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Exploration of factors influencing the adoption and viability of classroom-based physical activity among primary school teaching staff

A thematic synthesis of qualitative empirical research

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Abstract

Classroom-based physical activity (PA) may provide additional opportunities for children to be active during the school day and increase their physical activity levels and motivation whilst also contributing to their positive learning experiences. However, the sustained and maintained adoption of classroom-based physical activity depends on the teaching staff. To ensure the viability of classroom-based PA as a pedagogical approach, a more comprehensive understanding of the behavioural and psychological processes that influence teaching staff's implementation and adoption of the approach is needed. Therefore, the purpose of this study was to systematically review existing literature on teaching staff's perspectives and beliefs towards the implementation and adoption of classroom-based PA. The aim of the study was to increase our understanding by thematically synthesising existing research on the factors that influence teaching staff's behavioural intentions to implement and adopt classroom-based PA and thereby assessing and explaining the viability and sustainability of such methods in teaching and learning. The thematic synthesis of 13 eligible qualitative empirical studies resulted in the identification of 27 themes describing factors influencing teaching staff. The Theory of Planned Behaviour was used to explore what teaching staff's perceptions and intentions on classroom-based PA show us about the implementation of such pedagogical approaches. The main facilitators for implementing classroom-based PA have been identified as teaching staff's beliefs about the positive social, emotional and academic benefits of classroom-based PA for pupils, supportive school community and whole-school approach and the capability to do so. The main barriers hindering the implementation and adoption of the approaches included the evaluation of negative behavioural outcomes of physical activity in the classroom among pupils, societal and cultural expectations for teaching staff and education, as well as the lack of time for planning and delivering activities. The Theory of Planned Behaviour aligned with the main themes and could serve to explain teaching staff's behaviour and intentions towards classroom-based physical activity. Overall, the current study acknowledged the theoretical potential of classroom-based PA, however pointed out that challenges arise in the practical implementation of the approaches. Viability and sustained use of the approach cannot be ensured without looking into and targeting teaching staff's behaviour of implementing and adopting classroom-based physical activity approaches in teaching and learning.

Keywords: physical activity, classroom-based physical activity, teachers, theory of planned behaviour

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1 Introduction

Physical activity (PA) is any bodily movement carried out by skeletal muscles that prompts energy use and that is positively correlated with physical fitness (Caspersen et al., 1985). PA refers to all movement and physically active activities, including planned and structured, as well as unplanned and unstructured forms of activities. Therefore, the amount of physical activity that one engages in is dependent on individual's personal choice and lifestyle. Sedentary behaviour is characterised by periods of low energy expenditure, e.g. sitting (WHO, 2024). Higher levels of physical activity are associated with health outcomes, i.e. reduced risk to a variety of health problems such as heart disease, stroke, type-2 diabetes, and various forms of cancer (Kyu et al., 2016). Factors for diseases, together with health-related behaviours may originate from childhood and adolescent physical activity participation and habits. Thus, the importance of childhood physical activity experiences and engagement must be emphasised.

In addition to improved cardiorespiratory and muscular fitness, blood pressure, glucose and insulin resistance, and bone health, in children and adolescents, regular engagement in physical activity can further promote cognitive outcomes, e.g., improved academic performance and executive function (Poitras et al., 2016), as well as result in psychosocial improvements, e.g, increased self-concept, social skills, goal orientation and self-efficacy (Kohl III and Cook, 2013). Therefore, early and ongoing opportunities for physical activity participation among children are necessary to achieve not only improved physical fitness, but also better mental, cognitive and psychosocial health. Globally accepted physical activity guidelines recommend that children and adolescents, between ages 5 to 17, undertake at least an average of 60 minutes per day moderate-to-vigorous physical activity across the week and participate in vigorous and intense activities at least three times per week (WHO, 2020).

Physical education as a school subject is increasingly seen to be an important opportunity to accumulate physical activity levels of pupils (Hobbs et al., 2018). Physical education - in most countries - include games, swimming, gymnastics, dance, and athletics as the five main components of movement, and in some instances outdoor activities are part of the curriculum too. Nevertheless, Brown (2013) highlights that the tension between educational and academic values and the influence of physical activity are still central issues, and whilst moving is a key attribute of physical education in schools, the purpose of the subject remains unclear. Additionally, in many countries, physical education is organised in such ways that it contributes to inequality amongst pupils and to discrimination by arranging them into privileged and

marginalised groups. Strong and lasting impacts on pupils can derive from negative experiences in physical education (Haegele, 2019). Worrell et al. (2020) acknowledge that the success of physical education depends on regional (municipality or local authority) and school policies, financial resources for facilities and equipment, and on teachers' attitudes. Moreover, as in many cases physical education is not valued or prioritised the same way as other school subjects, therefore it becomes particularly important to find alternative solutions for providing an ideal setting to enhance children's physical activity engagement during the school day.

School-based physical activity refers to any type or form of physical activity which is added to the school day of pupils, generally organised before, during or after classes or during breaks. School-based physical activity includes active travel to school (e.g. walking or cycling), short physical activity breaks, physical activity clubs as before- and after school programmes, physical activity homework, health education, physical education, and physical activity as integrated into academic content or carried out during lessons in the classroom without specific curriculum goals (Sneck, 2022). Whilst attitudes and experiences are mixed and paradoxical among pupils and teachers, rooting in tacit and implicit understandings of what physical education is (Rekaa et al., 2019), classroom-based physical activity (hereinafter classroom-based PA) has been given considerable interest by educators, researchers, and professional organisations in recent times.

Classroom-based PA, on the other hand is focused on physical activity exclusively carried out in the classroom during lessons either as short active breaks, or as integrated with the academic content, i.e., integrated into the teaching and learning goals. Physical activity integrated with the academic content teaching and learning may be considered as a pedagogical approach (Daly-Smith et al., 2020). The same approach is also often referred as movement integration, physical activity integrated lessons, physically active lessons, physically active learning, motor-enriched activities, cognitively engaging activities, and physical activity integrated with academic instruction. Hills et al. (2015) highlight that schools are more likely to be equipped with necessary resources and infrastructure for classroom-based activities, thereby are able to promote physical activity beyond physical education too.

As a pedagogical approach classroom-based PA ultimately impacts on teaching staff's roles, teaching methods and other aspects of teaching and education which stand as barriers in implementing such approaches. Teaching staff's beliefs and attitudes have been recognised as a major influencing factor in the delivery of physical activity in the classroom environment

(Morgan and Hansen, 2008). In addition, barriers and facilitators towards the adoption of new approaches in teaching can derive from pre-existing structures of society and education system, social support provided to teaching staff, as well as non-motivation factors such as the availability of requisite opportunities and resources (e.g. time, equipment, training, etc.). These factors can influence teaching staff in their intentions and/ or decisions to implement classroom-based PA approaches.

The Theory of Planned Behaviour (Ajzen, 1985) has been widely used to study teaching staff's attitudes, perceived barriers and facilitators, and intentions towards a given behaviour. With recent technological developments, previous studies used the Theory of Planned Behaviour to explore, for instance, teachers' intentions towards using technology in education (Hou et al., 2022; Zhan et al., 2024). The increasing educational provision for inclusive education in the past decades (Norwich, 2013) also resulted in researchers seeking out to explore teachers' beliefs about and intentions towards inclusive practices (Hellmich et al., 2019; Kupers et al., 2023). In this study, the given behaviour covers the implementation and adoption of classroom-based PA approaches in teaching and learning. The goal of the Theory of Planned Behaviour is not merely to predict whether teaching staff is going to implement or adopt classroom-based PA approaches, but also to explain why they do or do not do so.

The aim of this study is to analyse existing literature systematically and critically on teaching staff's perceptions and beliefs about utilising classroom-based PA approaches. A Theory of Planned Behaviour perspective is used to frame and explain teaching staff's behavioural intentions for adopting classroom-based PA approaches. The study begins with the exploration of what has already been done and what are the current practices in education to increase children's physical activity levels. Then, by systematically reviewing the literature, the study is going to analyse and engage in discussions of what current perceptions and beliefs of teaching staff about classroom-based PA can show us about the implementation of such educational practices. By drawing on the Theory of Planned Behaviour framework, the study is going to elaborate on the ways and extent to which teaching staff's behavioural intentions to adopt classroom-based PA should be considered if future studies and practices are to ensure the sustainability and viability of the approach.

2 Theoretical and conceptual background

Children's early experiences of physical activity, sport and physical education may significantly impact on their later participation (Rainer and Jarvis, 2021). This is because, children are still in the phase of developing and learning behaviours that they will carry on with as they grow older (Agans and Budziszewski, 2021; Harvey et al., 2018). Hence, enabling and fostering children's enjoyment and motivation to engage in lifelong physical activity can depend partly on the approaches in which these early physical activity experiences are delivered.

The current chapter provides a narrative review of the literature, starting with examining and discussing the general debate about children's physical activity levels and opportunities to engage in physical activities (2.1). Physical education has been long considered as the main physical activity opportunity for pupils during the school hours (Cheung, 2019; Coulter et al., 2020). Whilst the importance and value of physical education is not denied, current physical education practices show that the subject does not always meet its goals to educate children for life-long physical activity participation. The second part of the chapter (2.2) discusses how physical education is losing sight of its purposes and argues why it cannot be the sole physical activity source and opportunity for children during school days. Three main areas are going to be discovered regarding physical education, its organisation, the experiences of pupils and teachers, as well as how priority is not provided for the subject, thereby not being an opportunity by which children could meet the recommended physical activity levels. The third part of the chapter (2.3) emphasise the potential of classroom-based PA as an integrative approach. Characteristics and limitations of current intervention studies and programmes are explored in order to map the landscape, use and outcomes of the approach. By discussing teachers' role in the integration of physical activity into their teaching, the chapter starts moving towards introducing teachers' beliefs and perceptions as indicators for their intentions for implementing classroom-based PA methods (2.4).

Children's current and later physical activity engagement depends on the approaches that teachers utilise during the school hours and in their classrooms as part of teaching and learning. In order to provide beneficial early physical activity experiences for children, it is necessary to understand teachers' perceptions, beliefs and intentions about teaching with/ through movement.

2.1 Children's physical activity levels and opportunities

The association between level of physical activity, physical inactivity (or level of engagement in sedentary behaviour) and health-related outcomes is well-recorded in the literature. Higher level of physical activity among school-aged children is associated with positive physical, psychological, social, and cognitive health (Poitras et al., 2016). Conversely, physical inactivity or high level of engagement in sedentary behaviours (e.g. sitting) is associated with unfavourable physical, mental, social, and cognitive outcomes. Despite internationally recognised physical activity guidelines - according to which children should engage in moderate-to-vigorous physical activity an average of 60-min per day across the week and in vigorous-intensity physical activity at least 3 days a week (WHO, 2020) – on average, less than 20% of children meet these recommendations globally (Aubert et al., 2018). In Finland, about 46% of children between the ages of 7-15 meet the recommended weekly physical activity levels (Kokko and Martin, 2019).

Schools are acknowledged to be ideal settings for promoting children's physical activity as there are various opportunities to be active, including active travel (walking, bicycling to school), sport clubs, PE, etc. Schools have also been targeted to implement interventions and to develop programmes to increase children's physical activity during the school day (Martin and Murtagh, 2017). Integrating physical activity within school curriculum can further contribute to the reduction of sedentary behaviour among children (Peiris et al., 2022). However, the high rates of classroom-based sedentary time are concerning. Students are most often required to sit through lessons representing sedentary time in majority of the day. For instance, students spend almost 5 hours sitting at German schools, equalling to 46% of their overall daily sitting time which is approximately 10 and half hours per school day (Ruhland and Lange, 2021). Similarly, children in Finnish primary schools remain seated for approximately 6 hours per day representing about 47% of the overall daily sedentary time (Tammelin et al., 2015). This indicates that children sit uninterruptedly for the longest periods of times during school hours. Sedentary behaviour, like sitting, is associated with higher risk for chronic health conditions (Dunstan et al., 2010). On account of these statistics and facts, the prevalence of sedentary behaviour during school hours raises questions about the approaches adopted and opportunities offered by schools as the ideal settings for increasing children's physical activity levels.

School-based physical activity opportunities (active travel, physical education, after-school sport, etc.) can assist children engage in more daily physical activity, meet physical activity recommendations, thereby improving their health and educational outcomes. That is, school-based physical activity opportunities may contribute to an increase in students' moderate-to-vigorous physical activity levels. Although, it does not necessarily mean that sedentary behaviour is decreased. In other words, children may remain seated for hours, whilst they still engage in e.g., 60-min of moderate-to-vigorous physical activity during the day. In accordance, Cheung (2019) confirms that school-based physical activity can increase children's physical activity levels, however it is not automatically associated with a reduction in sedentary time. Furthermore, Gråsten (2017) explains that light school-based physical activity, for example walking to school or playing (active) games, may decrease the thresholds to engage in higher levels of physical activity. That is, children's physical activity participation may result in being inactive for an upcoming period of time. Such phenomena may be explained by the Activity Stat hypothesis (Gomersall et al., 2013) which suggests that changes in PA level in one domain will result in changes in another domain. For instance, based on the theory, a child engaging in an after-school sport activity will be less active in the rest of the day. Similarly, Heemskerk et al. (2023) notice that students are less likely to actively participate in lessons following vigorous physical activity during physical education. Therefore, it becomes particularly important that school-based physical activity opportunities are offered throughout the day with adequate intensity and focus not only on increasing children's physical activity levels but also decreasing their sedentary time of sitting.

Physical education as a school subject has been traditionally regarded as a valuable source of children's physical activity (Cheung, 2019), and it may also be the most obvious option for trying to increase their physical activity levels in the educational/ school setting. However, based on the above discussion, it is perspicuous that physical education by itself cannot offer sufficient opportunities for children to meet physical activity recommendations, thus schools need to develop or implement approaches which further address physical activity during the school day. Additionally, based on the ActivityStat hypothesis, increased physical activity or energy expenditure in physical education may enhance students' inactivity, sedentary behaviour for the rest of the day. Hence, school-based physical activity initiatives should focus on the provision of longer duration of moderate-to-vigorous physical activity throughout the day. In the following, current status of physical education as a major school-based opportunity

is going to be explored, followed by the exploration of classroom-based PA as an alternative way to provide adequate level and intensity physical education during the school day.

2.2 Physical education: Losing sight of purposes

Physical education, as a school subject that is part of the curriculum and offered within ordinary school hours, is for many children may be the sole opportunity to participate in physical activity (Coulter et al., 2020). Important to note that experiences in physical education can influence students' attitudes, which in turn impact on their general attitude towards and engagement in physical activity (Bailey, 2006; Kretschmann and Wrobel, 2015). As physical education has the potential to reach almost all school-aged children, the adoption of positive attitudes towards the subject is seemingly vital in order to promote future physical activity participation.

2.2.1 Organisation of physical education

The overall aim of physical education as a school subject is to prepare students for a lifetime of physical activity whilst promoting all health-related benefits in addition (McEvoy et al., 2017). It is evident that all children should have access to adequate physical education which accommodates their individual needs to fulfil the aim of the subject. According to Hastie et al. (2023), quality physical education focuses on every student and their unique needs in order to ensure that they can develop motivation, confidence, physical competence, understanding and knowledge necessary for engaging in lifelong physical activity. However, in many cases it is not organised in such ways that it provides all students with equal opportunities in physical education or to access physical education. In fact, Gerdin et al. (2019) highlight that physical education often contributes to inequality among pupils and to discrimination by placing students into privileged or marginalised groups.

Whilst other school subjects have already begun crossing social boundaries, certain individual characteristics over others, for instance strong and athletic bodies, are continued to be privileged in physical education (Hill, 2015). These kind of bias attitudes and practices may remain stable in physical education due to the emphasis placed on the differences between students as explained by Cameron and Humbert (2020). This demonstrates the possibly reinforced inequity in physical education as a result of reduced positive learning experiences

for students deriving from bias attitudes and behaviour among practitioners and teachers. Although it is important to clarify that whilst these described instances may be generalised or highlighted as an average phenomenon, there are differences from country to country, even from school to school, depending on contexts and personal experiences. Nonetheless, inequalities in relation to learning opportunities in physical education has been associated with exclusionary practices, selective grouping and/ or practices of ability grouping, lower quality of instruction for pupils considered having ´´lower abilities´´, and the lack of adaptation to meet the learning needs of each pupils (Wilkinson and Penney, 2022). Moreover, sporting competence as a privilege in physical education results in increasing or exacerbating the phenomena for students with less competence to feel othered (Røset et al., 2020), to feel a lack of belonging (Rekaa et al., 2019), or to feel anxious about needing differentiation and modification for the activities (Haegele, 2019). It appears that the justification for grouping students based on increased motivation; social skills by the positive interaction with their peers; independence; and academic success (Wilkinson and Penney, 2014) is in contrast with the lived experiences of those student who may not depict preferred characteristics for physical education.

Another core goal of primary school physical education is to facilitate the development of sufficient levels of fundamental movement skills among pupils (Kirk, 2005). These fundamental movement skills are considered to be indispensable for the later development of specialised movement progression required for adequate participation in specific sport and physical activity throughout the lifespan (Clark and Metcalfe, 2002). The importance of proficient movement competence among children has been proven to be associated with a greater likelihood to engage in physical activity (Yli-Piipari et al., 2022). Despite some approaches in which groupings of students are based on movement competence and abilities (Hastie et al., 2023), the other side of the spectrum involves game-based pedagogies and a focus on playing cooperative games. Although, the integration of such games could lead to opportunities to be active in social context in physical education, enhance self-image and positive interaction with peers and friends (Harvey et al., 2018), an exclusionary utilisation of these approaches happens to marginalise the development of the fundamental movement skills, therefore marginalises the overall educational value of physical education (Ward, 2013; Backman et al., 2019).

Game-based pedagogies as an approach alone also face criticism from secondary physical education teachers, as well as from parents. Secondary school physical education teachers

claim that primary physical education with its mere focus on playing games hinders the opportunities for children to acquire adequate levels of fundamental movement skills and physical fitness seen as pre-requisites for participating in team sports, gymnastics, net- and court games, striking and fielding activities, i.e., for succeeding in secondary school physical education (Rainer and Jarvis, 2021). Similarly, the study by Coulter et al. (2020) found that parents also wish that their children could participate in more health and fitness related activities as part of physical education in addition to a curriculum mainly focusing on team sport skills and playing team sports. A lack of formal curriculum in primary school physical education and a strong emphasis on team games and sports could result in the exclusion of many students (Ward, 2013), as skills that should be developed during the primary school years are already a requirement for succeeding in these team games and sports, thereby making physical education more engaging for those with already higher levels of sporting competence or physical skills.

It is important to mention however, that the organisation, curriculum and delivery of physical education is likely to face cultural differences across educational systems, across countries. That is, physical education may face a lack of formal curriculum in primary school education in one country (Ward, 2013), however not in other countries. Physical education has particular relevance to a given society, offering different physical activity opportunities in the forms of exercise, play and/ or sports (Čučković and Vrcelj, 2020). Participation in and provision of physical education also differs across the world. A comparative study by Martins et al. (2020) demonstrate the prevalence of physical education participation among adolescents (ages 13-17) across 54 countries based on sex, age, country income and world region disparities. Interestingly, their study shows that - in average - adolescents are more likely to never take part in physical education in higher-income countries compared to low-income countries where adolescents participate in physical education up to 3 days per week. Furthermore, the study by Čučković and Vrcelj (2020) point to regional and individual national provision and operationalisation of physical education in primary schools in the European Union. Their vector representation showcases differences in the educational area of physical education across countries, i.e., the focus of the physical education curriculum and purpose of the subject as sport versus physical education, and health versus movement education. In most European countries, physical education as a school subject is more concentrated on sporting skills than on physical skills (Čučković and Vrcelj, 2020).

The development of fundamental movement skills among children in primary school is an important determinant of engagement in physical activity in adolescence too. In other words, children who are more skilled in physical activities are more likely to engage in physical activities again (Harvey et al., 2018; Yli-Piipari et al., 2022). That is, primary school children who succeed in physical education as a result of having adequate physical skill levels are more likely to also enjoy and succeed in physical education in secondary school. If the purpose of physical education is to educate for lifelong participation in physical activity, then this bidirectional relationship between skill level and engagement should be viewed as a target of primary school physical education. However, physical education can only achieve this aim if it is enjoyable and enable students to feel accomplishment and engage in skill building. A decrease in one's movement competence can negatively impact on their self-perception, losing confidence and motivation (Telford et al., 2021), therefore overall enjoyment for and participation in physical activity.

2.2.2 Experiences in physical education

There are large variations in the quality of experiences in physical activity among students both in and across primary schools (Rainer and Jarvis, 2021). Not only moderate-to-vigorous physical activity levels but also motivation towards physical education declines rapidly around grades 4 and 6 (de Bruijn et al., 2022; Yli-Piipari et al., 2022). Hence, it becomes necessary to understand whether students experience physical education as a valuable and enjoyable subject. Physical literacy is another key goal of and a guiding framework for quality physical education (SHAPE, 2013; UNESCO, 2015). Physical literacy can be understood as one's motivation, confidence, physical competence, capability, and understanding to value and submit oneself to engage in lifelong physical activity (Whitehead, 2013). As a framework for physical education, physical literacy is particularly useful in measuring the achievement of the objectives of the school subject, whether students become physically literate as a result of physical education, whether physical education provides adequate amount of daily moderate-to-vigorous physical activity, etc. However, at the end of the day, it is the situational and contextual factors, like physical education curriculum or teachers' instructional practices that contribute to or hinder children's physical education motivation and enjoyment. That is, various factors in physical education can influence how well its objectives and goals are met and how physically literature student become.

Teachers have an important role in stimulating the development of students' physical literacy. However, Morgan and Bourke (2008) acknowledge that despite the positive outcomes and benefits of physical education, teachers without a specialisation face difficulties delivering the subject. This is especially true for generalist primary classroom teachers who have limited initial teacher training in physical education, therefore lack confidence and motivation themselves towards the subject. Reduced level of confidence and motivation among teachers can influence how physical education fulfils its potential and objectives in teaching fundamental movement skills and educating physically literature students (Rainer and Jarvis, 2021).

The lack of knowledge, skills and even time remain the main hinders for primary teachers to teach physical education confidently. Issues with teachers' confidence and competence is usually a result of insufficient teacher training in physical education and support. Coulter et al. (2020) and Freak and Miller (2017) emphasise the challenge for teacher education to organise and deliver programmes from which newly qualified teachers feel confident, equipped, and prepared for primary school physical education. On the other hand, Lawson (1986) highlights that teachers' own experiences in physical education tend to be more influential than their teacher education and they may even develop resistance towards changing after completion of their training. Although Lawson (1986) may be outdated, more recent literature seems to support this phenomenon. The overpowering impact of teachers' own experiences shaping their understanding of physical education is also acknowledged by Elliot et al. (2013). Teachers' underlying beliefs and assumptions about the subject are central to the provision of quality physical education. This is because when experiencing stressful teaching situations teachers often return to teaching the curriculum the way they are familiar with and utilise pedagogies they experienced as pupils themselves in school, in contrast to what they were taught during their teacher education (Freak and Miller, 2017). This implies that personal learning experiences in physical education can become teachers' tacit knowledge of the subject and suffuse their decision-making ability, successively integrated into their approved understanding of what teaching and learning in physical education involves.

