage. Hence, this paper offers an important contribution to the existing literature because it demonstrates how secondary students enjoyed MI in academic classrooms. It is a finding that should not be neglected, because students' enjoyment affects their engagement in classroom activities and might even be a motivational factor to participate in leisure-time PA.

Almost all secondary students in this study felt that they learned better when they were allowed to be physically active. This finding is supported by a number of reviews and meta-analyses reporting that MI in classroom teaching improves students' learning and academic performance (Bedard et al., 2019; Daly-Smith et al., 2018; Martin & Murtagh, 2017; Michael et al., 2019; Norris et al., 2020; Vetter et al., 2020; Watson et al., 2017). Furthermore, research has also showed that increased PA in classroom teaching has no negative impact on cognitive performance and learning (Howie et al., 2015; Kulinna et al., 2018; Rasberry et al., 2011). Although in this study we present no specific data about students' academic learning, the fact that students felt their learning improved is by itself of great importance and a valuable finding and might well be seen as an actual learning advance.

In addition to enjoyment and learning benefits, secondary students in this study experienced that MI in classroom teaching improved their concentration, which several studies on younger children also have reported (Finn & McInis, 2014; Howie et al., 2014; Martin & Murtagh, 2017; McMullen et al., 2019). Previous research has shown that teachers also believe MI in classroom teaching contributes to improved concentration in younger students (Martin & Murtagh, 2017; McMullen et al., 2016). Moreover, observational studies have shown that MI in classroom teaching increases younger students' on-task behaviours and decreases their off-task behaviours (Goh, 2017; Watson et al., 2017). This is consistent with what the students in our study told us during the interviews and with what we observed during the secondary school lessons, although we did not measure the students' on-task behaviours. Thus, the potential cognitive, well-being, and academic benefits of MI may encourage the implementation of MI in secondary classrooms, as subject teachers see its positive effects.

However, as in most research assessing individual experiences, the findings in this study highlighted that there are individual differences between each student, which means that student experiences will differ. As Mazzoli et al. (2019) also noted regarding individual differences between younger students and that not all students like to be physically active, we need to acknowledge the variability in student voices related to all issues reported in this paper. Therefore, teachers should remember that "one size fit all" in relation to MI is a pedagogical approach they should avoid.

Our study also has some limitations that need to be taken into account when interpreting the findings. First, the sample was limited to only one lower and one upper secondary school in which the PSTs were teaching. Second, although we used a variety of methods to include students with different experiences, it is possible that more students who were enthusiastic about MI participated in the interviews. Third, this study focused on student voices and experiences and did not include the perspectives of teachers, and objective PA, on-task behaviours, or learning were not measured. The inclusion of these data would have complemented the findings. However, maintaining a narrow focus on the students' experiences might likewise be considered a strength, because secondary students' voices are often neglected. Finally, our findings may have limited generalizability due to the nature of qualitative research. This study was conducted in Finland, a country known for its high-quality education relative to many, and the possible impact of the sociocultural context is unknown. The findings emerging from our data might be valid in other contexts; however, it would be valuable to have opinions about MI from secondary students in other cultural and educational systems.

Conclusions

Our findings extend the current knowledge base, as data from this study showed that the MI lessons provided secondary students with innovative approaches to being physically active, which they considered enjoyable and which interrupted their sitting in classrooms. This study also reveals that the implementation of MI influenced secondary students' academic well-being through their energy levels, alertness, and concentration, and as such, they felt it improved their academic learning. These results are in line with previous studies on MI by classroom teachers in elementary setting suggesting that MI was well received by similar reasons related to student work and learning. Because student enjoyment has also been found as a dominant motivational factor to participate in physical activity and the primary element of secondary student acceptability of physical activity programs, it is an outcome that should not be neglected. Therefore, subject teachers are in an important position, and it is essential for future MI programs to challenge teachers' normal teaching practices and support alternative and interactive pedagogical approaches.

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