The responsibility to plan and deliver lessons falls on classroom teachers who may not be fully prepared to teach quality physical education. The lack of inadequacies in the physical education domain as part of one's teacher education leaves teachers underprepared to teach the subject (Telford et al., 2021) and prompts them to seek out other professional development courses later in their career (Elliot et al., 2013). Teacher education fails to move away from or change

pre-existing beliefs/ images and prior experiences (Freak and Miller, 2017) which consequently impact on teachers' attitudes, motivation and tacit knowledge of what physical education is about and how it should be delivered. In other cases, failure to support teachers' development may cause in their exclusion from physical education altogether (Randall and Griggs, 2021) resulting in them to focus on other key learning areas in preference to physical education (Freak and Miller, 2017). Therefore, it is important to emphasise that teacher education plays just as significant role in teachers' competence and motivation towards teaching physical education as teachers play in students' lives to develop physical literacy. Teachers without adequate education that challenges their prior beliefs and perhaps negative or pedagogically outdated experiences in addition to the development of their own (physical) competence most likely struggle to teach physical education according to the expectations and purposes of the subject.

2.2.3 Current position of physical education among core academic subjects

In addition to teachers' own beliefs and values, there are a range of other contextual factors that may influence decisions in physical education regarding the curriculum, pedagogy, and assessment. Ní Chróinín (2018) identifies a gap between the theoretical possibilities of physical education school subject and the reality of teaching and learning in the physical education classroom. Time constraints are usually the most commonly cited barriers towards delivering quality physical education. These includes for instance time limitations to implement adequate pedagogical methods or taking time to listen to students (Escrive-Boulley et al., 2021), as well as time limitations of the school day in which physical education is not a priority (Harvey et al., 2018). Such constraints can negatively influence on the quality and outcomes of the subject, as teaching in a 'rush' may result in fast and vague instructions and ignoring students' capacity or ability to follow those. Furthermore, lack of resourcing and inconsistency in physical education (Coulter et al., 2020) may interplay with other issues relating to inappropriate facilities and support, struggling meeting the curriculum requirements, and having conflicting demands between teaching core curriculum subjects, i.e., multicurricular responsibilities (Rainer and Jarvis, 2021; Telford et al., 2021). Similarly, Harvey et al. (2018) acknowledge too that competing policy requirements that demand teachers to meet other academic goals and the availability of proper facilities for physical education are usual barriers to regular participation in the school subject.

Lack of priority of physical education is not only an issue on the classroom-level carried out by generalist primary school teacher, however, is also influenced by school-level rules and culture. School-wide policies, values and behaviour play an important role in and are a significant influencing factor towards physical education and its quality. Beighle and Morrow (2014) highlight that standardised testing determining pupils' future education and increased accountability for curriculum coverage force schools to respond to the pressures of meeting specific expectations by prioritising academic achievement over the provision of opportunities for physical education. That is, physical education is often perceived to have less importance towards academic success compared to other subjects. The position of physical education within an already crowded curriculum becomes a conversion being dealt with rather hesitantly and considered as such of a token gesture (Rainer and Jarvis, 2018). This token gesture nature is also supported by Coulter et al. (2020) who find that some teachers cancel physical education lessons due to students' misbehaviour. That is, physical education is used as a reward for good behaviour rather than being seen as a school subject which promotes various health benefits and enhance lifelong physical activity participation and should be accessible for all students.

Overall, there can be seen a phenomenon that when school can decide on their curriculum and subject provisions, it is likely that they place a lower value on practical subjects like physical education. Yoon and Armour (2017) state that even when teachers have well-organised lessons and use innovative pedagogies, school-wide decisions may still enforce a reduction in the number of physical education lessons and place a strong emphasis on academic subjects. Additionally, teachers' motivation towards teaching physical education is also dependent on the school context and school cultures they are in (Escriva-Boulley et al., 2021). In other words, if the school management places less emphasis on physical education, teachers may be limited in power or motivation to still facilitate a progressive curriculum and support the status of physical education within their own classroom. Castelli et al. (2014) promote the idea of school-wide strategies that place physical education, along with other daily opportunities for physical activity as a centrepiece whilst also increase motivation, expertise, and reduced time constraints of the classroom teachers.

2.2.4 Summary

In overall, there are various challenges in physical education regarding specific content of the subject and pedagogical approaches in delivering lessons. Across the educational spectrum of primary school physical education, teachers are expected to teach students developing their movement skills and competence, whilst also facilitating their development of sense of identity, self-esteem and social skills (Rainer and Jarvis, 2021). Moreover, teachers must make sure that the individual needs of all pupils are met, everyone's participation is relevant, and students experience positive emotions as a result of physical education classes (Rekaa et al., 2019). That is, general classroom teachers, most likely without a specialisation in teaching physical education, may face extreme pressure and tension in their practice regarding what to teach as part of physical education and how to teach it, i.e., content and pedagogical knowledge required to engage children in physical education as a mandatory education setting, whilst the ''whys'' of physical education differ from context to context, from education system to education system, from teacher to teacher. Physical education is at risk of losing sight of its purposes and does not contribute to consistent and meaningful involvement of all pupils (Quennerstedt, 2018). It is not clear anymore how the theoretical potentials of physical education can be matched with the realities of teaching and learning in the subject, especially when schools are not partner in placing more attention to this particular subject, teachers lack confidence and competence to teach it, and pupils experience a numerous personal struggles related to physical challenges and their skill levels.

Based on the discussion of children's physical activity levels, the amount of pupils meeting weekly recommended physical activity levels (Aubert et al., 2018; Kokko and Martin, 2019) and sedentary time spent in schools (Ruhland and Lange, 2021; Tammelin et al., 2015), it can be concluded that even though the purpose of physical education should be partly to provide adequate levels of daily moderate-to-vigorous physical activity in schools, physical inactivity remains a persistent problem among children. Increasing children's physical activity within the school environment is a prioritised objective in many countries, however an effective, sustainable approach to providing and promoting opportunities for physical activity is yet to be explored (Telford et al., 2021). Organised physical activity is acknowledged to be a positive contribution to society through its impact on education and social inclusion objectives, empowering women, young people and communities, and promote tolerance and respect (UN, 2015). In contrast, as discussed in this chapter, traditional physical education practices place

students in vulnerable positions, treat them either the same regardless of their differences (not meeting their needs) or segregates/ excludes them due to those differences, resulting in negative experiences and possibly hindering future physical activity enjoyment and engagement. This indicates that there is a substantial difference between the impact that physical activity can achieve in one's life as an organised activity and physical education as a school subject.

In light of the above discussions, it may be reasonable for education systems to consider school-based, but especially classroom-based PA opportunities as an alternative, sustainable method for implementing frequent and adequate physical activity for students throughout the school day. Classroom-based PA, an already existing approach, could serve as an effective, economically acceptable, and sustainable method for physical activity in schools, even though such method is yet to be determined according to Castelli et al. (2014) and Harvey et al. (2018).

2.3 Classroom-based physical activity: an integrative approach

Activities during physical education do not offer sufficient opportunities for children to meet the recommended physical activity guidelines, and to increase their physical activity levels, thus neither to enjoy the benefits of being physically active (Peiris et al., 2022). However, classroom-based PA can provide other ways and additional opportunities to be active at school. This classroom-based PA could serve to increase time spent in physical activity without reducing educational time. This may be a major benefit as time spent on physical activity is often considered to be taking time away from academic content and learning, commonly identified as barrier by teachers (Vazou et al., 2020). The following discussion aims to explore the characteristics of current classroom-based PA interventions, their limitations, and the role of teachers in their implementation in order to gain insights into the scientific literature on what has been done and what are the possibilities of integrating such approaches into education.

2.3.1 Characteristics of classroom-based PA interventions

There are various ways how physical activity or movement can be integrated into classrooms, either as short bursts of physical activity (active breaks and academic content-relevant active breaks) or as physically active lessons/ learning with academic content, usually referred to as PAL (Masini et al., 2022; Watson et al., 2017). Additionally, children's sedentary time at

schools may be displaced with light physical activity or moderate-to-vigorous physical activity depending on intervention characteristics, i.e., based on mode, duration, and intensity of the programme.

Literature shows that the longest classroom-based PA intervention involved two times 10-min physically active episodes daily, five days a week over three years (Szabo-Reed et al., 2017; Ruhland and Lange, 2021). However, the most common duration of physical activity is between 10 to 20 minutes per day, with some exceptional cases where physical activity lasted only 3 to 4 minutes per day usually in the form of active breaks of high intensity or 50 to 60 minutes as a whole lesson integrating academics with movement (Vazou et al., 2020). These findings suggest a wide range of durations for physical activity in classroom settings, with a rather extensive spectrum of how long physical activity is integrated into the classroom or teaching. Additionally, it has been stated that the most effective interventions regarding their outcomes for students are those that integrate physical activity into the curriculum two to five times a week, involving aerobic exercises, muscle strength activities and games that improve motor skills of children (Robles-Campos et al., 2023).

Although certain conclusions cannot be interpreted from this data yet, it can however indicate that the choice of duration for physical activity during lessons may depend on various factors, such as available time, resources, space, student preferences, and educational goals. Overall, the mode, duration, intensity, and type of classroom-based PA varies greatly between interventions. This variance makes it difficult to establish a universal design with universal effect of them on children (Daly-Smith et al., 2018). Variances in interventions can also be seen in the number of participating students, the training and resources provided for schools/ teachers to carry out interventions, and theoretical frameworks used in the studies (Martin and Murtagh, 2017). Furthermore, differences in the measurement makes comparisons of outcomes of the different interventions also challenging (Ruhland and Lange, 2021).

Despite the variances, the literature suggests that classroom-based PA can improve and increase students' physical activity levels (Daly-Smith et al., 2018; Peiris et al., 2022). Martin and Murtagh (2017) emphasise that physical activity levels of pupils can be improved with classroom-based PA regardless of personal characteristics, e.g., sex or prior physical activity level. In fact, they propose that these integrated activities could particularly benefit the less active students who need to be provided with more structured opportunities to be physically active (Martin and Murtagh, 2017). This may be explained by the nature of the settings for

classroom-based PA, i.e., classroom where all children are present and can participate equally in the opportunities presented to them as no previous sporting/ physical activity skills are required. Classroom-based PA interventions generally result in more physical activity among children, whilst their participation in physical activity can also be associated positively with academic outcomes (Watson et al., 2017). That is, classroom-based PA interventions result in improvements in students' physical activity levels and enhance their learning.

There are various academic-related outcomes that can be associated with increasing physical activity level among children. Studies show that there is a positive influence of classroom-based PA on attention and on-task behaviour (Martin and Murtagh, 2017; Ruhland and Lange, 2021), on classroom behaviour (Watson et al., 2017), and self-efficacy in learning (Papadopoulos et al., 2022). Overall, academic performance either positively associates with classroom-based PA, or show no difference in outcomes following exercise, i.e., classroom-based PA interventions do not negatively affect learning any how (Daly-Smith et al., 2018; Martin and Murtagh, 2017).

Increased attentiveness follows academic lessons which integrate physical activity in the content. This is true for both repeated short-term interventions and single long-lasting interventions. Ruhland and Lange (2021) found that the beneficial effects of classroom-based PA on attention result from various physical activity approaches, including one-time or multiple interventions with durations from few minutes to 50+ minutes. Improvements also occur in students' ability to ignore distractions. Watson et al. (2017) state that such improvements in selective attention may further motivate teachers to incorporate physical activity into their classroom routine.

Moreover, Martin and Murtagh (2017) emphasise that it cannot only increase attentiveness in academic lessons among students but can also motivate and excite them to participate in the lessons academically. Similarly, Schmidt et al. (2020) point out that pupils who engaged in classroom-based PA interventions, either active breaks or physically active learning, enjoyed the lessons more than pupils who did not participate in such programmes. That is, students might be more inclined to engage with the academic content of the lessons when it is presented in integration with physical activity. In return, it might also explain why classroom behaviour improves as a result of these physical activity interventions (Daly-Smith et al., 2018) because students pay more attention, engage more with the academic content and are motivated to actively participate in the lessons compared to traditional teaching. In accordance, Watson et

al. (2017) state that lessons with physical activity can serve as a valid approach to engage pupils in the academic content, which may lead to improved on-task behaviour in the classroom.

Classroom-based PA can be beneficial to children's physical activity and academic performance. As educational outcomes show either notable improvements or no difference when compared to traditional teaching (Norris et al., 2015), it is important to acknowledge that incorporating physical activity into the classroom does not lessen the academic side of the lessons but may enhance learning. Therefore, challenges in appointing time for physical activity due to the emphasis of core academic subjects as an often-highlighted barrier in the literature, can be decreased with the incorporation of physical activity into the classroom. Increasing in self-efficacy in learning and motivation for physical activity among children demonstrate that classroom-based PA is an effective approach to also communicate and promote the health benefits of being physically active (Mok et al., 2020; Robles-Campos et al., 2023), as well as to build on this increased self-confidence and enjoyment to encourage students for a lifelong engagement in physical activity (Gråsten, 2017; Papadopoulos et al., 2022).

2.3.2 Current limitations in classroom-based PA interventions

Although classroom-based PA interventions can be associated with several positive academic outcome and increased physical activity levels among students, it is also highlighted in the literature that outcomes do not indicate consistent effects on cognition. Daly-Smith et al. (2018) assume that the possible explanation for the lack of evidence for enhanced cognition among students may be related to the variability in features of intervention design, their implementation within the school environment, and the quality of measures used. Watson et al. (2017) found that improvements in cognitive function among children were reported when studies used measures with moderate to high levels of reliability and validity, and no improvements were reported in studies who utilised less reliable and valid measures. Additionally, Peiris et al. (2022) acknowledge that the intensity, load, and the extent to which physical activity is integrated into the curriculum affects the outcomes and performance of students. That is, while physical activity interventions in classrooms may lead to improved academic outcomes, as discussed above, and increased physical activity levels among students, inconsistent effects on cognition are observed. This underscores the importance of carefully

designing interventions, deploying them effectively within the school/ classroom environment, and utilising reliable measures with high validity to accurately assess their impact on children's cognitive function.

Another possible explanation for the inconsistency in the effects on cognition according to Watson et al. (2017) could be related to the extent of cognitive engagement required in the different types of classroom-based PA. Best (2012) suggests that cognitively engaging physical activity (i.e., physical activities combined with cognitive demand, such as physically active learning or movement integration) potentially enhances cognitive function of children to a greater extent than non-cognitively engaging physical activities (for instance active breaks without a focus on curriculum or content). In accordance, Peiris et al. (2022) conclude that inconsistency in the amount of classroom-based PA, specifically active breaks, provided as part of the interventions contributes to the conflicting results for cognitive functioning among students. Likewise, Vazou et al. (2020) emphasise that variances between dose (frequency and duration), intensity, and type of physical activity between studies makes it challenging to draw universal conclusions on the effects of classroom-based PA interventions. This indicates that variability in designs complicates making universal conclusions regarding what works best in achieving improved cognitive function among students. On the other hand, Heemskerk et al. (2023) provide an insight into how different intensities of physical activity affect different types of behaviour in the classroom. It is suggested that physical activity of sufficient moderate intensity over longer duration leads to perceived alertness, feelings of being energised, and increases on-task behaviour, whilst high-intensity physical activity can lead to a depletion, enhancing tiredness and losing attention (Heemskerk et al., 2023).

The variations in designs outlined across the literature urge for specific guidelines for teachers on how best classroom-based PA can be integrated into their lessons to be effective in achieving both health and educational/ academic outcomes. However, it is also important to define the purpose of implementing classroom-based PA and identify what is intended to be achieved through such pedagogical strategies. Daly-Smith et al. (2018) acknowledge that different purposes require different activities, i.e., if the aim of the classroom-based PA is to reduce sedentary time, virtual field trips or similar pedagogical approaches may be utilised, whilst if the aim is to increase moderate-to-vigorous physical activity, relay-type activities may serve better (Daly-Smith et al., 2018). Consequently, if the purpose of integrating classroom-based PA into the curriculum is primarily to improve children's cognitive functioning during lessons, appropriate activities need to be selected considering the possibilities in designing the physical

activity programme. Although variance in design in this sense may not stand as a limitation of classroom-based PA, currently it limits the ease for a universally understandable and usable approach. That is because high variability calls for caution when interpreting results (Watson et al., 2017).

Furthermore, issues arise with the concept of classroom-based PA, as physically active lessons can be clearly differentiated from active breaks. Whilst physically active lessons are aimed to teach academic content, active breaks are not necessarily related to educational outcomes (Martin and Murtagh, 2017). Daly-Smith et al. (2018) point out that there is not a classification for classroom-based PA in the current literature which would combine pedagogical approaches with the delivery environment as they both impact physical activity outcomes. Considering the variances between classroom-based PA interventions, it might be critical for future studies to determine more nuanced classifications, as well as to identify and examine factors that influence (hinder or facilitates) each type of classroom-based PA separately. This is because different types of activities require different skills from teachers, e.g., more experience in teaching an academic content or more skills in time, space and classroom management (Vazou et al., 2020). Teachers' skills and attitudes play an important role in affecting the success or failure of classroom-based PA, hence the effectiveness of interventions (Martin and Murtagh, 2017). As teachers have a fundamental role in carrying out classroom-based PA and have the autonomy to decide the most appropriate time to carry out physical activities during their lessons, it is important that they are supported in understanding the different classifications, types, and benefits for their students.

Although teachers play an important role in the success of these interventions (Martin and Murtagh, 2017), Vazou et al. (2020) state that it is more likely for interventions to be researcher-driven, involving the researcher as a key stakeholder in the planning and delivery of classroom-based PA rather than interventions being teacher- or student-driven or collaborative between researchers and teachers. This raises questions how teachers' less active involvement will influence the sustainability of the programme over time, i.e., how likely teachers will keep using classroom-based PA approaches in their teaching. In accordance, Gråsten (2017) states that interventions are more likely to be sustained if individuals in the school are able to take ownership of the programme after the research-monitored and controlled phase has ended. Hence, current interventions are limited in that there is a lack of teacher involvement in most studies which raises concerns about the long-term sustainability of the programmes, whether teacher engagement and continued use of classroom-based PA

approaches may diminish after the research is over. This further raises questions on teachers' engagement in the research studies, how their views and attitudes are taken into account already in the researcher-driven phases.

Treatment fidelity is the final stage in implementing classroom-based PA interventions and it serves to monitor and faciliate the accuracy and consistency of the programme to ensure its implementation to be as planned (Vazou et al., 2020). However, most studies lack confirmation of treatment fidelity (Daly-Smith et al., 2018) or generally includes only teacher self-reports on the accumulation of minutes of PA as data for measuring fidelity which makes the information less precise and accurate (Vazou et al., 2020). That is, qualitative perspectives of teachers are rarely taken into account regarding the implementation of the physical activity programme. Understanding teachers' experiences, challenges, and attitudes towards these physical activity programmes and interventions through qualitative means could assist to identify specific barriers and facilitators to implementation, tailor support and training provision, thereby enhancing the sustainability of classroom-based PA approaches in everyday teaching, even after the research.

2.3.3 Teachers' role and capacity in utilising classroom-based PA

The classroom setting is appraised as an ideal environment for integrating physical activity into schooldays as students can be easily reached and teachers hold a good amount of autonomy (depending on context) to decide the most suitable time for and type of activities (Peiris et al., 2022). Teachers' own opinions, perspectives, and attitudes towards physical activity have been recognised as a major influencing factor to the promotion of physical activity in the classroom environment (Morgan and Hansen, 2008). Therefore, introducing and implementing change is teachers' decision (Martin and Murtagh, 2015) which in turn influences what children do in the classroom. In order to maximise teachers' role in implementing successful classroom-based PA approaches, interventions should also target teachers' behavioural change. This may mean a provision of interventions that correspond to their curriculum, their schedules, and their values and beliefs about teaching (McMullen et al., 2014). According to Martin and Murtagh (2017) targeting teachers' behavioural change and tailoring interventions to suit their individual contexts and need could encourage them to take responsibility and ownership for integrating physical activity into their classrooms/ lessons.

The difference between traditional classrooms and classrooms with alternative approaches, such as classroom-based PA, demonstrating how academic outcomes are affected by the teacher, their approach and relationship with students, highlights the importance of the design and use of the learning environment (Kariippanon et al., 2020). Thus, interventions with higher teacher involvement regarding the design of the physical activity programmes may be more pragmatic and sustainable than researcher-driven implementation (Vazou et al., 2020). Barriers to successful classroom-based PA include challenges with the delivery system (how physical activities are delivered and implemented) regarding the provided support, coordination, human resources, time availability and curriculum pressures (Papadopoulos et al., 2022). Therefore, teachers might only be able to integrate physical activity into their classrooms and lessons if they perceive that there is adequate support and resources available to them. After the end of an intervention, teachers may not be supported further by their school or provide them with necessary tools to continue the integration of such physical activity approaches. These institutional factors (barriers and facilitators deriving from the school environment which are beyond teachers' direct control) either hinder or promote teachers' use of classroom-based PA. Facilitation of classroom-based PA depends on teachers and the role they take in the task. However, it is ultimately influenced by how these programmes are introduced, supported and maintained by schools (Papadopoulos et al., 2022).

Besides institutional factors influencing teachers' role in classroom-based PA, intrapersonal factors should also be considered as facilitators or barriers. These include teachers' perception on the value of physical activity, on the ease and challenges of implementing it in their classroom, their confidence and motivation, and their training or perception on competence (Vazou et al., 2020). Therefore, understanding teachers' perceptions towards physical activity and towards the idea of integrating it into their lessons is crucial as they can be enablers or significant obstacle in enacting classroom-based PA. Considering that current studies focus mainly on interventions and only includes teachers' insights in the limited forms of treatment fidelity (see above), there is a clear need for research that focuses especially on teachers' experiences, perspectives and beliefs about physical activity and the adoption of classroom-based PA with or without engaging them in additional intervention programmes that lasts for a limited period of time. Long-term sustainability of a classroom-based PA approach as a pedagogical method may only be feasible if the ideal circumstances can be determined for such programmes, e.g., institutional provisions and intrapersonal influences.

2.3.4 Summary

On the whole, classroom-based PA is unique compared to other school-based physical activity opportunities (e.g., physical education and school sport) as it is a practical, affordable, time-efficient and effective approach increasing both academic outcomes among pupils, especially improving attentiveness, on-task and classroom behaviour, and their physical activity levels. Classroom-based PA can provide positive learning experiences, whilst also increase physical activity motivation and improve pupils' total physical activity levels and health (Gråsten, 2017). Although more studies are needed to confirm further effects and benefits, and to come to a more consistent conclusion for instance on the effect of classroom-based PA on students' cognitive function. The varied designs and focuses of current interventions limit the generalisability for a universal programme, however overall evidence of the literature demonstrates that classroom-based PA can be realistically incorporated into the school day over a long period of time (Ruhland and Lange, 2021). Nevertheless, this also requires that programmes can be supported, maintained, and continued by schools and individual teachers. Researcher-driven interventions are limited because of the lack of insider awareness about the school/ classroom contexts and other influencing factors (Vazou et al., 2022), therefore it becomes vital to understand teachers' perspectives as they are the link between schools, pedagogy, pupils, and physical activity in their classrooms.

Interventions do not necessarily empower teachers to use classroom-based PA in their teaching which facilitates the lack of sustainability of such temporary programmes once the institutional resources provided by e.g. the research funding or researchers (equipment, lesson plans, training, etc.) are no longer available or present (Vazou et al., 2020). In order to ensure sustainability of classroom-based PA as pedagogical approaches widely used in teaching, more focus should be given to teachers' intrapersonal characteristics, i.e., on what influences them to effectively implement it in their practice, e.g., self-efficacy, perceived competence, attitudes, as well as to their perceptions on the support available to them. Therefore, this study moves away from reviewing the effects and impacts of classroom-based PA programmes on academic-related outcomes and physical activity levels of students towards focusing on the issues, challenges and factors underlying successful implementation of such approaches from a teachers' perspective. It seems that there is a significant gap in the literature and as part of these intervention-based studies on understanding teachers' knowledge about physical activity, their attitudes, as well as the training needs or opportunities for them to prepare and deliver

classroom-based PA (Papadopoulos et al., 2022). In order to achieve long-term sustainability of classroom-based PA approaches, it would be reasonable to expect studies on teachers' beliefs about and intentions to implement such approaches. For this, it is important to understand the conditions in which teachers are expected to implement changes and their intentions and behaviours towards integrating classroom-based PA.

2.4 Adopting classroom-based PA in teaching as planned behaviour

Societal, cultural, structural, value-based, economic changes and technological developments require constant response from the field of education. Teachers need to continuously adapt to these changes or make modification to the teaching and learning environments in education. The response from teachers is guided by their intentions. That is, actions are controlled by intentions, however not all intentions are carried out and some of them are adapted or modified to fit the changing circumstances (Ajzen, 1985).

The Theory of Planned Behaviour (Ajzen, 1985) has been used widely in studying teachers' behavioural intentions, although to a lesser extent to explore their actual behaviours (Kupers et al., 2023). Nevertheless, in order to achieve pro-active planning for integrating classroom-based PA into lessons and teaching, the behavioural intentions of teachers need to be understood. As teachers need to consciously plan and prepare their lessons with classroom-based PA integrated, various challenges might be posed depending on context. To better understand where variations between teachers' behavioural intentions towards classroom-based PA arise from, it is important to explore the key aspects that either facilitate or hinder teachers in their actions of implementing classroom-based PA approaches into their teaching.

The Theory of Planned Behaviour has been extensively used in the sport and physical activity domains. For instance, previous studies, by using the Theory of Planned Behaviour, have extensively explored and predicted children's physical activity behaviours (Gray and Evans, 2024; Wang and Wang, 2015), and pupils' physical activity intentions during breaks between school lessons, and leisure-times (Pasi et al., 2021). On the other hand, the theory is less widely used in the field of education or among teaching staff, however, there is research which has focused specifically on teachers' intentions to use various pedagogical approaches and practices. In recent times, the Theory of Planned Behaviour has been used to guide studies most commonly on teachers' intention to integrate technology into teaching and learning (Hou et al.,

2022; Teo et al., 2016; Zhan et al., 2024) and to analyse inclusive education and inclusive practices from the viewpoint of teachers' perceptions and intentions (Hellmich et al., 2019; Kupers et al., 2023; MacFarlane and Woolfson, 2013; Opoku et al., 2021; Yan and Sin, 2013). The results of these studies show that the Theory of Planned Behaviour is an applicable psychological theory to explain teaching staff's behavioural intentions in educational contexts.

Ajzen (1991) believes that one's behaviour reflects the influence of different factors unique to that person's specific context, including occasion, situation, and action being observed. However, attitudes and personality traits further influence some of the factors that can be linked to the behaviour in question. Previous studies using the Theory of Planned Behaviour show that teachers' intentions can be significantly influenced by their attitude and perceived behavioural control even in unique and specific contexts, e.g., implementing museum visits in early childhood education (Wu, 2024), prioritising their goals for instruction (Voet and De Wever, 2020) or even in adopting competency-based approach to instruction (Lenski et al., 2019). This is because the theory is designed to predict and explain human behaviour in specific contexts and provide a framework for the nature of behaviour-specific factors (Ajzen, 1991). Hence, the theory provides a framework for identifying the different factors that influence teachers' intentions to implement classroom-based PA in their teaching. Further, it enables a space for recognising teachers' specific contexts in which their intentions are being observed. By utilising a Theory of Planned Behaviour approach for analysing data on teachers' perceptions regarding classroom-based PA, their beliefs and attitudes can further be discovered and linked to their intentions and actions of adopting such pedagogical methods in their teaching. According to the Theory of Planned Behaviour framework, teachers' change in their practice, introducing classroom-based PA methods in their teaching can be best described from their behavioural intention, which is a function of the three predictor variables of the theory.

A central factor in the Theory of Planned Behaviour is a teacher's intention to perform a specific behaviour, i.e., intention to implement classroom-based PA approaches in their teaching. In this sense, intentions apprehend the motivational factors that influence the teacher's behaviour, indicating the extent to which a teacher is willing to try to utilise classroom-based PA as a pedagogical method and representing the amount of effort that they are planning to make to do so. Generally, a stronger intention implies a higher likelihood to perform the behaviour (Ajzen, 1991), i.e., the stronger intentions a teacher has to integrate physical activity in their classroom, the more likely they will do it so.

Nevertheless, teachers' action take place within a set of pre-existing structures (e.g., education system, policy intentions, extent of decision-making power) and cultures (e.g., school ethos, societal views of physical activity) which can influence the way teachers understand their position (Pantic, 2015) in performing the behaviour. Structures and cultures, thus, either foster or hinder teachers' intention to the behaviour over time. Implementation of classroom-based PA, thus, depends also on other, non-motivational factors as accessibility and availableness of requisite opportunities and resources (e.g., time, financial resources, skills and knowledge, teacher collaboration, support from others, etc.). These factors represent aspects impacting on teachers' behaviour to an extent that may impede or facilitate the success of it (Ajzen, 1991).

Contexts and influential factors of teaching staff are unique to each behaviour in question. E.g., the same teacher in the same school may have completely different intentions towards adopting technology-based teaching and learning and towards physical activity-based teaching and learning. Thus, factors need to be assessed specifically for a behaviour in question, that is, factors that influence the implementation or adoption of classroom-based PA approaches. In order for the Theory of Planned Behaviour to be expanded with other relevant variables important in the context of the behaviour in question, it is necessary to map potential factors/ variables. This may be done by identifying factors through qualitative data before the construction of a questionnaire built on the Theory of Planned Behaviour. The identified factors that are likely to influence the behaviour then can be variables in the questionnaire. That is, salient beliefs need to be elicited in a free response format to assist the construction of items in a final Theory of Planned Behaviour -guided questionnaire (Fishbein and Ajzen, 2010).

As the Theory of Planned Behaviour can be utilised in various contexts and fields, there is not a set of variables that can be adopted, but researchers tend to construct and use an expanded model of the theory. For instance, Hou et al. (2022) added constructivist pedagogical beliefs and information and communication technology competencies as antecedent variables for the determinants of the Theory of Planned Behaviour to support their study aim explaining technology use in education among pre-service teachers. Similarly, Wu (2024) integrated the Theory of Planned Behaviour with determinants of the model of technology acceptance in orderto explain pre-service teachers' behaviour that are influenced by their use of technology. Several studies utilise the Theory of Planned Behaviour together with the Self-Determination Theory (Deci and Ryan, 2002). A theoretically integrated model of the Theory of Planned Behaviour and the Self-Determination Theory provides a ground for the relations between autonomous and controlled motivation and beliefs and intentions, e.g. towards physical activity

(Jacobs et al., 2011), among pupils towards learning artificial intelligence (Chai et al., 2023) and in identifying relevant factors in teachers' use of differentiated instruction to meet the educational needs of pupils (Kupers et al., 2023).

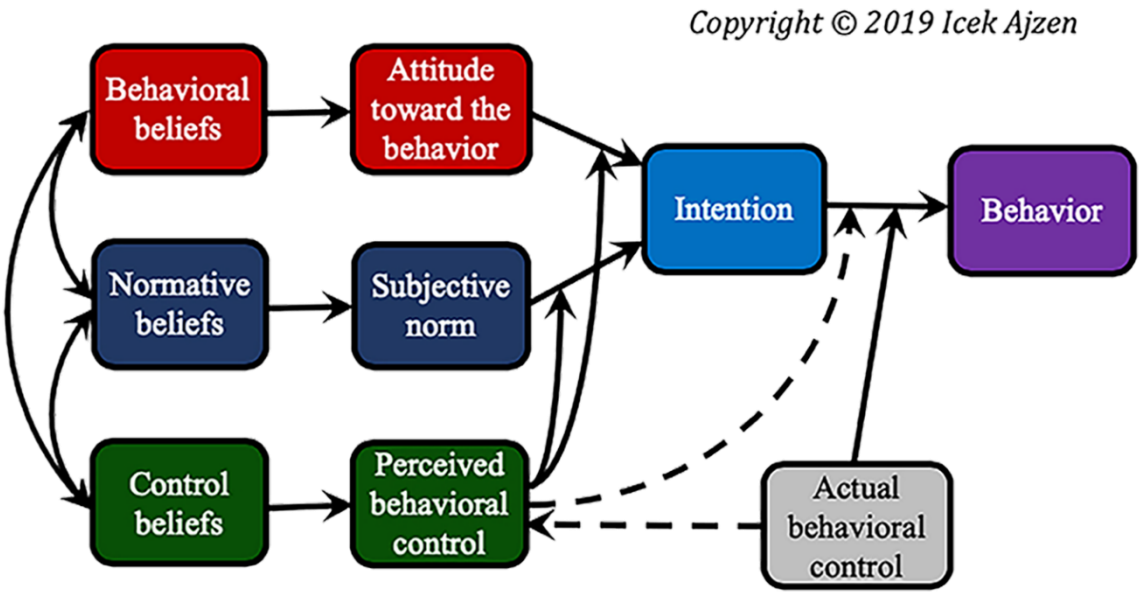

Figure 1 Theory of Planned Behaviour Diagram (Ajzen, 2019)

Figure 1 above demonstrates the relations between teachers' intentions and actions. The Theory of Planned Behaviour framework enables to examine the ways in which goals and plans guide behaviour, and the factors that influence teachers to change their intentions, or decide not to successfully execute the behaviour (Ajzen, 1985). There are three conceptually independent determinants of intentions, namely attitude which is personal in nature, subjective norm which reflects social influence and perceived behavioural control which is concerned with issues of control (Ajzen, 2005). These antecedents of behavioural intentions are composed of beliefs (behavioural beliefs, normative beliefs and control beliefs) regarding taking action towards classroom-based PA and are necessary to be determined in relation to implementing such approaches among teachers (Fishbein and Ajzen, 2010).

2.4.1 Attitude

According to the Theory of Planned Behaviour, attitude towards a behaviour is determined by accessible beliefs about the consequences of the behaviour (Ajzen, 2005). As a personal factor this implies that this attitude towards specifically the behaviour is the teacher's positive or negative evaluation of performing the behaviour of question, here the implementation and use of classroom-based PA as a pedagogical method in teaching and learning. These behavioural beliefs connect the behaviour to the outcomes, or to other attributes of performing the behaviour. The evaluation of outcomes of the behaviour then contributes to the attitude in proportion to the teacher's subjective probability that integrating classroom-based PA into teaching will produce an outcome in question, e.g., increased attentiveness among pupils. This is because attitude can be conceptualised as one's an existing tendency or inclination to respond with some extent of favourableness or unfavourableness to a psychological object (Fishbein and Ajzen, 2010), e.g., to one's perception, motivation, learning.

Attitudes are also based on direct experiences with classroom-based PA (engaged with the approach or exposed to it, e.g. as part of an intervention) and on indirect experiences (observing others utilising the approach, and listening or understanding their verbal and non-verbal communication about it), thus it can also be considered as a learnt predisposition to react either favourably or unfavourably to implementing classroom-based PA in one's teaching (Fishbein and Ajzen, 2010). That is, attitudes can be cognitive (reflecting the perceived outcomes and value of utilising classroom-based PA approaches), and affective (reflecting experiences perceived to be associated with utilising classroom-based PA approaches) (Fishbein and Ajzen, 2010). In other words, attitude develops reasonably from the beliefs and values that the teacher holds about teaching and about classroom-based PA.

2.4.2 Subjective norm

The second determinant of intention is the teacher's perception of the social environment, or social pressures placed on them to perform or not perform the behaviour in questions, i.e., to implement or to not implement classroom-based PA in their teaching. Subjective norms are the teacher's beliefs that specific individuals or groups (e.g., pupils, other teachers, school leaders, parents, policy makers, etc.) think they should or should not implement or use classroom-based PA in their teaching. These beliefs underlying the subjective norms can be referred to as

normative beliefs. According to Ajzen (1985) motivation to comply with what others think influences teachers in performing or avoid performing the behaviour. Additionally, this determinant can also include norms based on perceptions of what others do, not only what they think (Ajzen and Fishbein, 2005).

Af Ursin (2016) discusses critiques of the determinant as it may exert influence indirectly via attitudes, however it may not directly affect a person's intentions to perform the given behaviour. For instance, Hou et al. (2022) found that subjective norm influences attitude and perceived behavioural control of pre-service teachers differently across pupils' grade levels, i.e. influencing intentions indirectly via influencing attitudes instead. Nevertheless, as subjective norm in this case is determined by how much a teacher believes that others want them to implement classroom-based PA, it certainly demonstrates connection between teachers' approaches towards and engagement with physical activity in their classrooms and aspects of social norms in which the teacher socialised (including the wider education system, societal and cultural perspectives on education, pedagogical approaches, and teaching, as well as views on physical activity and physical activity in the classroom). That is, teachers remain to face normative expectations from relevant others, which beliefs represent their worlds, regardless of correct or incorrect information on which these beliefs are built on, therefore determining teachers' behaviour to some extent (Ajzen, 1985).

2.4.3 Perceived behavioural control

Despite one's beliefs and stated intentions to engage in a behaviour, performing it is not fully under the person's voluntary control (or extent of choice), thus Ajzen (1985) introduces the concept of perceived behavioural control which refers to control beliefs. That is, beliefs of a person regarding the behaviour being under their control. Fishbein and Ajzen (2010) conceptualise perceived behavioural control as the degree to which people believe that they are capable of exerting or have control over performing the behaviour in question. This can include both internal and external items facilitating or hindering e.g., the implementation of classroom-based PA. These items might be resources and opportunities available to teachers which can, to some extent, determine the likelihood of delivering physical activity in the classroom (Ajzen, 1991).

Perceived behavioural control includes teachers' perception of the easy or difficulty of implementing classroom- based PA, as well as confidence in their abilities to implement it or to overcome the barriers hindering facilitation (internal items). Items such as available resources can stand as external factors (facilitators or barriers), making it easier or more difficult to implement classroom-based PA for teachers. Ajzen (1991) states that perceived behaviour control is not always realistic when teachers have relatively little information about classroom-based PA methods or teaching through physical activity, when requirements (e.g., national curriculum, policies) or available resources (e.g. time, financial resources, human resource, space) have changed, or when new and unfamiliar segments are introduced into the situation/ context. Hence, perceived behavioural control may be understood as a multidimensional construct, including two separate however related components, sometimes referred to as self-efficacy (confidence in performing the behaviour) and controllability (beliefs about one's role in performing the behaviour) (af Ursin, 2016).

2.4.4 The Theory of Planned Behaviour as guiding framework for understanding teachers' perceptions and intentions for adopting classroom-based PA

Literature shows that studies on classroom-based PA adopt theoretical support, for instance the ecological model, social cognitive theory and behaviour change theory (Peiris et al., 2022). An ecological model of behaviour change may emphasise intrapersonal aspects as key elements in influencing change in teachers' behaviour (Vazou et al., 2020). This demonstrates that teachers' perceptions and control of their behaviour in implementing and delivering classroom-based PA (or participating their class in such interventions) is an acknowledged aspect in determining the success or failure of these physical activity programmes. However, exploring teachers' intention to implement physical activity approaches in the classroom might still not be the primary focus of most intervention-based studies. Although the Theory of Planned Behaviour rather than serving as a theory of behaviour change is a framework to understand, explain and predict behaviour (Ajzen, 2015), it also provides insights into teachers' beliefs and perceptions whilst also enables the exploration of their cultural and structural surroundings and relationships that shape their ecologies within which they work, thereby shaping their intentions. Previously, the Theory of Planned Behaviour enabled the examination of teachers' beliefs and behaviours about and towards pupils with social, emotional and behavioural difficulties (MacFarlane and Woolfson, 2013). And whilst not a behaviour change theory,

intervention in the form of, for example, training session can influence beliefs, thereby impacting on intentions and behaviour.

According to Ajzen (1991) the more positive one's attitudes and subjective norm regarding the behaviour with strong perceptions of behavioural control, the more likely an individual demonstrates intention to perform the behaviour under consideration. Based on this general rule of the Theory of Planned Behaviour, teachers can be expected to implement classroom-based PA in their teaching when the following conditions are fulfilled:

a) They have a positive attitude towards physical activity and towards the idea of physical activity in the classroom. This attitude further includes the perceived outcomes of the approach, whether it is the evaluation of their own performance delivering physical activities in the classroom or its consequences for the pupils.

b) There is a sense of social pressure to deliver physical activities in their classroom. This includes if teachers believe that others (e.g., pupils, parents, other school staff) perceives classroom-based PA as a good method (injunctive norm), or if they are inspired or guided by the actions of others (e.g., other teachers implementing the approach or being guided by school management, head teacher; descriptive norm).

c) They perceive their capacity to implement classroom-based PA. That is, teachers are provided with necessary resources, opportunities, and knowledge, as well as perceive their own skills and capability to be adequate to deliver physical activities in their classrooms and/ or overcome barriers in adopting such approaches.

The Theory of Planned Behaviour is generally used to measure items on attitude, subjective norm, and perceived behavioural control in order to predict a single behaviour or the intention to perform that behaviour (Fishbein and Ajzen, 2010). However, through questionnaires developed in the context of the theory, it could serve as a useful guiding tool for exploring teachers' intentions in existing studies on their perceptions, experiences, opportunities and capabilities to incorporate physical activity in their regular classroom teaching. This is particularly important if the goal is to achieve long-term sustainability of classroom-based PA. In this regard, the focus needs to shift from how teachers implement such physical activity interventions often designed and led by researchers, but attempts should be made to consider how teachers' beliefs, identities, and knowledge influence their actions in achieving change in ways of learning by the integration of physical activity in the classroom. Furthermore, social

influences and available, culturally, socially developed resources that impacts on teachers' capability should also be explored (Lasky, 2005). That is, if teachers' goal and interest is to use classroom-based PA as new way of learning, research should look into how teachers understand their position in utilising such approach, how they exercise their abilities, skills and personalities to implement physical activity practices in their teaching, and what are the conditions and contexts in their perspective that can hinder or facilitate their attempts to introduce classroom-based PA as a new way in learning and contributing to pupils' health.

Many factors can be identified to influence the steadiness of behavioural intentions. Exploration and analysis of the factors that influence behavioural intentions may showcase the ways and means by which it can be possible to avoid changes in intentions or modify predictions to take expected rearrangements into account (Ajzen, 1985). At present, it is believed that there is literature which focus on factors that hinder or facilitate teachers in utilising classroom-based PA methods in their teaching, however the examination of how these factors influencing teachers in their intentions or predict their behaviour of implementing these approaches would be minimal.

Interventions might serve well as temporary solutions for familiarising teachers with the approach of classroom-based PA and provide them opportunities to engage with its methods, however these might not increase teachers' intention to continue the use of it (Vazou et al., 2020). According to the Theory of Planned Behaviour, teachers might hold positive beliefs about or value physical activity positively in the classroom, however without perceiving their own control over the implementation or inhibiting factors, they may not form strong intentions to implement it. Thus, there is a need to discover teachers' beliefs about and perceptions of classroom-based PA in connection to their intention to implement such approaches or continue utilising them, and to understand the conditions in which teachers are expected to integrate physical activity in their teaching. As a framework for understanding, explaining and predicting teachers' behaviour rather than trying to achieve a change in their behaviour (Ajzen, 2015), the Theory of Planned Behaviour enables the discovery of beliefs and factors that influence teachers in implementing and adopting classroom-based PA. Attitudes towards physical activity and classroom-based PA as a pedagogical method in combination with subjective norm and perceived behavioural control lead to the formation of their intentions to utilise such method or not (Ajzen, 2012).

3 Methodology

3.1 Purpose of the study

The purpose of this study is to critically analyse and evaluate current literature on teachers' perspectives, beliefs and attitudes towards physical activity and examine existing academic studies on the implementation of classroom-based PA from teachers' perspective, and to evaluate the viability of such pedagogical approaches and teachers' role in maintaining them over time. By drawing on the Theory of Planned Behaviour (Ajzen, 1985), the study will be able to explore the factors that constraints or support teachers in their intentions to adopt classroom-based PA approaches. That is, the current study utilises a Theory of Planned Behaviour perspective to guide the identification and analysis of teachers' perceptions regarding the adoption of classroom-based PA. The aim of this master's thesis is to increase our understanding of the factors that influence teachers' behavioural intentions for implementing and adopting such methods in teaching. Furthermore, to elaborate on how those factors (behavioural beliefs and attitude, normative beliefs and subjective norm, control beliefs and perceived behavioural control) influence or predict teaching staff's use of classroom-based PA methods. That is, the Theory of Planned Behaviour is used to guide the review of literature and to assist in analysing findings in relation to teachers' experiences, perceptions, and intentions. More specifically, an effort is made to answer the following research questions.

(1) Can a content analysis of perceptions and beliefs be supported and categorised by the determinants of the Theory of Planned Behaviour? (2) What teaching staff's perceptions and intentions on classroom-based PA show us about the implementation of such pedagogical approaches?

Through thematic synthesis of existing qualitative empirical studies, the study will be able to elaborate on and engage in discussion on the above-mentioned research questions. It is important to explore current research and methods used in order to be able to assess and explain the sustainability of adopting classroom-based PA. The viability of classroom-based PA in the long-term depends on teaching staff's practices, thus classroom-based PA need to be explored from their perspective. By reviewing the literature and engaging in contextual and methodological analysis of previous research, the current study will be able to highlight implications for the future and implications for the sustainability and viability of classroom-based PA as a pedagogical approach.

3.2 Research design

Synthesis of knowledge through literature reviews is necessary to keep up with an exponentially growing numbers of publications in any discipline (Paré and Kitsiou, 2017). Such research design is indispensable for identifying what has been done on a subject or topic; identifying interpretable trends or patterns; combining empirical findings in relation to support evidence-based practice; and for recognising topics or questions that require more research or investigation (Paré et al., 2015). There are various types of literature reviews which can be used to address various kinds of research questions or aims, thereby defining and dictating the methods and approaches that were used is important to achieve the objectives of the current study. Chapter 2 has already focused on providing a narrative review of the current states of physical education and physical activity, however by utilising systematic review as research design for this study, a transparent process for searching and finding, identifying, analysing and evaluating empirical evidence on teachers' perceptions of classroom-based PA could be employed (Borenstein et al., 2009).

Systematic review of the academic literature facilitates the synthesis of existing knowledge generated through empirical research which may be used to assist policy and decision-making and/ or to discover new patterns or trends (Grant and Booth, 2009). Furthermore, systematic review as the research design enabled an attempt to be made to accumulate empirical evidence that suits the pre-specified eligibility criteria (Chandler et al., 2017) in order to answer whether current perceptions and beliefs of teachers on classroom-based PA could be elicited and categorised under the Theory of Planned Behaviour framework, to explain and identify factors which influences teachers' behavioural intentions towards classroom-based PA and to gain an insight into how existing literature discovers the implementation intentions of teachers.

Qualitative research can provide imaginative and multi-disciplinary perspectives describing humans as beings rather than focusing on them as variables (Silk et al., 2005). Therefore, embracing an interpretive paradigm in the current study promoted a recognition of the complexity of the social world and teachers' ecologies, and the meanings that teachers attribute in their everyday teaching practice and life. A qualitative approach allows an exploration of teachers' individual experiences and beliefs instead of forming explanations in a reductionist

way (Henwood and Pidgeon, 2003). Thus, qualitative synthesis as a form of systematic review of the literature deemed to be an appropriate design for this research.

Synthesis of qualitative literature produces new insights from a collection of findings from individual qualitative research by using an interpretive approach and translating results from these studies into thematic descriptions, comprehensive affirmations, conditions, or connections (Ludvigsen et al., 2016). Additionally, qualitative synthesis gathers understanding from a wide range of primary qualitative research which could assist educators and drive force for evidence-based practices (Maeda et al., 2022). On the other hand, Pope et al. (2007) express critiques of qualitative synthesis claiming that results of qualitative studies cannot be generalised beyond the studied phenomena. In contrast, Finfgeld-Connett (2010) emphasises that these findings are nonetheless transferable to a conceptual understanding or theory. Therefore, utilising qualitative synthesis was pertinent for this study and contributed greatly to the aims to aggregate findings of qualitative empirical studies under the Theory of Planned Behaviour framework.

Although the study was being guided by the Theory of Planned Behaviour and its pre-identified determinants (attitudes, subjective norm, perceived behavioural control), the framework also allowed the emergence of further themes. Qualitative synthesis cohered with the objectives of the study, whilst thematic synthesis as a subtype of qualitative synthesis could provide further flexibility for the emergence of themes. Thematic synthesis (Thomas and Harden, 2008) adopts techniques from thematic analysis (Braun and Clarke, 2006) to integrate the findings of primary studies and to identify prominent and recurrent themes in the relevant literature (Maeda et al., 2022). Thematic synthesis was believed to be the most appropriate design for the study's purposes.

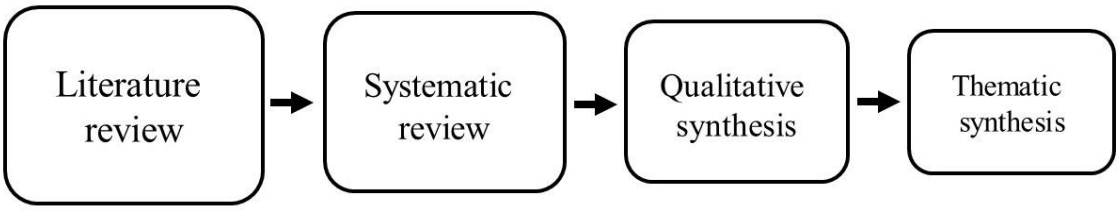

Figure 2 Summary of the research design.

3.3 Procedure

Upon thorough investigation of existing literature regarding the current opportunities for physical activity at schools for children, it was possible to identify gaps and shortcomings in related research. This investigation of literature enabled to present a comprehensive background knowledge and thereby justify the need for understanding teachers' current perceptions and beliefs on classroom-based PA and their roles in promoting healthy lifestyles of children through integrating physical activity into teaching. Discussion of background elements provided an opportunity to explore a research problem and narrow down the focus of this study. Reviewing the background further supported the acquisition of a good working knowledge of the proposed topic, classroom-based PA, and assisted illuminating avenues of study (Luft et al., 2022). Moreover, such review of existing studies on children's physical activity in overall in the school context enabled not only the establishment of the current study's objectives and research questions, but further promoted the development of a Boolean search string used for this systematic literature review. That is, exploring the literature assisted the identification of appropriate methodology, design of the study, article samples and sampling methods, as well as methods of measuring concepts and analysing data.

Keywords for finding sample for this study were combined with Boolean operators. A search string was developed specifically in a way to reflect the diverse conceptualisation of PA in teaching and learning (e.g., physically active learning, movement integration, activity breaks, etc.), as well as to reflect adequately on issues highlighted in the literature. For instance, it has been emphasised that children's early experiences of physical activity provide the basis for the development of lifelong physical activity habits (Agans and Budziszewski, 2021), therefore attention in the present review was specifically given to studies conducted in the context of primary (or elementary in American English) rather than secondary schools so that the teaching staff was involved with younger children. The following search string was used:

(‘’teachers’’ OR ‘’educators’’ OR ‘’stakeholders’’ OR ‘’staff’’) AND (‘’attitudes’’ OR ‘’beliefs’’ OR ‘’perceptions’’ OR ‘’experience’’ OR ‘’implementation’’ OR ‘’delivery’’ OR ‘’opinions’’ OR ‘’thoughts’’ OR ‘’motivation’’ OR ‘’facilitators’’ OR ‘’barriers’’ OR ‘’enabler’’ OR ‘’application’’) AND (‘’classroom-based physical activity’’ OR ‘’physically active learning’’ OR ‘’movement integration’’ OR "PAL" OR ‘’classroom* physical activity breaks’’ OR ‘’class physical activity’’ OR ‘’classroom breaks’’ OR ‘’classroom exercise’’) AND (primary school* OR "elementary school*)

As it can be seen above in the complete string, keywords of different groups were focused on covering any type of teaching staff at schools (whether they are teachers, subject teachers, headteachers, teaching assistants, etc.), and on action words which were believed to relate to and cover the items of Theory of Planned Behaviour (e.g., words related to expressing beliefs or thoughts, control variables, and encounters with the approach). Overall, the use of the Boolean search string promoted the identification of relevant studies to be included in the present systematic review.

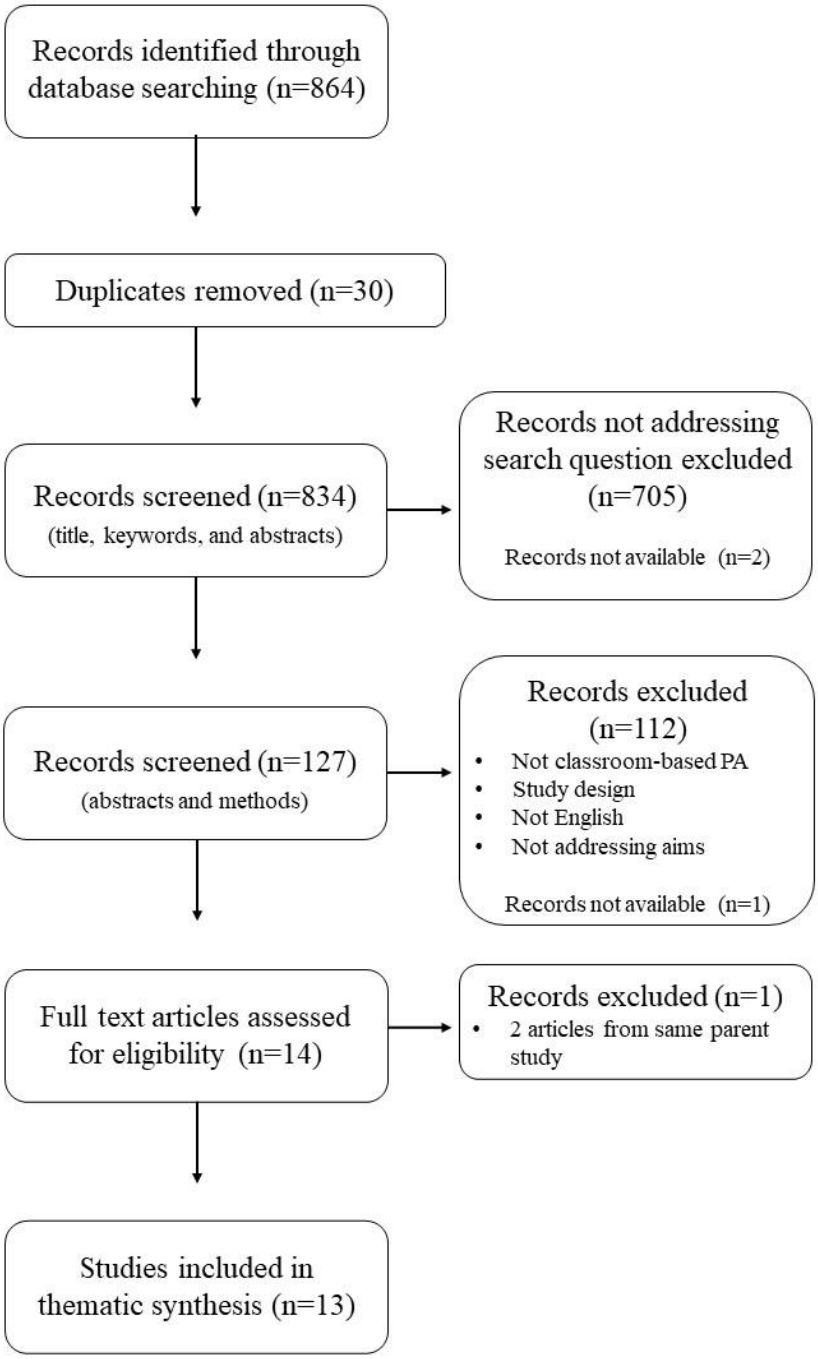

Figure 3 PRISMA flow diagram depicting the inclusion of studies in the review.

Relevant studies were searched in and obtained from a total of 456 databases available in the university's library search, Volter database. Examples of some of the search engines include but not limited to Wiley Online Library, Taylor & Francis Online, Ebsco, ProQuest, SAGE Journals. Articles were screened based – in addition to the Boolean search string- on pre-set inclusion and exclusion criteria. Some criteria were specified regardless of the theme or topic of this study as follows:

1) articles in peer-reviewed academic journals,
2) published within a time span between 2019 and (February) 2024,
3) written in English language.

This filter was used to ensure that the literature search comprised quality research, especially in reputable journals where validity, significance and originality of the studies are determined and quality of manuscripts are reviewed and improved before publication (Kelly et al., 2014). Additionally, sources used for the research were required to be published in the past 5 years. Firstly, this is due to the quick changes and rapid developments in the field of education with the growing acquisition of new knowledge and risk of obsolete information. Secondly, considering the relatively recent wide-spreading of classroom-based PA approaches.

The first search using the Boolean search string and the general inclusion criteria resulted in 864 records to be identified through the Volter database. No additional records were identified through other studies' reference lists or databases. The search involved an objective selection process of the studies (Figure 3). After removing 30 duplicates, 834 articles were eligible for their title to be screened. The first round of screening was executed in February 2024. Articles at this stage were eligible for a second-round screening if they were qualitative studies and deemed relevant to the aims and purposes of this study. 705 articles were excluded in the first-round screening based on assessment of their titles, keywords, and abstracts (only where relevance remained tentative after assessing the former two elements). Articles were excluded in the screening process if:

- the language was not English,
- focused exclusively on physical education, physical education classes and lessons, physical education teaching, etc.,

- focused on the effects (e.g., health benefits, outcomes for students) of classroom-based PA, mainly intervention studies,
- focused exclusively on secondary schools,
- the title clearly did not indicate a match with the overall and general themes of classroom-based PA,
- the title clearly did not indicate research involving the perspectives or views of teaching staff (e.g., only of students).

Despite the exclusion criteria above, articles at this stage were still accepted for second screening if they mentioned physical education in addition classroom-based PA; if the context included both primary and secondary school; if the theme was related to school-based physical activity; if perspectives and views followed a multistakeholder approach and clearly included teaching staff. The second round of screening was performed in March 2024. 129 articles were identified to be eligible for their abstracts and methodology section (only where applicability remained tentative after assessing the abstract) to be assessed. Records were excluded if:

- only the title and abstract were available in English, but not a full text,
- they were not qualitative empirical studies,
- perceptions did not relate to using classroom-based PA approaches in teaching,
- focus was not on teaching staff together with classroom-based PA approaches.

Altogether 112 articles were excluded, and further 2 articles could not be retrieved anymore from the Volter database. Despite the reasons for exclusion above, records were included if they utilised mixed-method approach and qualitative data was not used as intervention fidelity. Exclusion criteria of perceptions not relating to the integration of classroom-based PA refers to e.g., studies in which teachers' perceptions relate exclusively on testing out a specific classroom-based product/ tool or toolkit, and studies in which perceptions are exclusively focused on students' responses to classroom-based PA. The last, third round of screening occurred in April 2024. 1 record could not be retrieved anymore from the university's library, Volter database. Hence, 14 full texts were assessed for eligibility. One article was excluded from the review. Although the text paid little attention to classroom-based PA, its major focus was on school-based physical activity approaches in general. Additionally, the data in this

excluded study was utilised from a parent study. Another article, focusing more specifically on classroom-based PA from the same parent study was selected and included in this review.

Once the number of studies were reduced and relevant articles identified, research quality of the selected eligible articles were appraised. Although there are no universally accepted methods for evaluating the theoretical, methodological and/ or analytical components of articles within the synthesis of qualitative evidence, by engaging in some sort of quality appraisal processes, drawing on unreliable and misleading conclusions and recommendations were potentially avoided (Thomas and Harden, 2008). At this stage, the sample for the review was finalised and its analysis could begin by thematically synthesising the findings.

3.4 Data analysis

Thematic analysis is often used in qualitative research to analyse data as it is an effective way to examine perspectives, emphasising similarities and differences, and generating unanticipated insights (King, 2004). Thematic synthesis as a type of thematic analysis allowed the collection and integration of the findings of the 13 qualitative studies included in this current systematic review. Thomas and Harden (2008) present the three stages of thematic synthesis as the free line-by-line coding of the findings of included articles, the development of ´´descriptive themes´´ by organising those free line-by-line codes and generating analytical themes. These three stages were followed to synthesise and analyse data.

Firstly, results and findings and discussion parts of all articles were read and re-read with initial free codes in mind, then verbatim findings of the studies were entered into an online database and colour coded under the three independent determinants of the Theory of Planned Behaviour framework. Secondly, codes were organised and categorised into descriptive themes to identify patterns. Similarities and differences were searched for between the codes, and new codes were identified to assist the grouping of initial codes. These new codes opened up the determinants of the Theory of Planned Behaviour, introducing descriptive themes and organising findings under these themes. After generating these ‘free’ or initial codes and organising them under descriptive themes, analytical themes could be identified. By this point the findings of each study were combined into a whole via listing of themes which described teachers’ different attitudes, subjective norm and perceived behavioural control regarding classroom-based PA. According to Thomas and Harden (2008), in this last stage of thematic synthesis, additional

concepts, understanding or hypotheses are needed to be generated beyond the findings of the included articles. In this study, the step of going beyond the content of the primary studies was guided by the Theory of Planned Behaviour framework. The determinants of the framework could be used already to organise initial codes and enabled the emergence of new, descriptive notions. These notions were used to form 'families of codes' (Bryman and Burgess, 1994), i.e., to pre-identify domains supported by the Theory of Planned Behaviour literature. Further coding enabled the identification of reoccurring themes across the reviewed articles.

The content analysis of the reviewed articles included the analysis of the studies' results, findings and discussion of their findings. Analysis of the data and coding began with identifying instances of occurrence of the framework's determinants within the article texts. Findings of the studies were broken down into 1-2 sentence parts and analysed and coded for more specific themes. This enabled the identification of incidences from teaching staff's practice and beliefs. Codes were generated for various incidences, e.g., utilisation of effective strategies, managing classroom-based PA effectively, laying down rules. The conceptions were then reevaluated to fit the determinants of the theoretical framework and pre-identified domains. Nonetheless, not all of the codes were identified to be themes later, but enabled the identification of themes, e.g., planning (which can include planning for using classroom management strategies, ways to manage pupils in the classroom whilst doing physical activity, and communicating the activities and rules clearly to pupils). That is, by thorough analysis and several revisitations of the data and codes, more abstract or analytical themes were generated until all themes were adequately abstract to explain and describe the beliefs, perceptions of teachers and their perceived barriers and facilitators regarding the use of classroom-based PA approaches. This resulted in the identification of the 27 final themes that explain and describe beliefs and perceptions of teaching staff about and on classroom-based PA. The Theory of Planned Behaviour framework assisted in describing and explaining teachers' experiences with or views on classroom-based PA from a perspective which indicates their own intentions of implementing it or adopting it in their classroom. That is, themes and concepts from the original studies were translated into the purposes and topic of this study and considered in defining implications for future research or intervention development.

3.5 Rigour: quality of the research

Ratings from the Publication Forum (JUFO, Julkaisufoorumi, 2024) – created by the Finnish scientific community - were included. JUFO as a rating and classification system aims to support the quality assessment of research output and publishers on four levels (Level 1 as basic, Level 2 as leading and Level 3 as top, as well as 0 for all other publication channels that do not meet one or several of the Level 1 criteria). By only including articles which met the Level 1 criteria (except one which was not available in the JUFO system), the present study considered the quality of research, potentially contributing to the overall quality and trustworthiness.

Quality appraisal recommendations of Garside (2014) were utilised during the data collection phase of the current study. Following to these recommendations specifically advised for qualitative synthesis, trustworthiness of the selected articles was screened through considering the suitability of their study design and its appropriate execution. It was also found to be important that the studies built on theoretical and/ or conceptual frameworks or models and whether their results and conclusions were plausibly supported by the data or not. Technical aspects were assessed based on the themes and sub-themes which the study contributed to.

Additionally, during the data analysis phase, steps from the Step-by-Step Approach were utilised. This involved a prolonged engagement with the data (e.g. reading and re-reading the articles), documenting reflective thoughts (e.g. comments on text, interpretations, questions) and thoughts about potential themes. Furthermore, data was kept well-organised in online databases (mainly in Excel sheets and tables) throughout the study, and the development and hierarchies of themes was recorded in each phase. These actions contributed to the means of establishing trustworthiness of this thematic synthesis (Nowell et al., 2017).

The synthesis of qualitative research has been criticised due to the findings being de-contextualised and that identified concepts cannot be applied to other settings (Britten et al., 2002; Pope et al., 2007), therefore it was a particular challenge for this study to ensure that transfer of data from one context to the other was valid and its transferability assessed. In accordance with Thomas and Harden (2008), this study also attempted to provide structured summaries of the studies detailing aims, methods, settings, participants in order to preserve their context as much as possible. Additionally, contextual factors or conditions under which the studies were executed were taken into consideration in the generalisability of the results of this research. The inclusion of studies conducted across diverse settings is further advised by

Britten et al. (2002) in order to achieve a higher level of generalisability or abstraction that is aimed for in qualitative synthesis. In compliance with Britten et al. (2002), diversity of settings and study characteristics were analysed in order to achieve a higher level of abstraction of the present results. It is believed that diversity in the settings of the included studies (e.g., experience of teachers with classroom-based PA, country specific policies regarding physical activity, pupils age groups or grades in which teachers taught, etc.) adds to the trustworthiness and reliability of the current research and its conclusions.

4 Findings

4.1 Study characteristics

The systematic review of articles involved the analysis of various study characteristics. Characteristics analysed include the country where the research was conducted in, background of the study, aims, mode of physical activity on which the study focused, population sample and experience with classroom-based PA, theoretical or conceptual framework used to guide the study, measures and type of research design and the type of data collected. On the next page, Table 1 shows a summary of all the studies which were identified to be eligible and relevant for the current thematic synthesis and their characteristics and diversity of settings.

Most studies were conducted in Norway (n=5), followed by the United Kingdom (n=3) and the United States of America (n=2). The remaining studies are from Denmark (n=1), Canada (n=1) and from Sri Lanka (n=1). Interestingly, in some countries, physical activity is supported by wider policy aims as described in the reviewed studies, therefore schools in Ontario, Canada [6], in Denmark [4] and in Norway [10] are required to provide some sort of daily physical activity for pupils. This may explain the higher number of studies conducted in Norway compared to the rest of the current review as the Norwegian government aims to add one hour of daily physical activity for all pupils without lengthening the school day or limiting teachers' pedagogical autonomy (Skage and Dyrstad, 2019). Nevertheless, it is possible that physical activity is also emphasised if not required in other countries' policy documents too, however in other included studies such policy aims were not mentioned.

The most common aims of the reviewed studies were to understand perceptions of teaching staff on classroom-based PA (n=5), to identify factors influencing implementation of classroom-based PA (n=5), to identify strategies that could support teachers or teaching staff in implementing classroom-based PA (n=4), to understand perceptions regarding the implementation or sustained adoption/ use of classroom-based PA (n=3), and to identify factors that are associated with maintained adoption of classroom-based PA (n=2). Some of these common aims focus on the same aspects but some are with, and some are without specifically mentioning teaching staff's perception. Furthermore, another difference between aims were the focus on sustained implementation of classroom-based PA or just implementation. Besides these common aims, studies also focused on other aspects unique to individual studies, e.g., effectiveness of practices, perceptions on participation and interaction among pupils.

Table 1 Summary of the articles included in the thematic synthesis.

	Study	Country	JUFO level	Background	Aims	PA focus	Exp./ Interv.	School grade(s)	Sample	Methods			Data
										Design	Framework/ Theoretical approach	Analysis	
1	Campbell and Lassiter (2020)	USA	N/A (The Journal of Educational Research)	Only one US state meets the national recommendations for school PE time. However, schools can contribute to increasing PA through classroom PA breaks.	1) to explore the implementation of active breaks on a realistic scale of minimal training or resources, 2) to understand teachers' perceptions on the implementation and sustained use of active breaks within typical school conditions	active breaks, non-academic	current exp. with intervention	primary, grade 1 and 5 (age 6-7, and 10-11)	8 teachers (1st and 5th grade primary)	qualitative, focus group semi-structured interviews (before any intervention, mid-intervention, at the end, 6 months after)	diffusion of innovation (DOI)	deductive; DOI as guide for coding framework	DOI theory served as a foundation for development of focus group questions, questions were developed to compel teachers to elaborate on the constructs defined by the theory without using the explicit language of the theory
2	Chorlton et al (2022)	UK	1 (BMC Public Health)	A collaborative approach by all stakeholders is needed to create a comprehensive understanding regarding the barriers and facilitators towards classroom-based movement breaks.	1) to better understand the perceptions on classroom movement breaks from a wide range of stakeholders, 2) to identify the perceived barriers and facilitators regarding the delivery, implementation and adoption of classroom movement breaks according to these stakeholders.	active breaks	regardless of exp.	primary schools KS 1-2 (ages 5-11)	interviews 5 school staff (1 KS1 teacher, 1 KS2 teacher, 1 TA, 1 assistant HT, 1 HT); (64 primary school staff from 41 schools; 20 governors; 34 pupils)	sequential, mixed method; for school staff and governors: questionnaires + semi-structured interviews (focus group interviews with pupils)	Comprehensive School Physical Activity Program in the USA as holistic framework to promote PA opportunities	semantic inductive approach, thematic analysis	covered four main areas: (1) attitudes towards school-based PA, (2) current incorporation and knowledge of classroom movement initiatives, (3) barriers and facilitators of movement implementation, and (4) potential ideas for future incorporation.
3	Dorling et al. (2021)	UK	1 (Education 3-13)	EduMove (Education through Movement) offers physically active and movement-based teaching and learning facilitating cross-curriculum delivery in schools.	1) to assess the underlying mechanisms relating to stakeholders and the effectiveness of practices demonstrated by EduMove student practitioners who design and deliver sessions	PAL(T)	exp. with intervention	not specified	5 teachers and 6 student practitioners	qualitative, semi-structured interviews	COM-B model	thematic analysis	relating to planning, delivery, implementation, integration, benefits, impact, and challenges.
4	Knudsen et al. (2021)	Denmark	2 (Scandinavian Journal of Educational Research)	PA is no longer voluntary in Danish schools. The policy states that sport, exercise and/or PA can be part of school curriculum subjects such as math, science, language subjects, etc., or part of so-called assisted learning classes.	1) to identify factors associated with teachers' sustained use of CBPA, 2) to point out usable ways to support teachers in integrating physical activity in their professional practice.	CBPA (not specified, in general)	CPBA to some extent (from daily to few times a month)	grade 1-9 (age 7-16)	9 teachers (for the interview study): 1-4 (n=2), 4-6 (n=3), 3 (n=1), 7-9 (n=3)	part of a 3 years mixed methods study, qualitative, in-depth semi-structured interviews	Scaffolding; Didactic theory (Westbury, 2000)	both deductive and inductive approach of thematic analysis (Braun and Clarke, 2006)	topics such as perception of the PA policy, perceived facilitators related to daily teaching routines, as well as implications for teaching practices in and across school-subjects reflecting the didactic framework were addressed
5	Mandelid et al (2024)	Norway	2 (Scandinavian Journal of Educational	Teachers are potential enactors of PAL. If PAL is to be sustainable in schools, further research with teachers is required.	1) to explore teachers' perceptions and experiences of PAL; 2) to explore teachers' educational values to understand how they shape their judgements about PAL	PAL	strategic partners. in HE project, exp. of using PAL	primary (age 6-16)	21 teachers (8 with 15ECTS CPD, 13 with no formal PAL educ.)	qualitative, focus group interviews	didaktikk perspective (Selandaer, 2017)	thematic analysis (Braun and Clarke, 2022)	teachers' experience with PAL, their purposes in using PAL, and the anticipated benefits and outcomes of PAL
6	Martyn et al. (2022)	Canada	1 (BMC Public Health)	In Ontario, the Daily PA policy aims to ensure all elementary school children receive a minimum of 20 min of MVPA each school day during instructional time. However, only 1/2 of teachers in Ontario were fulfilling this expectation.	1) to investigate factors influencing DPA fidelity in Ontario elementary schools, 2) provide teacher-identified recommendations to support DPA implementation	CBPA (not specified, in general)	regardlesss of exp.	primary school, grades 1-8 (age 6-14)	15 teachers	mixed-method, surveys/ questionnaires and semi-structured interviews/ focus groups	socio-ecological model; social cognitive model	interviews: thematic analysis (Maguire and Delahunt, 2017)	interviews: participants' perspectives on how implementation could be improved
7	Øien and Solheim (2019)	Norway	2 (European Physical Education Review)	Teachers have emphasized management routines and challenges; however, no studies have addressed how teachers promote the participation and interaction of active and less active students in physically active lessons.	1) to identify how teachers experience and reflect on participation and interaction with and between less active fifth-grade pupils in physically active academic lessons in the school playground	PAL and ABs (+PA homew.)	exp. of interv.	5th grade (age 10-11)	11 classroom teachers (+11 parents)	qualitative, focus group interviews	Tradition of Phenomenology; Phenomenology of Perception	analytic approach of systemic text condensation	questions (for teachers) related to challenges in the experiences of planning and carrying out PA and their experiences of the interactions among pupils and between teachers and pupils

Table 1 Summary of the articles included in the thematic synthesis (cont..)

	Study	Country	JUFO level	Background	Aims	PA focus	Exp./ Interv.	School grade(s)	Sample	Methods: Design	Methods: Framework/ Theoretical approach	Methods: Analysis	Data
8	Peiris et al. (2023)	Sri Lanka	1 (PloS One)	Of all primary school children in government schools in Sri Lanka, high levels of sedentary behaviour are most prevalent among the fifth graders. The grade five curriculum is identified as the most loaded and competitive when it is about teaching and learning.	1) to explore teachers' opportunity, capability and motivation relating to the implementation of an in-classroom PA breaks programme	active breaks, content-related	no prior exp. with interv.	5th grade (age 9-10)	21 teachers	qualitative, semi-structured interviews, topical approach (interview guide)	COM-B model (Michie et al., 2011)	deductively thematic analysis; content analysis; participant-based perspectives	current strategies to improve academic achievement, movement behaviours and health enhancement; critical aspects that a prospective IcPAB intervention needs to focus on with special reference to the mathematics and reading achievement, movement behaviours, and health outcomes; and possible challenges of implementing the prospective intervention
9	Quarmby et al. (2019)	UK	1 (Education 3-13)	PAL presents a key paradigm shift in educational practice. Yet, little is known about the barriers to implementing PAL.	1) to explore a wide range of primary school teachers' perceptions of PAL, 2) to map the barriers and identify the various and interconnected levels of influence	PAL	currently do not impl. PAL	grades 1-6 (age 5-11)	31 staff 9 schools: 3 TAs, 20 teachers, 4 PE teacher /spec./ coord., 2 AHT, 1 HT, 1 EY Lead	qualitative, semi-structured focus group interviews	socio-ecological model	thematic analysis (Braun and Clarke, 2006)	teachers 'understandings, perceived benefits and barriers to physically active lessons
10	Skage and Dyrstad (2019)	Norway	1 (BMC Public Health)	The Norwegian government aims to add one hour of daily PA for all children in school, without extending the school day or compromising teachers' pedagogical autonomy.	1) to explore headteachers' perceptions of PAL, 2) to identify factors affecting headteachers' approval or rejection of PAL implementation	PAL	regardless, offer to particip. in interv. (accept 4/29)	prim. and second.	29 headteachers (62% female, 38% male; ages 39-70); urban area schools	Quantitative, semi-structured telephone interviews	Quality Implementation Framework	Qualitative content analysis, inductive approach for coding.	On perceptions, prioritisation and response to the request to introduce PAL.
11	Skage et al. (2020)	Norway	1 (Evaluation and Program Planning)	Knowledge can contribute to improving design and implementation of PAL interventions. General PA at school is a requirement added by the Norwegian government in 2001 for health promotion.	1) to examine the continuation of PAL two years after a 10-month cluster randomised controlled PAL intervention, 2) to answer the following research questions: What were the teachers' use of PAL at two-year follow-up? What are the factors affecting continued use of PAL?	PAL, in outdoors	exp. with interv.	primary schools, 3-7 grade (age 7-12)	9 teachers (grade 3, n=1; grade 4, n=1; 6, n=1; 7, n=6) and 5 school leaders	qualitative, semi-structured interviews (follow up study 2 years after intervention)	Levels of Use approach from the Concerns Based Adoption Model (Hall and Hord, 2015)	thematic analysis (Braun and Clarke, 2006); psychological phenomenology (Moustakas, 1994)	about teachers' current use and factors affecting continued use of PAL. School leaders were asked about how the school has worked with continuation of the programme, and how they managed leadership in this matter.
12	Skage et al. (2022)	Norway	3 (Teaching and Teacher Education)	Understanding teachers' use and perceptions of PAL is essential to understanding how to expand its use to a wide range of schools and teachers. Dissemination of innovations in education are only significant if the use of the innovation is sustained over time.	1) to better understand teachers' perspectives on implementing PAL as didactic practice, with the goal of improving the design of teacher training and implementation support	PAL	exp.with PAL interv., 3 or more training seminars	primary, 1-5th grade (age 5-10)	7 teachers (grade 1, n=2; 2, n=1; 3, n=2; 4, n=1, 5, n=1)	qualitative, structured interviews at two time points	Levels of Use approach from the Concerns Based Adoption Model (Hall and Hord, 2015)	deductive and inductive, Levels of Use as framework	interviews were organised around a series of specific decision points that allowed the interviewer to decide which questions to ask. If it was determined that the interviewee was at a certain LoU, then the interviewer continued with appropriate questions for that LoU to gain more in-depth information.
13	Walker et al. (2022)	USA	1 (Evaluation and Program Planning)	Given the well-documented implementation challenges of classroom-based PA approaches, there is a need to better understand current implementation strategies that are being used in schools, and perspectives from different stakeholders' as to why they are effective.	1) to examine implementation strategies to support the delivery of classroom-based PA approaches from the perspectives of elementary school staff	CBPA (not specified, various/ any type, motorlabs, ABs)	Potentially knowledgable about PA	primary schools (age 4-11)	15 primary school staff (4 classroom teachers, 4 PE teachers, 3 assistant headteachers, 4 headteachers) from 10 schools. 15 females, 1 male.	qualitative, semi-structured interviews	-	directed content analysis and iterative categorisation approach (Naele, 2016)	about the amount of physical activity students were participating in, the types of opportunities provided, and the adoption and implementation of those physical activity opportunities; about how different job types played a role in the adoption, implementation, and maintenance of physical activity approaches

Figure 4 below shows a summary of the most common aims of the reviewed studies by the number of occurrences of aims across the included articles.

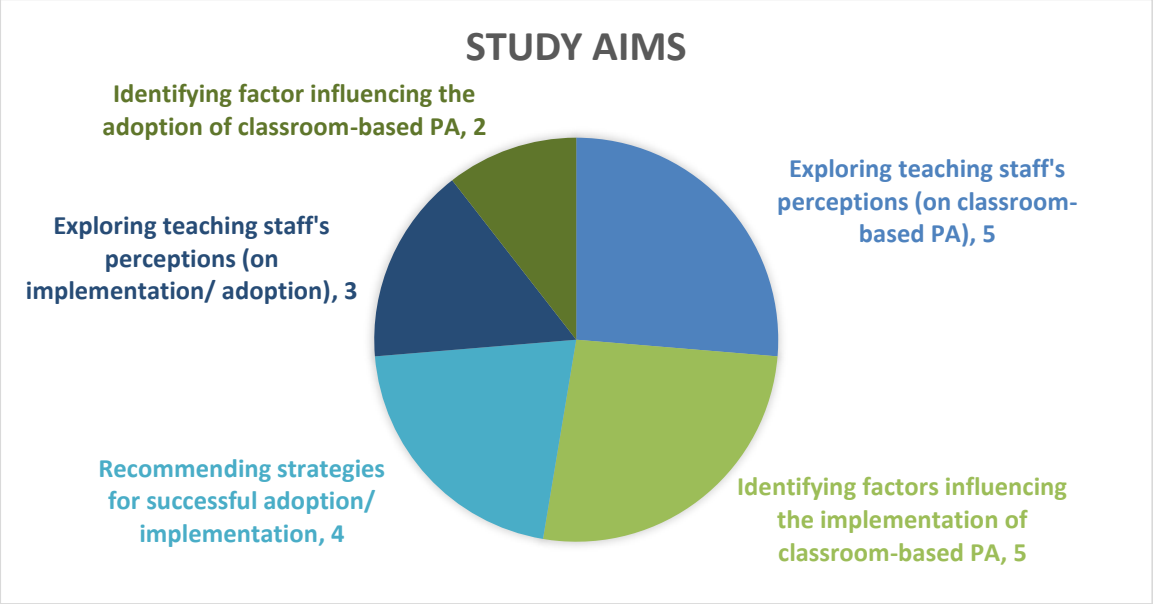

Figure 4 Most common aims of the reviewed studies (number of occurrences across all included articles)

To fulfil the above mentioned aims of the studies, articles focused on collecting data on and related to teaching staff's current understandings and knowledge of classroom-based PA (n=3), teaching staff's perceptions of or response to physical activity policy (n=2), teaching staff's perceptions of the available opportunities and school-wide approaches (n=2), teaching staff's perceptions on the impact of classroom-based PA (n=4), exploring current planning and delivery methods (n=2) and identifying strategies for future implementation of classroom-based PA as suggested by teaching staff (n=3). Last but not least, the most commonly collected information and data were related to factors (facilitator and barriers) influencing the adoption of classroom-based PA, i.e. perceived barriers and facilitators to use or adopt such approaches (n=6), as well as perceptions of teaching staff on the current implementation of classroom-based PA approaches (n=8). Figure 5 below shows the focus of data collection in the reviewed studies and the number of occurrences of the given focus across the included articles.

Most of the reviewed studies focused on physically active learning or physically active lessons (PAL, n=6). Teaching staff in 2 studies had no current involvement with physically active learning/ lessons, whilst teaching staff in the other 4 studies had experience with either using the approaches or taking part in prior interventions. Several studies focused specifically on active breaks (AB, n=3), of which one targeted non-academic approaches and one connecting

the breaks to the academic content. The third study examining active breaks did not specify whether breaks were academically integrated or not. There was one study which targeted both physically active lessons and active breaks. Other studies (n=3) referred to the approaches in general and the perception of teaching staff could involve any type of classroom-based PA.

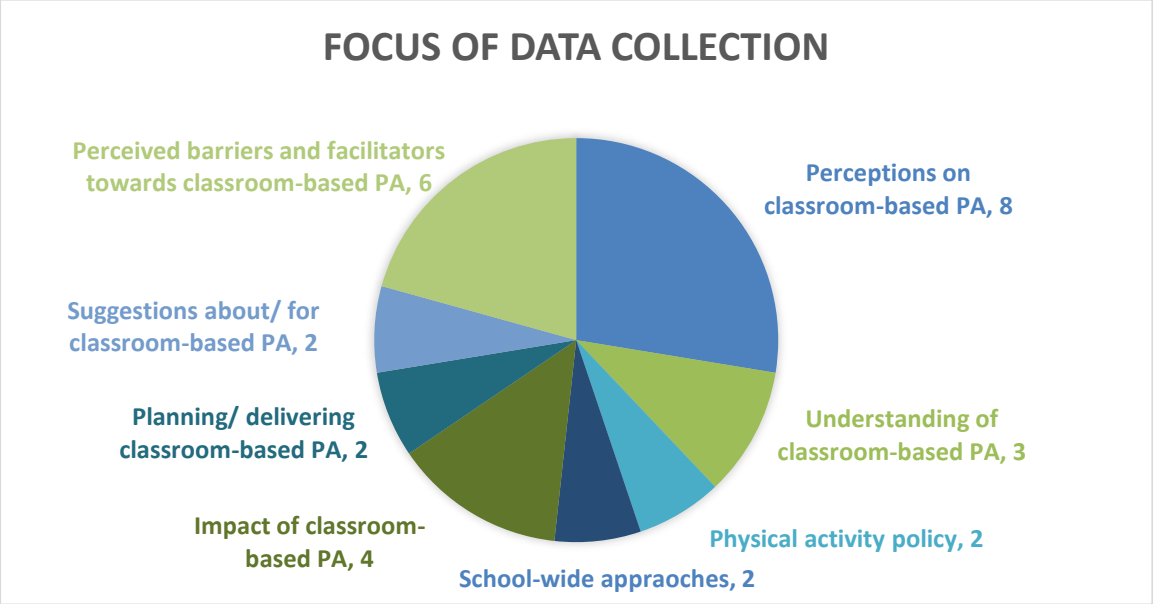

Figure 5 Focus of data collection of the reviewed studies (number of occurrences across all included studies)

Overall population sample of qualitative research with teaching staff (=197) – i.e., excluding pupils and other stakeholders - in the reviewed articles involved a wide range of roles from primary schools, including primary and classroom teachers (n=132), teaching assistants (n=4), physical education specialists/ teachers or coordinators (n=8), assistant head teachers (n=6), head teachers (n=35), school leaders (n=5), student practitioners (n=6) and lead practitioner early years (n=1). Some members of the teaching staff operated in several roles, e.g., both as a Year 5 teacher and as an assistant head teacher. In these cases, their role as a teacher were considered for this review.

Furthermore, teaching staff had different experience with classroom-based PA approaches and interventions. 72 staff members were involved in current or prior intervention programmes, therefore had experience with classroom-based PA approaches. Further 9 participants stated that they used classroom-based PA. Thus, all together 81 people (41% of total population sample) had definite experience with classroom-based PA. Additional 49 participants were recruited for the studies regardless of their experience, 15 who were potentially knowledgeable about classroom-based PA approaches and 31 who were defined as not engaged in delivering

such approaches. That is, 95 people (48%) may or may not had prior experience with or knowledge about classroom-based PA. It is uncertain how experienced in or knowledgeable about classroom-based PA were this segment of the population sample. Lastly, 21 people (11%) were identified to have no prior classroom-based PA experience.

Most of the reviewed studies included the school grades/ years that primary and classroom teachers currently taught. Figure 6 shows that out of the 132 teachers identified in the population sample, the teaching grade is unspecified in 45 cases (34%). The most taught school grade among the population sample was year 5, including 45 teachers (34%), followed by 3rd grade (n=13, i.e., 10%) and 1st and 4th grade (both n=11, i.e., 8%).

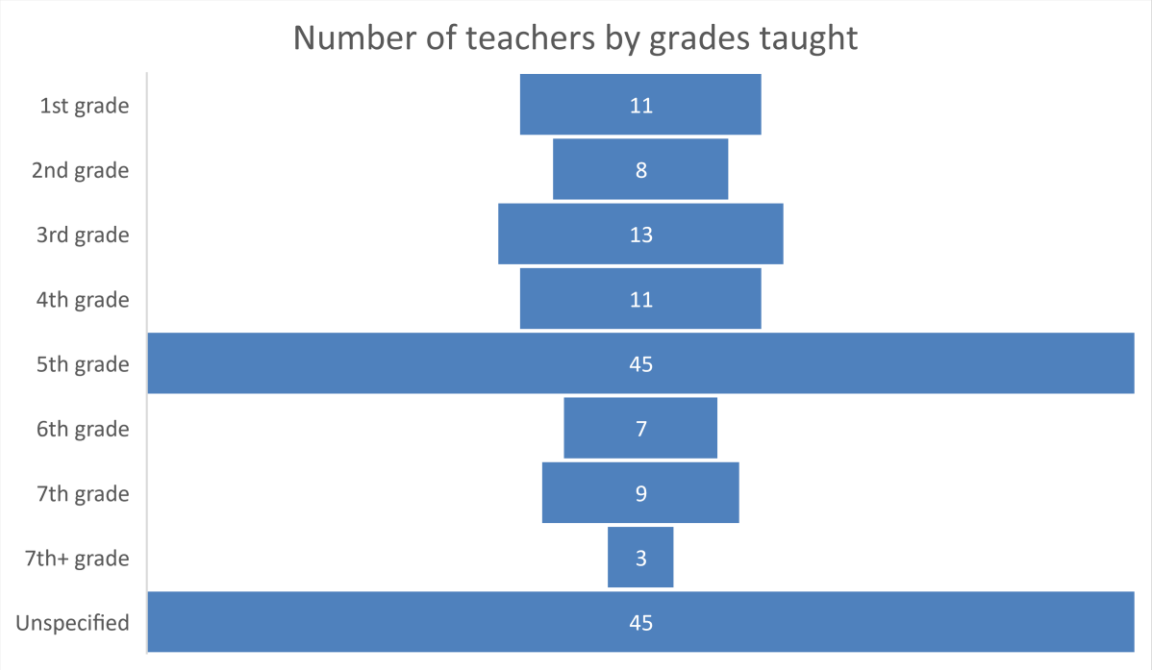

Figure 6 Number of primary/ classroom teachers based on school grades taught.

Nonetheless, as the review included studies from various countries, it should be noted that there are differences between school systems which includes the age of children in the various grades and years of studying. Figure 7 shows that based on students' age, the most teachers taught 9-10 years olds (n=30, i.e., 23%), followed by those teaching 10-11 years olds (n=24, i.e., 18%), and 7-8 years olds (n=12, i.e., 9%).

Important to mention that several primary school teachers taught in multiple years, these were added to all grades and students' ages stated (e.g., a teacher who taught year 4-6 was included in the statistics for 4th grade, 5th grade, and 6th grade as well as corresponding age groups).

Hence it is possible for the overall number of teachers grouped by school grades and students' ages to go above the number of total teachers (n=132).

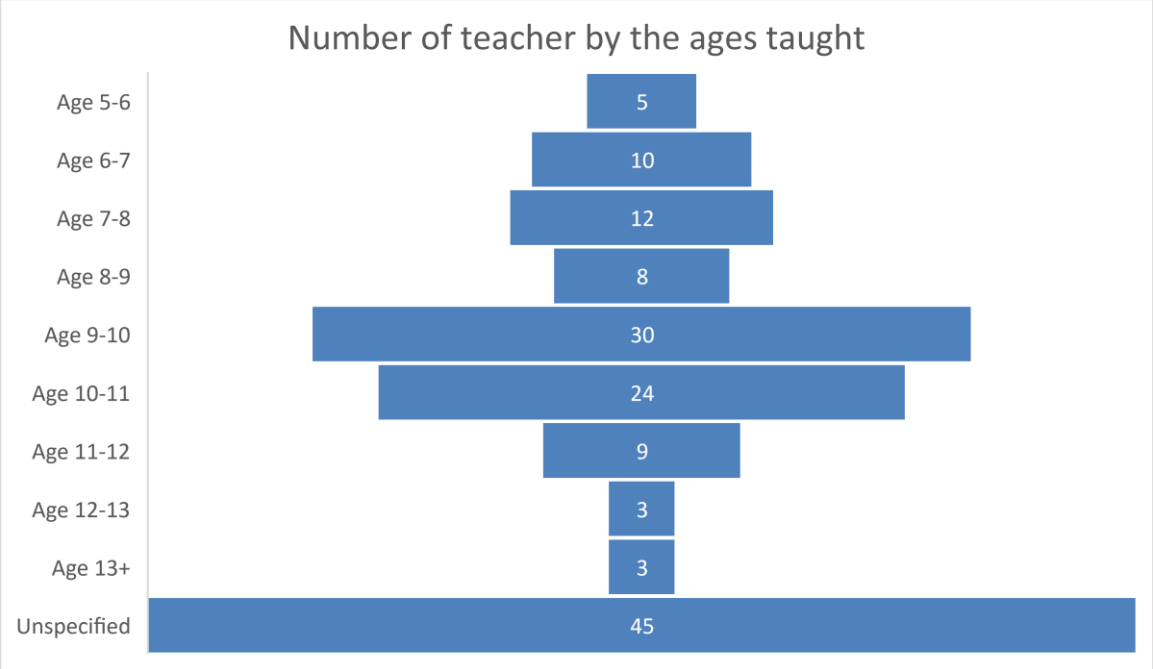

Figure 7 Number of primary/ classroom teachers based on the taught pupils' age.

There is a visible difference between the number of teachers teaching 1st graders and the number of teachers teaching 5-6 years old children. This difference highlights that children begin school at different ages in different education systems depending on country. Consideration of children's age may be more significant in the planning of classroom-based PA than actual school grades as 5 years olds are likely to have different educational, as well as movement needs than 7 years old children. Fundamental movement skills are the roots for more complex sporting and physical skills and movement combinations. It is believed that children should be competent in the fundamental movement skills by the age of 7 (Gallahue et al., 2012), therefore 1st grade teachers across education systems have different roles regarding the content and planning of classroom-based PA depending on pupils' age in the class.

Interestingly, there are considerably more teachers involved in the reviewed studies teaching in 5th grade than other school years or teaching ages 9-10 and 10-11 than other ages. Couple of studies focused exclusively [7, 8] or partially [1] on 5th grade teachers. The specific focus in study 8 on 5th grade teachers is explained by a local phenomenon, that is, high levels of sedentary behaviour being the most prevalent among 5th grader pupils in Sri Lanka (Peiris et al., 2023). Study 7 describes their interest in teachers of 5th grade pupils based on the findings

of Martin and Murtagh (2017) in which teachers expressed satisfaction with interventions targeting 5th and 6th grade pupils (Øien and Solheim, 2019). Study 1 compares the perceptions of 1st and 5th grade teachers as they represent both the lower and upper primary school grades, as well as due to the varied daily schedules in these grades (Campbell and Lassiter, 2020). Seemingly there is no correlation between the particular focus on 5th grade teachers.

Based on the framework and supporting literature, nine theoretical/ framework domains were pre-identified and modified during thematic analysis to assist pairing each theme with relevant concepts of the Theory. Such domains served as 'families of codes' during the data analysis phase (Bryman and Burgess, 1994). Domains within the attitude determinant include beliefs and values of teachers; evaluation of outcomes of teaching with physical activity; and the evaluation of the academic relevance of classroom-based PA. Domains under the subjective norm determinant are identified as social environment and norms; influential others; and reasons to comply with others and expectations. The perceived behavioural control determinant is also divided into domains of internal factors; external factors; and exerting control over utilising classroom-based PA. The overarching domains provide a comprehensive summary of teachers' perspectives on classroom-based PA, their perceived factors that hinder or facilitate the implementation of such approaches, as well as the potential influence of their social surroundings. Themes may apply to one or more domains as interconnectedness were observed.

Twenty-seven reoccurring themes from the analysis of the 13 reviewed articles were identified and aligned with the three determinants of the Theory of Planned Behaviour (attitude, subjective norm and perceived behavioural control) and the nine domains related to the framework. In other words, themes were generated and connected to the pre-identified domains deriving from the theoretical framework used to guide the present study. Table 2 provides a comprehensive demonstration of the overarching nine domains, the twenty-seven emerged themes and examples from the data that were either considered as perceived facilitators or hindrances towards teaching staff's intention to implement and adopt classroom-based PA approaches.

Table 2 Alignment of theoretical domains, themes, and subthemes deriving from the thematic analysis.

TPB	Theoret. domains	Themes	Sub-themes	Examples of the findings		Articles
				Facilitator	Hindrance	
Attitudes towards PA/ classroom-based PA/ teaching	Beliefs and values of a teacher	PA		physical activity is valued, children's physical development needs are acknowledged		1, 2, 3, 4, 5, 10, 13
		Classroom-based PA		physically active learning helps pupils, classroom-based PA is beneficial, classroom-based PA is valued	classroom-based PA is interruptive of smooth lesson delivery	1, 3, 5, 7, 8, 10, 11, 12, 13
		Teaching (methods)		classroom-based PA provides variety to the ways of teaching and learning	traditional teaching approaches provide more control in the classroom	1, 2, 3, 5, 8, 9, 11, 12
	Evaluation of outcomes of teaching with PA	Health, social, emotional, mental, behavioural		improved concentration, attentiveness, focus, children open up	overexcitement, behaviour issues during physical activities	1, 2, 3, 5, 6, 7, 9, 10, 11
		Academic self-confidence and outcomes		pupils' learning is enhanced, pupils' conceptual understanding of the academic content is improved during classroom-based PA	does not influence the learning of academically weak pupils	1, 3, 5, 10, 11, 12
		Energy		energises tired pupils, pupils can release their energy	pupils become too hyper, too energised	1, 2, 3, 12
		Student enjoyment		fun, enjoyable		1, 2, 3, 4, 7, 11, 12
	Evaluation of academic relevance	Academic/ education side		balance between academic and physically active side of lessons	classroom-based PA does not fit current educational practices, challenge to balance physical and academic activities within a lesson	3, 4, 5, 9, 10, 12
		Content/ subject compatibility		compatible with mathematics, activities relate to the academic content	difficult to adopt in humanistic subjects	1, 3, 4, 5, 11
Subjective norm	Social environment and norms	Societal expectations and cultural mindset		national level understanding of classroom-based PA	traditional (lecture-based, didactic) ways of seeing education	2, 5, 8, 9, 12, 13
		Testing and result-orientation			pressures, must teach curriculum content, preparing pupils for the kind of tests	1, 2, 5, 8, 9, 10, 12, 13
		School-approach		school initiatives, active breaks for all classes at the same time, designated classrooms for physical activity	pupils have other school-based physical activity opportunities (no need for classroom-based PA)	1, 3, 4, 6, 9, 10, 11, 12, 13
	Influential others	Pupils		getting to know pupils	pupils' negative behaviour towards each other	1, 5, 7, 9
		Administrators/ Management		engagement of administrators and management staff in the implementation and adoption	lack of involvement in implementation and adoption	1, 4, 6, 8, 12, 13
		Other teachers		examples, motivating if others are involved with classroom-based PA	being alone, lack of involvement of other teachers	4, 10, 11, 12, 13

Table 2 Alignment of theoretical domains, themes, and subthemes deriving from the thematic synthesis (cont.).

TPB	Theoret. domains	Themes	Sub-themes	Examples of the findings		Articles
				Facilitator	Hindrance	
	Reasons to comply with others/ expectations	Supporting/ support from others		community of practice, feedback, reminders, encouragement	lack of support from management, lack of support from teaching staff community	1, 4, 6, 8, 9, 10, 11, 12, 13
		Fulfilling needs and interests		understanding and knowing what is important for pupils in the class, taking pupils' preferences into account	pupils' negative attitudes towards participating in physical activities in the classroom (disinterest among pupils)	1, 2, 3, 4, 5, 7, 8, 11, 12
Perceived behavioural control	Internal factors	Confidence		confidence in one's knowledge and abilities	lack of confidence in abilities, lack of confidence in capabilities to plan and deliver physical activity in the classroom	3, 4, 5, 8, 9
		Accountability and ownership		reporting and planning classroom-based physical activities, classroom-based PA as part of one's teaching and teacher identity	false reporting of delivering physically active activities, provided ready activities to be delivered by teaching staff	1, 5, 6, 8, 12
		Will/ Self-initiation		implementing classroom-based PA even when one is not required, want to implement		1, 4, 5, 6, 7, 10, 12, 13
		Awareness/ knowledge		understanding benefits for pupils, knowing ready activities	lack of understanding of classroom-based PA and its methods	1, 3, 4, 6, 7, 8, 9, 11, 12, 13
	External factors	Curriculum demands/ Schedules		(social) skills-focused curriculum	academic knowledge-focused curriculum, lack of priority for physical activities within teaching and learning	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13
		Health & Safety		classroom-based PA lessons as a safe place for pupils (e.g. inclusive, supportive)	concerns about injuries and accidents, teaching staff's own health	2, 5, 7, 8, 9
		Training		professional development, workshops, in-house training, train-the-trainer	additional responsibilities for teaching staff to train other teachers	3, 4, 5, 6, 8, 12, 13
		Resources	time	practice and experience reduces time required for planning	lack of time for planning and preparing, lack of time to deliver, time for pupils to settle back	1, 2, 4, 6, 7, 8, 9, 11, 12
			space	spare classrooms in the school building	lack of space in the classroom, need to prepare space	2, 3, 5, 6, 7, 8, 9, 13
			activities	variety, accessibility, online resources	lack of variety in activities, lack of knowledge of different activities	1, 2, 4, 6, 11, 13
			equipment	enough equipment, technology is available	sharing limited amount of (physical education) equipment in school, issues with technology (not working)	1, 2, 8, 9, 13
	Exerting control	Routine		classroom-based PA as daily part of teaching and learning	current ways for teaching are stronger, falling back to old practices	1, 3, 8, 11, 12
		Conscious planning and implementation		extensive planning of activities and classroom, teacher attentiveness during activities, reflective practice		1, 2, 4, 5, 7, 11, 12, 13

There was no theme that had been identified in all reviewed articles. Table 2 demonstrates that the most common theme across the articles were curriculum demands and schedules, occurring in 12 articles either as facilitator or as a barrier or perceived as both. Curriculum demands and schedules also covered codes which reflected priorities at individual (teacher) or organisational (school) level. This is because prioritising was considered as a step in the process of scheduling school activities, subjects, and physical activity. The second most common theme was awareness/ knowledge (occurrence in 10 articles). The third most common themes, each present in 9 articles, were the expression of values and beliefs about classroom-based PA; the evaluation of health, social, emotional, mental and behavioural outcomes of classroom-based PA; school-approach and school culture as social influence; supporting and support from others and fulfilling students' needs and interests both as factors influencing motivations to comply with others in utilising and implementing classroom-based PA approaches.

As mentioned above, interconnectedness was observed. This also means that several parts of the coded data could belong under various themes. It is because, e.g. an opportunity to attend a training increased the awareness and knowledge of the attending teachers who became therefore more knowledgeable about the benefits and possibilities of classroom-based PA approach in teaching and learning [13], likely influencing their overall attitude and beliefs. In this example, whilst certain conclusions cannot be made, merely speculations, regarding the impact on beliefs and attitudes of teachers, however the codes here could be both training, as well as awareness/ knowledge. Training as an external factor provided to the teaching staff and awareness/ knowledge as internal factors influencing teachers' intentions whether to implement or not implement classroom-based PA approaches.

Due to the lack of adequate or specific information regarding certain characteristics of the teaching staff recruited for research, results could not be coherently and conclusively presented e.g. based on experience with classroom-based PA or based on students' age/ grade. As almost half of the total population sample across the reviewed articles were recruited regardless of experience, due to current non-engagement with classroom-based PA or based on potential knowledge about physical activity, it did not seem rational and reliable to compare the perceptions of teaching staff based on experience. Furthermore, as the present review relies partly on secondary data, insights of many participants of the total population sample were not accessible if quotations were not embraced in the published papers or occurrence of themes in the original articles were not specified by such characteristics. Thus, it did not appear to be sensible and reasonable to compare perceptions of teaching staff based on their roles, e.g. 2nd

grade teachers, 6th grade teachers, headteachers, etc. Due to the inconclusiveness and potential validity and reliability issues of such results, comparison of these data is excluded from the present study.

Nevertheless, based on the occurrence of themes in particular articles (Table 2) and studies' focus on the mode of physical activity (Table 1), differences can be observed between the emergence of themes and the type of physical activity approaches on which the reviewed studies focused. It can be seen that the theme, academic self-confidence and outcomes, is not equally apparent among the articles focusing on different modes of physical activity (active breaks, physically active learning, classroom-based PA as mixed or in general). Academic self-confidence of and outcomes for pupils was the most common factor influencing attitude among those who were involved or interviewed about physically active learning approaches. Similarly, teaching staff in physically active learning studies are the most concerned with the academic and education side of the approach, whilst the theme does not emerge as an influential factor among those who are involved in studies focusing on active breaks. Furthermore, it can be observed that the theme, fulfilling needs and interests of pupils emerged in all those studies which were concerned with active breaks, whilst only in half of the studies concerned with physically active learning. Besides, the theme did not emerge among any of the studies which focused on classroom-based PA in general without specification of any modes or types of approaches.

Additionally, as seven articles [1, 3, 4, 5, 7, 11, 12] clearly identified their population sample to have current or prior experience with classroom-based PA approaches, emergence of themes can be presented based on this. Fulfilling students' needs and interests emerged as a theme for explaining reasons and motivations for complying and utilising or implementing classroom-based PA approaches in all 7 articles. Other factors, all occurred in 6 articles, most commonly influencing the intentions of teaching staff who has experience with classroom-based PA included their attitudes (beliefs and values) regarding classroom-based PA; evaluation of student enjoyment as an outcome of classroom-based PA; awareness and knowledge; curriculum demands and schedules; and conscious planning and implementation as strategies to exert power over perceived barriers, i.e. to overcome barriers. The third most common factors, occurring in 5 articles, among teaching staff experienced with classroom-based PA included attitudes (beliefs and values) about teaching/ teaching methods; the evaluation of health, social, emotional, mental, and behavioural outcomes for students; academic outcomes for students; content and subject compatibility of classroom-based PA; school-approach and

school culture; will or self-initiation; and time. Factors which were perceived as the least influential among teaching staff with classroom-based PA experience included societal expectations and cultural mindset; safety (both occurring in 2 articles); and availability of equipment, emerging in 1 reviewed article.

On the other hand, whilst themes occurred the most frequently as mentioned above among those articles which indicated teaching staff's experience with classroom-based PA, the distribution of themes across experienced and unspecified population shows further distinction. Based on the distribution of themes across experience groups, it can be seen that all articles in which content and subject compatibility emerged are studies involving population sample who had prior or current experience with classroom-based PA approaches. This is followed by differences between experienced and unspecified groups regarding themes of student enjoyment (occurrence in 6 out of total 7 articles in which the theme occurred, ~86% of the articles in which the theme occurred), academic self-confidence of and outcomes for students (5 out of 6, ~83%), and routine (4 out of 5, 80%). In contrast to the analysis of the theme emerging in most articles exclusive to experienced teaching staff, fulfilling needs and interests of pupils corresponds to 7 occurrences (~78%) out of the total 9 articles in which the theme emerged. Factors which were perceived as the least influential did not differ from the analysis of the number of articles in which the themes occurred, resulting societal expectations and cultural mindset to emerge among 2 articles focusing on experienced populations out of the total 7 articles in which the theme occurred (~28%), and availability of equipment to emerge in 1 article out of the total 5 articles in which the theme occurred (20%).

In overall, results of the contextual analysis of the reviewed studies showcase that there are clear or potential differences in behavioural, normative and control beliefs between population samples regarding e.g. the role of individual members of the teaching staff which in turn can influence the perceptions of factors as hindering or facilitating adoption of classroom-based PA and intentions and motivations to do so. Additionally, the contextual analysis enabled the discovery and exploration of the differences between perceived factors that influence teaching staff in different contexts, e.g. based on prior or current experience with classroom-based PA, mainly interventions. This highlights the results that teaching staff with experience with classroom-based PA (mainly through participation in interventions) has potentially different beliefs and values about the approaches, their experience may reflect already supportive or non-supportive environments and perceive internal and external factors differently than

teaching staff without definite experience. Coding conducted as part of the thematic synthesis resulted in themes which corresponds to the determinants of the Theory of Planned Behaviour.

Table 3 Overview of theoretical/ conceptual frameworks used in all reviewed articles.

Framework	Articles	Justification for adopting the framework	Framework methods as described in the reviewed articles
Capability, Opportunity, and Motivation Behaviour (COM-B) Model	3, 8	To improve the effectiveness of classroom-based PA interventions, a behaviour change theory should be integrated. It is essential for a teacher to change their behaviour in order to accept and adopt classroom-based PA approaches.	Identifying causes behind the adoption of classroom-based PA (behaviour) in relation to being physically and psychologically capable, using the available social and physical opportunities, demonstrating reflective or automatic motivation.
Comprehensive School Physical Activity Program (CSPAP)	2	There is a need to understand how classroom-based PA can be implemented and adopted. CSPAP offers a framework to promote physical activity during school hours.	Identifying and exploring ways to engage, support and empower schools and staff to implement and adopt classroom-based PA approaches.
Didactic theory	4	Within the Danish-Nordic didactic tradition, teachers have the autonomy to decide their own teaching approaches within the national curriculum guidelines. To identify teachers' didactic choices, reflections, and reasoning for integrating classroom-based PA.	Analysing what concerns teachers' didactical choice in integrating PA: choice and selection of PA (what), integration method (how), and justification of why the chosen activity fits the academic content and students' learning.
Didaktikk perspective	5	To understand teachers as potential enactors of PAL, to gain insights into teachers' professional knowledge about PAL focusing on pupils, the teacher, and content.	Identification of interacting elements that mediate teaching and learning. Examining how teachers design teaching, hence how they vary resources and environments to create experiences for pupils under the ideological ideas of the curriculum.
Diffusion of Innovation (DOI)	1	Active breaks are not a normative practice but a relatively new approach (innovation) in education.	Exposure to the existence of active breaks, understanding the functions of active breaks, forming attitude, committing to the adoption of active breaks, using active breaks, evaluating outcomes.
Levels of Use	11, 12	Innovations in education are only significant if their use is sustained over time. Behavioural change is the centre of implementation. The instrument helps to describe current use of classroom-based PA approaches.	General patterns of teachers' behaviour across phases of preparation to use PAL, beginning to use PAL, gaining experiencing in PAL. Experience analysed in relation to knowledge, acquiring information, sharing, assessing, planning, status reporting, performance.
Phenomenology of Perception	7	Studying how becoming aware of things and people can make sense to teachers.	Building knowledge on teachers' lived experiences of classroom-based PA in their classroom with their pupils. Identifying how teachers experience with classroom-based PA influence their understanding of the approach.
Quality Implementation Framework	10	Help to understand why an innovation/ approach is accepted or rejected.	Focusing on the first phase of implementation, addressing critical steps before implementation: need for the approach, fit for the approach at the school, capacity for the approach.
Scaffolding	4	Teaching practice provides a setting for teaching activities, active participation, dialogue, and feedback. Teachers need assistance and guidance when dealing with changes in their practice.	Identifying scaffolds (different supports for teachers) that may enable the sustained used of classroom-based PA among teachers under institutional scaffolding, team scaffolding, and individual scaffolding.
Social Cognitive Model	6	Teachers' knowledge acquisition can be directly related to the observation of others as part of social interactions and experiences.	The concept of mastery experiences within the model helps to identify opportunities that teachers need to improve their skills and develop self-efficacy by completing tasks, ultimately increasing the likelihood to perform the behaviour.
Socio-Ecological Model	6, 9	A framework for mapping and understanding the multidimensional influences that shape teachers' adoption of classroom-based PA.	Identifying intrapersonal factors, interpersonal factors, institutional (school) factors, community factors, policy factors. Examining interrelations between personal and environmental factors influencing behaviour.
Tradition of Phenomenology	7	Teachers' experiences of adopting an approach are shaped by different forms of reflective practice.	Addressing every day and classroom-based PA practices of teachers, exploring meanings and experiences of interactions between pupils and teachers and pupils.

Furthermore, analysis of the reviewed articles included the theoretical and conceptual frameworks used to guide the studies, interventions, or their data analysis (Table 3). Theoretical or conceptual frameworks were evaluated to provide an overview of the approaches that researchers adopt in order to promote the use of classroom-based PA as a teaching method in their studies. Table 3 provides an overview of the frameworks used, as well as their assertion for being used to guide the reviewed studies.

Studies justified the adoption of specific frameworks to meet the objectives and aims of their studies, thus resulting in various ways to approach the implementation and utilisation of classroom-based PA. Commonly, all frameworks enable the identification of facilitators and barriers that either support or hinder teaching staff in the adoption of classroom-based PA, however all does it from different perspectives. The Socio-Ecological Model [6, 9] enables the identification of internal, external, and social factors influencing teaching staff in their behaviour to adopt classroom-based PA approaches in their teaching. The Social Cognitive Model [6] narrows down opportunities that are especially useful to improve teaching staff's skills and self-efficacy to increase intentions to adopt classroom-based PA approaches. In a similar fashion, the COM-B model [3, 8] also helps to identify intentions (motivation) and behavioural control (physical and psychological capabilities, available social and physical opportunities), i.e., factors influencing teaching staff in implementing and adopting classroom-based PA approaches. The Diffusion of Innovation [1] approach begins to take a more practical stand, introducing teaching staff first to classroom-based PA and then exploring their understanding of and attitudes towards the methods, identifying teachers' perceptions on the outcomes, and measuring their intentions and adoption of classroom-based PA approaches.

The Quality Implementation Framework [10] aims to gain information on the actual needs of teaching staff for classroom-based PA, to assess how classroom-based PA fit well with the particular teaching staff and school culture, and to identify the school's and its staff's capacity to implement and adopt classroom-based PA. In other words, this framework enables the emergence of factors that influence teachers whether to implement or not implement classroom-based PA approaches. Then the Comprehensive School Physical Activity Program [2] focuses specifically on providing support for schools and staff to expose themselves to the implementation and adoption PA approaches before, after, and during school hours. Similarly, Scaffolding [4] also enables the identification of the various support that can be available for teaching staff in the implementation and adoption of approaches. Hence, via these frameworks,

insights can be provided into what supports, motivates, and helps teaching staff to adopt classroom-based PA.

Seemingly, once teaching staff has implemented classroom-based PA approaches, other theoretical frameworks can be used to analyse the sustainability of the approaches and teachers' behaviour in the long-term to adopt the approaches. The Didactic Theory [4] and the Didaktikk perspective [5] frameworks provide insights into how teachers adopt classroom-based PA approaches in their teaching, thereby enabling the identification of difficulties and supporting factors that influence them to continue to utilise it in their practice. Furthermore, in adopting classroom-based PA, teachers' choice and selection of activities can inform research on what available resources influenced their use of the approaches and how it influenced the adoption. The Tradition of Phenomenology [7] framework can assist to address such practices of teachers, and explore the interactions between pupils and teachers and pupils during integrated activities in the classroom. With this framework, lived experiences gain more meaning in forming the intentions of teaching staff for the sustained adoption of classroom-based PA. The Phenomenology of Perception [7] then enables to build on this knowledge gained from teachers' lived experiences with classroom-based PA approaches in their classes in order to inform how experience contributes to their knowledge and awareness and the ongoing use of the approach in their teaching practice. Lastly, teachers' sustained use of classroom-based PA can be analysed with the Level of Use framework [11, 12] which helps identifying how knowledge, information, sharing, assessing, planning, reporting, and performing the behaviour influence teaching staff over long term in adopting the approaches. The framework allows teachers' behaviour to be explored at various points of implementation of classroom-based PA, i.e., at the start/ before using the approach, once one started to use the approach, and after some valuable experience has already been gained in using the approach.

None of the reviewed studies utilised the Theory of Planned Behaviour to guide their research. Nonetheless, a Theory of Planned Behaviour approach could provide a guidance to explain and predict teaching staff's behaviour in adopting classroom-based PA. With its socio-ecological perspective, this framework can assist in identifying internal, external and social factors influencing teaching staff, including self-efficacy (Socio-Ecological Model, Social Cognitive Model), thereby informing intentions (motivation) and behavioural control (ability) to implement classroom-based PA approaches. The identification of these factors, prior exposure to classroom-based PA, can also provide information whether the approach is likely to be supported on a school level based on school culture and the capacity of teachers to implement

the approach based on the perspective of teaching staff (Quality Implementation Framework). These factors then can help to identify support needs of teaching staff and identify the type of support teachers would need (Scaffolding, CSPAP). Furthermore, the Theory of Planned Behaviour provides a solid ground for the exploration of teaching staff's knowledge and awareness of classroom-based PA, as well as measuring attitudes towards the behaviour which determinant also includes the evaluation of outcomes of the behaviour (Diffusion of Innovation).

Once experience is gained in the use of classroom-based PA, it is probable that teaching staff's attitude, view of important others, and perceived behavioural control changes. This is because experience may shape beliefs, making new beliefs to be supportive of the desired behaviour (Ajzen, 2005). These changes in intentions and perceived control then impacts on the actual adoption of classroom-based PA approaches and/ or further inform necessary steps that need to be taken for the success of the approaches in long term. Hence, the theory can also be used to predict intentions and explain behaviour at various phases of the implementation of classroom-based PA assisting in measuring actual control and actual adoption of classroom-based PA approaches. As intentions change over time due to changes in perceptions, and as a result of new information, resources, opportunities, it is necessary to recognise their provisional nature (Ajzen, 1985). On the whole, it can be asserted that the Theory of Planned Behaviour framework explains behaviour, i.e., provides reasons for why teaching staff accept and adopt or do not accept and adopt classroom-based PA approaches. It can help to identify – often interconnected and multidimensional - factors that assist teaching staff in enacting classroom-based PA approaches, thereby identifying the resources and opportunities (including support, assistance, and guidance) that are used or are needed for a sustained adoption of the methods.

Review of existing literature on teaching staff's perspectives, beliefs and attitudes towards classroom-based PA enabled the exploration of factors that constrain or support the implementation and adoption of the approaches as a relatively new way of teaching and learning in the classroom. The next section elaborates and expands on what factors and how they influence or predict teaching staff's use of classroom-based PA approaches.

4.2 Perceptions and beliefs under the Theory of Planned Behaviour framework

Perceptions and beliefs of teaching staff on classroom-based PA can be adequately supported by and categorised under the Theory of Planned Behaviour. That is, a content analysis of teaching staff's perceptions and beliefs can be supported and categorised by the components of the Theory of Planned Behaviour (Research Question 1.). The identified themes in the current study represent a mixture of factors that can influence the beliefs teaching staff hold. Findings regarding the perception and beliefs of teaching staff are exhibited under the Theory of Planned Behaviour framework. Discussion of the findings in connection with the wider literature and studies about classroom-based PA support the proposition that beliefs of teaching staff are suitable to be organised under the Theory of Planned Behaviour framework. The themes identified as part of the content analysis of the reviewed articles fit well to represent factors that affect teaching staff's behavioural, normative, and control beliefs, and as a result, influence their intentions and actions in implementing classroom-based PA (Ajzen, 2005). The present section of the chapter provides an extensive justification for why and how perceptions and beliefs of teaching staff deriving from content analysis of the reviewed articles can be adequately categorised under the Theory of Planned Behaviour.

4.2.1 Attitude

Attitude towards a behaviour indicates the extent to which an individual hold favourable or unfavourable evaluation or analysis of the behaviour in question (Ajzen, 1991). That is, attitude towards the implementation of classroom-based PA refers to the extent to which individual members of the teaching staff have favourable or unfavourable evaluation or appraisal of implementing classroom-based PA. Findings of this study support the nature of classroom-based PA methods as integrative approaches, integrating pupils' learning with physical activity. Teaching staff does not only hold beliefs and values about the behaviour to implement classroom-based PA, but their attitudes towards implementing classroom-based PA is also influenced by perceptions about physical activity and beliefs and values about teaching and learning. Furthermore, the data enables the identification of not only outcomes of classroom-based PA for pupils as perceived by teaching staff, but also demonstrates teaching staff's concern with the academic relevance of utilising classroom-based PA.

Beliefs and perceptions of teaching staff in the reviewed articles seem to be generally positive regarding the importance of physical activity for children. Physical activity in primary school is valued due to its importance for pupils' physical health and development [2, 10] and for pupils' physical and/ movement needs [1, 3, 5]. Furthermore, physical activity was not considered as a superficial add-on to the teaching of academic content [4]. The lack of emergence of potentially negative beliefs about physical activity may be related to the research aims and/ or focus of questions within the interview guides of specific studies. Nevertheless, teaching staff's attitudes and behaviours can have an influence on pupils' physical activity participation. Research shows that pre-school teachers' (Fossdal et al., 2018), as well as primary and middle school teachers' (Pulling Kuhn et al., 2021) daily average moderate-to-vigorous physical activity levels are associated with children's physical activity level or their physical activity promotion practices at school. Additionally, Martin and Murtagh (2017) note the importance that teachers' attitudes play in enabling the success or failure of classroom-based PA. Findings of the current study are in accordance with the importance of positive attitudes of teaching staff towards the promotion of classroom-based PA approaches. Walker et al. (2022) highlight that physical activity champions assigned to lead classroom-based PA implementation efforts in schools usually have a personal interest in physical activity along with their passion for facilitating classroom-based PA [13]. Thus, it is important to understand the underlying behavioural beliefs and attitudes of teaching staff, especially when they are not currently involved with classroom-based PA approaches or have no prior experience with such methods in their teaching. By identifying underlying foundations of beliefs about implementing classroom-based PA, substantive information can be gained about the determinants of the implementation and later adoption of such approaches. This is because, it is at the level of beliefs that research can determine about the factors that influence teachers whether to engage in the implementation or adoption of classroom-based PA or not (Ajzen, 1991).

Interestingly, classroom-based PA is perceived both positively and negatively by teaching staff. Positive perception may serve as facilitating factors in teaching staff' intentions and motivations to implement and adopt classroom-based PA in their teaching. Accordingly, negative perceptions may hinder intentions and motivations of teaching staff. Teaching staff seem to appreciate the uniqueness and new ways that classroom-based PA offers to teaching and learning [3, 5, 10, 11, 12]. On the other hand, teachers' negative beliefs about classroom-based PA are concerned with classroom organisation elements of the methods and the actual level of physical activity pupils' gain by the activities. Teachers' perceptions of classroom-

based PA indicate that traditional, didactic or lecture-based teaching methods provide a more organised and effective environment for learning [5, 9] and that it involves less physical activity than they would expect [3]. Teaching staff in the study of Walker et al. (2022) also perceived that not all staff members in the school see the value of using classroom-based PA approaches for their pupils [13]. Curtner-Smith et al. (2018) believe that there is an association between teachers' beliefs about the purposes of what they teach and the curriculum and pedagogies they apply. In other words, it is possible that there is a relationship between teachers' beliefs about physical activity and teaching which influences their intentions and motivations to employ classroom-based PA as an integrative pedagogical approach. Although the identification of the theme of beliefs and values about classroom-based PA is considered as a separate entity in this study, interconnectedness with beliefs and values about teaching is evident and characterises this theme. This is supported by the findings of Mandelid et al. (2024) stating that teachers' values are important in shaping their engagement with physically active learning methods [5]. On the other hand, Skage and Dyrstad (2019) highlight that the integrative nature of classroom-based PA may face limited understanding as physical activity and learning seem to be viewed and regarded as two separate activities and not as one integrated activity [10]. Because attributes associated with introducing PA in the teaching of subjects other than physical education are likely to be already valued positively or negatively, it is expected that teachers automatically and simultaneously shape their attitudes towards implementing classroom-based PA (Ajzen 1991). That is, teachers have already acquired attributes linked to physical activity and to teaching which may determine their attitude towards implementing and adopting classroom-based PA approaches in their teaching.

Beliefs and values about teaching considered as facilitators towards the intention of teaching staff to implement classroom-based PA approaches highlight teachers' perceptions of the importance of providing pupils with a variety of teaching methods, meeting their different learning needs and preferred learning styles, as well as seeing it as an alternative pedagogy [1, 3, 8, 10, 11, 12]. Nonetheless, Mandelid et al. (2024) and Quarmbly et al. (2019) highlight that some teaching staff's educational values and views of teaching and learning are rooted in traditional teaching methods, e.g. lecture-based methods, which can act as a hindrance towards changing their ways towards implementing classroom-based PA and deviating from those traditional didactic approaches [5, 9]. Dierendonck et al. (2024) discuss why teachers are likely to not implement recommended teaching practices. Their study shows that teachers who use other than traditional teaching practices are most frequently have higher motivational intention

to do so and influenced positively by attitude and perceived behavioural control. Many factors can influence the stability of teachers' intentions to (not) implement classroom-based PA along with their other teaching practices. Attitudes towards not implementing and adopting classroom-based PA reveals a different aspect of the implementation of such approaches, thus can serve as a point of future intervention in attempts to change it (Ajzen, 1991). However, in the current study it is not possible to make further associations between teaching staff's beliefs and values about teaching practices and their intentions and associations with other perceived factors due to the availability of data presented in the reviewed studies.

The next theoretical domain is concerned with the evaluation of outcomes of utilising classroom-based PA in teaching. As teaching staff's perceptions represent information (outcomes of classroom-based PA for pupils, whether valid or not) they believe about their worlds (Ajzen, 1985), it is possible to present also non-experienced teachers' beliefs and what they think of the potential outcomes of classroom-based PA can be for pupils and teaching. Teaching staff's evaluation of outcomes of classroom-based PA for students and teaching practice appears to be a dominant theme across the reviewed studies. Teachers with experience with classroom-based PA emphasise several social, emotional, mental and academic benefits for pupils. Several studies emphasised improved social skills and social interaction between pupils as a result/ outcome of classroom-based PA [1, 5, 7, 10, 12] and referred to real-life learning or pupils' improved ability to understand or apply concepts more easily [3, 5, 12]. Skage et al. (2022) conclude that physically active learning increases social engagement among pupils, their creativity and independence [12]. Improved collaboration among pupils is further appraised by Øien and Solheim (2019). Teachers particularly intended to use classroom-based PA to increase participation and collaborative interaction between students [7]. Moreover, Campbell and Lassiter (2020), Chorlton et al. (2022) and Dorling et al. (2021) emphasise the improved behaviour of students, level of focus and concentration, and retention of information assisting and reinforcing learning [1, 2, 3]. Findings are in accordance with the findings of Webster et al. (2020) and Ruhland and Lange (2021) who state that teachers perceive classroom-based PA as beneficial for students' learning, especially on-task behaviour, and in Daly-Smith et al. (2018) regarding improved classroom behaviour as a result of physical activity integration into teaching. Whilst it was not common among the reviewed studies, it was noted that attention and focus does not always change before and after classroom-based PA is delivered [3]. This is supported by Norris et al. (2015) who found that academic outcomes

show either improvement or no difference in classroom-based PA compared to traditional teaching.

Behavioural outcomes and increased energy levels among students result in contradictory findings. Many of the teaching staff perceives that classroom-based PA is a hotbed for behavioural issues. It is found that dealing with behavioural issues can demotivate staff to continue with classroom-based PA [1, 2, 9]. Difficult behaviours and increased energy levels are reported to influence classroom instruction and classroom management negatively. Koorts et al. (2022) acknowledge that teachers often face disruptions and distraction to the class during active breaks especially due to classroom behaviour and students' learning and behavioural characteristics. Based on the findings, evaluation of behavioural outcomes is more commonly associated negatively with implementing classroom-based PA than positively. Similarly, Moon et al. (2022) note that teachers feel that physical activity makes classroom management more difficult even after being provided with external support. Furthermore, their study also highlights that teachers who utilise effective management strategies more frequently in their classrooms are more intended to apply classroom-based PA more frequently. Webster et al. (2019) add that classroom management challenges as usually related to other themes (e.g., dealing with students' high energy and excitement during classroom-based PA). Findings of this study are in accordance; hence classroom management was not identified as a theme on its own but were associated with other influential factors, like behavioural outcomes of classroom-based PA for pupils.

Student enjoyment appears in more than half of the reviewed studies, emerging exclusively as a factor facilitating the intention of teaching staff to implement classroom-based PA [1, 2, 3, 4, 7, 11, 12]. Student enjoyment may facilitate pupils' behaviour, making classroom management easier [3], as well as may bring about teachers' positive feelings about classes which integrate physical activity by facilitating teacher enjoyment too [4]. Higher levels of enjoyment of classroom-based PA approaches compared to enjoyment of lessons without physical activity is also pointed out by Schmidt et al. (2020). Overall, most reviewed studies highlight teachers' positive evaluation of the social, emotional, mental, and academic benefits for students, as well as their enjoyment for physical activity during classes and lessons. Consequences of and evaluation of outcomes deriving from utilising classroom-based PA approaches in one's teaching can shape or form new beliefs of teaching staff, consequently shaping their intentions towards future implementation of the approach too (Ajzen, 1985).

Lastly, attitudes of teaching staff are further influenced by their beliefs about and evaluation of the academic relevance of implementing classroom-based PA. A particular focus of teaching staff regarding this domain represents the importance of an effective integration of physical activity with student learning and with lesson content. Teaching staff expresses concerns whether physically active learning is suitable to be integrated with classroom teaching due to the academic requirement for lessons and regarding the assessment of learning [1, 3, 4, 5, 9]. Mandelid et al. (2024) showcase that teachers' attitudes about classroom-based PA is connected to their views of how the activities can be responsive to both the curriculum and the students. The mode of physical activity in which teaching staff was involved or questioned about did not make a difference in the results. Teachers who were involved with active breaks, physically active learning and with classroom-based PA in general highlight the need for physical activities to be relevant for pupils' education. These reflect the issues with the conceptualisation of classroom-based PA approaches, as physically active learning is a method which intends to teach the academic content through physical activities, whilst active breaks do not have such clear pedagogical intention (Martin and Murtagh, 2017). Academic content appears to be an influential factor in the implementation of classroom-based PA regardless of the type of activities or integration. The results suggest that relevance of activities to the academic content facilitates the integration of active breaks into the teaching.

Furthermore, subject compatibility with physical activity acts as another important factor hindering or facilitating teachers' use of classroom-based PA. Teachers generally perceive mathematics to be a more compatible school subjects with physical activity than other subjects [3, 4, 5, 7]. This finding is in accordance with Webster et al (2017) who found that maths and science are reported as most compatible with classroom-based PA. Sneck (2022) explain that compared to other academic lessons, mathematics seems to be most suited to be effectively integrated with physical activity, especially acquiring automatization of number line skills, completing basic addition and subtraction calculations and learning multiplication tables are suitable for physical activity to be integrated into mathematics and meet curriculum goals. Although Doherty and Brennan (2014) pose that movement experiences can be features in other school subjects as well as other academic content can be also covered in physical education, findings [3] indicate that teachers may see physical activity as more compatible with academic content than academic content to be compatible with physical education. Last but not least, Skage et al. (2020) connote that teachers perceive physical activity to best fit repetition and memorisation of the academic content in early primary school grades [11]. Similarly, teachers

in the study of Øien and Solheim (2019) integrated mathematics and vocabulary quizzes with relay race-type of activities to promote physical activity. This may indicate that teachers who have more favourable beliefs about the academic relevance of classes integrated with physical activity (and perceived ability to find or plan plausible activities) showcase stronger intentions which are expected to influence their use of classroom-based PA approaches (Ajzen, 1991).

4.2.2 Subjective norms

Subjective norms as a social factor relates to the perceived social pressure to engage or not to engage with the given behaviour (Ajzen, 1991). Subjective norms reflect the beliefs and perceptions of individual members of the teaching staff about how other individuals or groups approve or disapprove of implementing and utilising classroom-based PA approaches in their teaching. That is, these beliefs and perceptions reflect how much teachers and other staff members are concerned with others approving or disapproving them implementing classroom-based PA approaches. Findings of this study signify the importance of teaching staff' beliefs about the societal expectations towards them as educators and cultural mindsets about their role in the education system and students' achievement on standardised testing on how it influences teachers' intentions to implement classroom-based PA. The data enables the identification of others who appear to be important influences in teaching staff's intentions. Factors which motivate or demotivate teaching staff to comply with influential others and their social environments are also explored.

Teaching staff socialising in a variety of different social environments may acquire different perceptions about different issues, information that offers the foundation for their beliefs about the consequences of implementing and adopting classroom-based PA, or about the normative expectations for them as educators (Ajzen, 2005). Results of this study identified schools where teaching staff worked at and wider society as social environments. This was apparent in many articles in which teaching staff's expressed their perceptions regarding the expectations towards them about what education is and how they should teach [2, 9, 12]. These perceptions were related to e.g., how the wider society (educational leaders, parents, etc.) disapproves the adoption of classroom-based PA as it contradicts which traditional, didactic methods which are preferred. Whilst some teaching staff hold different views than their perceptions about what others expect them to do and how, the findings also point to the role of the subjective norm

determinants within the Theory of planned Behaviour as these perceptions of others' view influence their decision whether to implement or not classroom-based PA. The reviewed articles demonstrated instances in which teaching staff agreed or decided to accept or comply with what they believed others want to do and how. The study of Peiris et al. (2023), nonetheless, evoke teachers' beliefs that a national (societal?) understanding of classroom-based PA can potentially facilitate the successful implementation of such approaches (implemented by teachers) [8]. Furthermore, as element of the education system, teachers' beliefs regarding the societal beliefs on the importance of standardised testing and good results has been identified as a related but separate theme. The expectations and pressures arising from testing and result-orientation seem to influence teachers' intentions to implement classroom-based exclusively negatively [1, 2, 5, 8, 9, 10, 12, 13]. The findings of this study support that social norms and the broader education system can influence the implementation of classroom-based PA among teachers (Daly-Smith et al., 2021; Pulling Kuhn et al., 2024).

School-approaches and school culture is another important factor facilitating or hindering teachers' intentions and motivations. The culture or habitus of a school appears to be influential towards the ways how it operates (priorities on the school level, pupil attainments, curriculum delivery, extracurricular opportunities) which in turn defines the extent to which teaching staff is likely to implement or adopt classroom-based PA approaches [3, 4, 9, 10]. Teaching staff repeatedly express more positive intentions towards implementing and adopting classroom-based PA approaches if it was part of the whole school community or built into the school infrastructure [1, 6, 11]. Results regarding the need for school-wide initiatives towards classroom-based PA resonate the extend of the various teaching staff in the population samples, including perspectives e.g. of not only teachers but also head teachers and senior leaders. Additionally, Daly-Smith et al. (2021) warn that building a whole-school approach must be seen as a vitally important element to maintain classroom-based PA in the long-term.

Important others who appear to be influential towards the intentions of teaching staff to implement classroom-based PA are identified in this study as pupils, administrators and management, and other teachers. Parents and ´´higher-ups´´ also seem to influence teachers' intention in some context, however, occur limitedly in the present study. Although it is acknowledged that pupils and other staff members are some of the most important others whose approval or disapproval plays a role in teachers' motivations about classroom-based PA, this theme is more concerned with occurrences in which teachers' intentions seem to specifically correlate with the influence of others, rather than the ways which describes teachers' intentions

to comply with them (or with their beliefs) which is elaborated under the supporting/ support from others and fulfilling needs and interests of pupils themes. This may explain the low number of articles in which pupils are considered as influential others. For instance, Øien and Solheim (2019) describe contingent interactions between teachers and pupils upon interactions between pupils, whilst Campbell and Lassiter (2020) point to how uncontrollable variables of pupils can act as influences in teachers' perceptions. Teaching staff's normative beliefs are shaped and formed by the ways in which they perceive the beliefs of administrators and school management regarding the implementation of physical activities (Ajzen, 1991). This is reflected in the reviewed articles in which the importance of head teachers or managements' approval for the approaches seemed to influence teaching staff's intentions to implement classroom-based PA [8, 12]. Similarly, perceptions of other teachers' beliefs about classroom-based PA also shape teaching staff's beliefs. Headteachers in the study of Skage and Dyrstad (2019) believed that teachers were generally tired of change [10] which may have influenced their decision whether to implement classroom-based PA as a whole-school approach or not.

The last domain of the subjective norm determinant of the Theory of Planned Behaviour highlights teachers' beliefs about factors that can motivate or demotivate them to comply others and/ or comply with expectations of them. The findings show that school-wide and teacher community-based support systems are commonly identified approaches which is perceived by teaching staff as potential facilitators for their intentions to implement classroom-based PA [1, 4, 6, 8, 9, 10, 11, 12, 13]. For instance, Walker et al. (2022) emphasise the motivating power of school-wide support systems by providing positive reinforcement and encouragement for teachers to integrate active breaks into their teaching, providing general reminders at various platforms and creating positive dialogue around classroom-based PA. Reminders are also referred to be influential support provisions [1, 6, 8]. Other influential support approaches include community and paired ways to discuss physical activity, experiences, and share ideas for activities. Knudsen et al. (2021) identify a desire among teachers for a community that could support classroom-based PA approaches at the school and would provide a platform for sharing tried-out activities and methods/ practices that appear to be working [4]. These findings confirm those of Turner et al. (2019), i.e., approaches that are embedded within the whole school have potential to support teachers' implementation of classroom-based PA. Support from others may be a clear indication whether those others approve implementing classroom-based PA. However, it is up to the individual members of the teaching staff how much they care whether those others approved or disapproved their implementation of classroom-based

PA (Ajzen, 1991). This phenomena can be observed among teachers who are provided with adequate support to implement classroom-based PA by their school leadership, yet show little interest in complying with this approval for integrating physical activity in their teaching [13].

Another theme that was identified and is concerned with reasons to comply with others is fulfilling students' needs and interests. This theme reflects the extent to which teaching staff takes into account their own perceptions of pupils' beliefs (approval or disapproval) about them integrating physical activity into their teaching. That is, it can be understood as teaching staff's motivation or demotivation to adapt their teaching, i.e. integrate physical activity into their lessons and classes, to the needs and interests of their pupils. Pupils' disinterest [1] or expression of negative attitudes among pupils towards physical activity in the classroom may be perceived by teachers as disapproval of students of classroom-based PA approaches, thus demotivate them to integrate physical activities into their lessons again. Nevertheless, the use of classroom-based PA is further embraced as an approach that respond to children's different needs [11, 12]. Fulfilling interests and needs of pupils generally seem to facilitate teachers' intentions to implement classroom-based PA and informs them about the when and what activities to deliver [4, 5, 7]. Adapting one's teaching in regards of classroom-based PA is further highlighted by Øien and Solheim (2019) who states that teachers made ongoing adjustments in their practices of utilising classroom-based PA over time for the benefit of each particular pupil [7].

Although perceptions and beliefs of teaching staff regarding influential societal/ cultural norms and others as well as those others' beliefs can be adequately elicited under the subjective norms in the Theory of Planned Behaviour, Ajzen (1991) notes that results for this determinant are often mixed and show no clearly discernible pattern. Therefore, whilst findings of this study support the possibility of the emerged themes to be influential for teaching staff, without further research it remains questioned to what extent these beliefs facilitate or hinder the intentions to implement classroom-based PA. Wider literature highlights the indirect influence of subjective norms, yet the direct affect towards a person's intentions is debated (af Ursin, 2016).

4.2.3 Perceived behavioural control

Perceived behavioural control is underlined by control beliefs which is the degree to which teaching staff believes that they have the capability to or have control over implementing

classroom-based PA (Fishbein and Ajzen, 2010). In other words, themes under this determinant of the Theory of Planned Behaviour are concerned with factors that increase or reduce the perceived difficulty of utilising classroom-based PA approaches. In accordance with the framework, themes emerged as differentiated between internal and external factors. Additionally, the results enable the identification of ways in which teaching staff may exert control over perceived barriers. This domain is based on the idea that the more resources and opportunities teachers believe that they have and the less they consider these as hindering them in the possibility to implement classroom-based PA, the more likely that they perceive control over integrating physical activity in their teaching (Ajzen, 1991).

Confidence in own abilities to implement classroom-based PA is identified both a factor facilitating as well as reducing perceived control. Upon the availability of resources, some teacher does not question whether they are capable or not delivering active breaks during their lessons [5, 8]. Studies also found that teaching staff have doubts in their abilities or knowledge to design physical activity integrated lessons that fulfils students' educational outcomes or have lack of confidence in their teaching if children are not taught the traditional ways [3, 5, 9]. The interconnectedness of this theme is apparent with many other factors. Similar to the perceptions of teachers in the study of Peiris et al. (2023) [8], additional resources and training increasing knowledge may also associate with increased levels of confidence. McCullogh et al. (2019) acknowledge that increased confidence may be underpinned by experience, improved understandings and gained knowledge, supporting and being supported by others, and seeing the results of fulfilling social, emotional, academic, etc. needs of pupils.

Beliefs about accountability indicate that many teachers would like to or already account for the integration of physical activities in their teaching. Wanting to have accountability in some cases is justified by beliefs that it facilitates actual implementation of classroom-based PA [6, 8]. In these cases, feeling accountable may also further shape beliefs about ownership of the methods and activities. However, feelings of accountability may not always serve as a facilitator in the long-term implementation of classroom-based PA. The study of Campbell and Lassiter (2020) demonstrates that teachers may feel accountable to deliver classroom-based PA even if they do not want to continue with it when there are others involved with the approaches too [1]. Ownership of classroom-based PA seem to be related to teaching staff's beliefs of how it fits their own teaching identities and practices, how close it is to their values and practices [5, 12]. The findings suggest that a sense of ownership over the activities and methods as part of delivering classroom-based PA can ease the difficulties perceived by teachers, e.g.,

perceptions of classroom-based PA as embarrassing [5] or remembering to integrate physical activities into the lessons [6, 8]. As teacher ownership can impact the long-term and sustainable implementation of classroom-based PA, it acts an influential factor facilitating or hindering teachers' long-term use of the approach. Teacher ownership over classroom-based PA as a suitable teaching and learning approach is a mental or psychological state which is achieved when teachers feel their effort succeed and feel that the approach is in their hands, and it is not simply forced on them to implement and adopt (Ogborn, 2002). The importance of ownership among teachers is also acknowledged in the study of Walker et al. (2022). Some school leaders are reluctant to mandate their staff to implement classroom-based PA as they believe that individual members of the teaching staff need to make this choice on their own [13].

Attainment of certain behavioural goals requires ´´will power´´ which can further support action-oriented individuals in taking steps towards performing the behaviour (Ajzen, 1985). Teaching staff's will and self-initiatives towards classroom-based PA appears as a facilitator in this study. Teachers extensive and time-consuming planning is associated with their willingness and commitment to engage in improving their professional practice [7]. Similar will and commitment towards improving one's practice through acquiring more expertise about classroom-based PA can be observed in motivation to attend training or take part in professional development opportunities [13] or in motivation to immerse themselves with classroom-based PA to have something new [6]. These findings of the current study resemble the results of van Eekelen et al. (2006) concluding that teachers' willingness can be indicated by the aspiration to explore new practices they have, their open-mindedness to experiences and others, their pro-activity, their attributions of successes and mistakes, reflection on their performance, by teachers taking action to learn and recognising their own learning processes and results. Such will and initiation to gain information about the behaviour, implementing classroom-based PA, may contribute to perceived behavioural control to become more realistic and predicting the overall probability of a successful behaviour attempt, attempt to implement classroom-based PA (Ajzen, 1991).

Teaching staff's beliefs about their knowledge, awareness and understanding of classroom-based PA can certainly increase or reduce their perceived difficulty of utilising the approaches. Training opportunities seem to highly interlink with perceived knowledge. The findings indicate that courses and training opportunities are considered as a good source of knowledge of appropriate activities, and as beneficial for gaining understanding of the evidence-based outcomes of daily physical activity for pupils' learning and wellbeing [4, 6]. Knowledge is also

seen as a contributing factor to decreasing perceived time barriers due to the experience and capability to plan lessons with integrated PA [11]. Additionally, teachers' motivations to fulfil the needs of their students by continuously adjusting their methods and professional practice also resulted in enhanced knowledge of convergent and divergent interaction patterns in their classroom [7]. Acquiring knowledge is found to be a useful strategy perceived by teachers to support their long-term utilisation of physically active approaches (Shoesmith et al., 2022). Furthermore, teaching staff's awareness about teaching methods and practices in classroom-based PA and awareness of the benefits for pupils is associated with sustainability of classroom-based PA as an integrative approach (Koorts et al., 2022). Thus, it can be concluded that knowledge and awareness serve as powerful internal resources that can assist teaching staff in overcoming several perceived barriers associated with utilisation of classroom-based PA.

The most common external factors influencing teaching staff's perceived difficulties or ease are time and curriculum demands and schedules, often lack of time deriving from the expectations to meet the curriculum or as time is not prioritised for physical activity in the schedules of schools and teaching staff. This interconnectedness is demonstrated in the findings as teaching time is for instructing academic content, and lessons are filled up already [1, 2, 8, 11]. Curriculum demands and scheduling can impact negatively on the prioritisation of physical activities. The increasing curriculum demands and an already crowded curriculum are significant hindrances perceived by teaching staff. Literature supports that teachers perceive competing demands and conflicts between schedules and delivery of physically active activities (Koorts et al., 2022). On the other hand, the findings present some exceptions where the focus of a new national curriculum is perceived to align with social benefits of classroom-based PA for students [5]. This is because teachers perceived the value in the new curriculum as opportunities to create alternative trajectories and space for teachers to reflect their own educational values in their teaching. Furthermore, conscious and planned scheduling can support the prioritisation of physical activity in academic subject teaching and learning. A school-wide scheduling approach showcases how it can serve as a facilitator towards organising time, equipment, or other available resources for teaching staff [13]. Scheduling practices also serve as facilitators of perceived control over barriers on the individual level as teachers have the autonomy to decide when to deliver physically active activities during the day [11].

Besides time arising as a factor in relation to curriculum demands and schedules, time is also identified as a sub-theme under resources. This is simply justified as it's *´´time, it's always*

time, there's never enough time´´ [2, p6]. In more complex terms, time can be considered as time for planning physically active activities and lesson content, time for preparing the environment and/ or equipment, time for delivering the activities including instructions and rules, time for pupils to settle back after the activities, and time taken away from the academic content within the lesson [1, 2, 4, 6, 7, 8, 9, 11, 12]. Teachers and teaching assistants in the study of Chorlton et al. (2022) also emphasise that physical activity does not only require time for the delivery of the actual activities but that pupils also need time to settle back down after active breaks [2]. This time required for transitioning back to academic tasks following active breaks is also acknowledge by Stylianou et al. (2016). The perceived difficulty and/ or complexity of activities is also associated to influence teachers' perception of time as an available resource. Generally, the findings show that easy options for activities in terms of the length, difficulty of the activity, as well as equipment needed are appraised to be influential factors in integrating physical activity in the classroom [4, 6]. Additionally, time further interconnects with the availability of space in the form of preparation time to arrange the classroom suitable for classroom-based PA [9]. This suggests that classroom-based PA need to comprise activities that are easy to implement and involves simpler actions and less motivation from teaching staff (Daly-Smith et al., 2021). Generally, the lack of time of teaching staff as a perceived barriers is acknowledged in the wider literature (Dinkel et al., 2017; Webster et al., 2017; Stylianou et al., 2016).

To demonstrate further interconnection between the subthemes of resources, it can be noted that delivering activities may be comprised with the perceived difficulties of acquiring or obtaining certain equipment. Whilst it is a relatively rarely emerging factor in the current study, although occurring repeatedly in an adequate number of studies to be identified as a sub-theme, several studies showcased examples when teachers perceive their surroundings differently and how it influences them in implementing classroom-based PA. For instance, in the same study teaching staff's perceptions of the available school equipment (e.g. interactive whiteboards) contradict, that is, one believes the availability whilst the other perceives the equipment as not available [2]. Nevertheless, it remains unclear whether the perceptions of these two primary school teachers represent the same school environment or different ones. PE equipment is a potential resource for classroom-based PA too, however it imposes challenges with the share, use and return of those [9, 13]. The identification of the various subthemes under resources advocates that the successful implementation of classroom-based PA of most teaching staff is contingent to some degree on non-motivational factors, i.e., on the availability of necessary

opportunities and resources (Ajzen, 1985), within the current theme as time, equipment, available space, type of activities, availability of activity banks.

Additional external factors relate to safety of pupils whilst participating in physically active activities as part of the class and training opportunities for teaching staff. Safety can be differentiated as physical safety of pupils or mentally and/ emotionally safe spaces. The latter is represented in perceptions on classroom-based PA (not) providing safe, inclusive and supportive environments [5, 7, 9]. Articles in which teaching staff had more experience with planning for classroom-based PA showcase instances which were overlooked or unexplored in other studies. Experienced teachers were presented as acknowledging that integrated physical activities could contribute to accidental and intentional pushing or touch other pupils [7]. Additionally, other studies identified teaching staff's concerns about pupils (and teachers) with health issues, and children injuring or hurting themselves as a result of the activities and behaviour arising from the involvement in the activities [8, 9]. Nevertheless, the actual influential factor here may not exclusively concern pupils' accidents, but the findings of the current study indicate that those could also be related to teaching staff's perceptions regarding the difficulties involved in the management, reporting and resolution of incidents in the school.

The aim of training is to form and shape the beliefs of teaching staff in their capabilities to implement classroom-based PA. According to Daly-Smith et al. (2021) training also requires the attitudes of teaching staff to be addressed prior engagement in skill development opportunities, like practical training. Different types of training are mentioned across the reviewed studies. Some studies point out needs regarding the content of trainings to include suitable activities, to build capability to deliver physical activities integrated into lessons [4, 5, 6]. Opportunities for professional development is acknowledged to increase the confidence of teaching staff in delivering active breaks (Pulling Kuhn et al., 2024) and result in positive changes in attitudes (Michael et al., 2019). In other instances, the qualities of the training are emphasised, as in-school or external training [13], continuous professional development training or training during pre-service teacher education [6]. Interestingly, it is pointed out that some teachers seem to be reluctant on training their colleagues [12] whilst some schools specifically encourage train-the-trainer (or teaching-the-teacher) approaches to train their staff members [13]. These findings indicate that training can refer to numerous different opportunities, which may facilitate teachers' intentions to various extent. Kupers et al. (2023) advocate that it is only high quality, sustainable professional development which can impact positively teachers' intentions. Such professional development is believed to last for an

adequate length of period and to require plausible ways in which schools support the development of teaching staff (Kupers et al., 2023).

The last identified themes are concerned with instances or practices in which teachers expressed or demonstrated their perceived control over perceived barriers. In addition to previously mentioned association in which factors may positively influence another factor, thereby reducing perceived difficulties, the establishment of physical activity in the classroom as routine activities and practices may be a viable way to overcome barriers perceived among teaching staff, e.g., time constraints challenging the planning of integrated lessons, or the time needed for introducing and instructing activities to pupils. Nonetheless, studies also concluded that teachers can be apprehensive about the difficulties in dissociating from existing ways of daily practice [8, 12]. Finally, the conscious or attentive planning and implementation of activities, methods, and organisation of the class is mentioned extensively across the reviewed articles. Although this theme may not always act as a facilitator, there appeared no instance in the reviewed data which would indicate that careful planning would hinder classroom-based PA. Rather, its importance as a generally influential factor is accentuated in this study. Teaching staff ascribe ways of creating lesson plans which already integrates physical activities, emphasising the need to include it in the lesson plans [1, 2]. Teachers further attribute ways of designing environments which meets both physical activity and educational needs of pupils whilst also contributing to other benefit. Mandelid et al. (2024) state that teachers rather design learning environments that embraces pupils' encounters with knowledge than to plan for learning outcomes in regard to specific academic content [5]. Advanced planning can prevent the withdrawal of pupils, as well as prevent the emergence of unpleasant emotions or expressions of pupils (Øien and Solheim, 2019) [7]. Planning and preparation in advance of integrated activities may be indispensable for classroom management and instructions (Webster et al., 2019). That is, literature supports that planning in prerequisite for the successful implementation of classroom-based PA in regards of overcoming many challenges as perceived by teaching staff.

4.3 Teachers' intentions towards classroom-based PA

Teaching staff's behavioural intentions are presumed to arise from their beliefs about performing the behaviour (Ajzen, 2005). These beliefs are discussed above. Attitudes, norms,

perceptions of control and intentions formed and shaped by beliefs are automatically activated and readily available to guide the implementation of classroom-based PA approaches. Teachers' behavioural intentions deriving from thematic synthesis of existing literature can be explained to a certain extent by attributes of the Theory of Planned Behaviour. This section of the chapter discusses what teaching staff's perceptions and intentions on classroom-based PA show us about the implementation of such pedagogical approaches (Research Question 2.). The section is focused on explaining intentions of teaching staff identified through already existing qualitative data, as well as presents how data from existing literature supports the use of the Theory of Planned Behaviour framework in predicting the adoption of classroom-based PA among teachers or in demonstrating their intentions to do so.

Ajzen (1991) state that behavioural intentions turn into actual behaviour once it is under teaching staff's volitional control. That is, if teachers can decide willingly to implement or not implement classroom-based PA approaches in their teaching. There is no indication in the reviewed studies that teaching staff would be limited in their volitional control over the implementation and utilisation of these pedagogical methods. The degree of autonomy of teachers in deciding when to integrate physical activities and what type of activities to integrate has been pointed out by Peiris et al. (2022). This connotes that teachers shall succeed in adopting classroom-based PA approaches in their teaching upon the availability of opportunities, required resources and intention to do so. However, the relative importance of teachers' attitudes, subjective norms, and perceived behavioural control in predicting their intentions varies across situations (Ajzen, 1991).

Findings from the analysis of study and population sample characteristics (4.1) point to various situations in which teaching staff's intention may have been appearing differently. Identification of relevant background factors could deepen understanding of the determinants of adopting classroom-based PA approaches in teaching (Ajzen, 2005). However, inconsistency in the detail of background information of population sample across studies limits the possibilities of the current study to profoundly immerse in the similarities and differences of various situations and individuals' background factors. The high variability in study design across classroom-based PA research has been previously called and cautioned for in regards of synthesising data (Daly-Smith et al., 2018; Watson et al., 2017).

Additionally, the previous section demonstrated the interconnectedness between factors that influence teaching staff's beliefs, ultimately intentions and actual behaviour. The finding that

studies lack sufficiency in assessing these complex interactions is also confirmed by Daly-Smith et al. (2021). Complexity should be considered as evident in the ecological context of teaching (Daly-Smith et al., 2021). Although complex interactions could not be adequately assessed in this study, the adoption of the Theory of Planned Behaviour as guiding framework enabled the exploration of cultures, structures and relationships that shape the ecologies of teaching staff within which they work. Thereby, exploration of intentions towards the implementation of classroom-based PA approaches in teaching was possible to an extent that does not require multiplication of beliefs and other perceptions. Instead of multiplying normative beliefs with motivation to comply with others, or control beliefs with the factors facilitating or hindering adoption of classroom-based PA (Ajzen, 1991), these elements were considered in the identification of domains and organisation of themes.

Several studies among the reviewed articles indicated impact on teaching staff's motivation, intentions, or behaviour. Teaching staff's attitudes towards adopting classroom-based PA approaches influenced their intentions in doing so. Findings of this study point out that teachers generally expressed positive beliefs about the outcomes of classroom-based PA for students. Skage et al. (2020) and Skage et al. (2022) assume that attitude, more specifically evaluation of outcomes for pupils (benefits and enjoyment) is the main factors affecting teachers' intention and explaining actual adaptation of classroom-based PA. This finding is in correspondence with research. Studies show that despite perceived barriers, teachers continue to adopt classroom-based PA due to perceived benefits for pupils (Dinkel et al., 2017; McLoughlin et al., 2023) and pupils' increased classroom performance (Moon et al., 2022). The importance of pupils' enjoyment in influencing teachers' intention is also widely acknowledged in the literature. Research shows that students' enjoyment encouraged teachers to continue implementing classroom-based PA approaches (Koorts et al., 2022). Perceived benefits of classroom-based PA are strongly associated with teachers' intentions (McLoughlin et al., 2023; Webster et al., 2020).

On the other hand, teachers' intentions towards not adopting classroom-based PA are also a result of the evaluation of outcomes for pupils. Teachers who stopped performing the behaviour in question believed that pupils were bored of the activities (Skage et al., 2020). That is, evaluated the outcomes and believed that it resulted in boredom among the pupils. This demonstrates how behavioural beliefs about adopting classroom-based PA can predict intentions of teaching staff to perform the behaviour in question. Similarly, whilst beliefs of physically active learning and its benefits for pupils were positive, it was not enough to increase

headteachers' intention for engaging in a school-wide intervention (Skage and Dyrstad, 2019). These findings exhibit that attitudes toward adopting classroom-based PA approaches can make significant contribution to predicting teaching staff's intentions (Ajzen, 1991).

Furthermore, Dorling et al. (2021) conclude that teachers first intended to adopt perceivably more boring teaching methods than integrating physical activity, however upon introducing them to classroom-based PA approaches the possibility to invoke changes can appear. This corresponds to the notion that beliefs represent the information currently available to the teachers, however their intentions can change over time as new information emerges (Ajzen, 1985). Similarly, teachers with no experience with classroom-based PA indicated that they would be more likely to implement ABs if they believed that it was a fruitful approach for learning and teaching (Peiris et al., 2022). Thus, it can be presumed that once teaching staff have gained adequate knowledge about or experience with classroom-based PA, their attitudes towards the methods evolve, influencing their intentions to adopt the approaches. To further demonstrate the relevance of the notion in adopting classroom-based PA, Mandelid et al. (2024) note that physically active learning could initiate changes in teachers' beliefs about what knowledge was and how pupils can demonstrate learning through integrated physical activities. This shows that exposure to physically active learing presented new information for teachers which shaped their attitudes regarding their beliefs and values of teaching and classroom-based PA and through the evaluation of academic relevance of the educational side of the approaches (assessment for learning). Similar findings are reported by Micheal et al. (2019) highlighting that first hands-on experiences with new educational practices are one of the most important factors in changing teachers' beliefs.

Although the subjective norms determinant has been widely criticised for its inconclusive results in predicting intentions (Ajzen, 1991; af Ursin, 2016), the findings of the current study suggests that subjective norm may play a more influential factor among teaching staff and in their adoption of other than traditional teaching methods. Elaborating on the theme of societal expectations and cultural mindsets, it can be seen that in studies conducted in countries where physical activity is reported to be supported in wider policy documents, teachers perceive less or indicate no societal expectations or cultural mindsets about education as factors towards adopting classroom-based PA. Mandelid et al. (2024) mention shortly the influence of the current performative focus of education as an obstacle towards meeting educational goals through physically active learning. Cultural mindset refers to the individualistic working culture rather than to education in the study of Skage et al. (2022) which seems to be

interconnecting with school-approaches and/ or available support from their school leaders and colleagues. This indicates that the appraisal of physical activity at national level as part of the education system may influence teachers' normative beliefs and perceive it as a social pressure to adopt classroom-based PA approaches in their teaching. It is also possible that these teaching staff perceive classroom-based PA more favourably. Webster et al. (2013) state that those teachers who are aware of the policy perceive physical activity intervention favourably.

Additionally, numerous studies highlight the facilitators and barriers towards adopting classroom-based PA approaches as related to the wider school community (Tuner et al., 2019; Koorts et al., 2022; Pulling Kuhn et al., 2024). That is, school culture, whole-school approach towards PA, support from management/ administrators/ senior leaders, teacher communities or communities of practice within the school and/ or across the school district. Walker et al. (2022) found that school champions play an important role in the life of school regarding the promotion of physical activity in forms of adopting, implementing, and maintaining approaches (through training and supporting other staff); leading school physical activity efforts and initiatives; obtaining materials and equipment, etc. More extensive findings of the importance of school champions and administrators are presented by Densley et al. (2021). Findings of their study underlines that adoption of physically active learning approaches is more common in schools where school champions are employed, and active breaks are adopted by over 97% of teaching staff in schools where administration encourage teaching staff to adopt such approaches. The importance of school environments for teachers is further appraised by Webster et al. (2013) who state that teachers feel more innovative when perceiving support from others at the school to adopt classroom-based PA.

Lastly, an assumption can be generally made that intention and behavioural control interact in their effects of achieving the particular behaviour (Ajzen, 1991). That is, teachers' intentions may influence their actual adoption of classroom-based PA to the extent that they perceive their behavioural control. In turn, actual adoption of classroom-based PA may increase perceived behavioural control as it increases teachers' motivation/ intention. Teachers' intention to adopt classroom-based PA approaches may be hindered with their realisation of lack of information, skills, or abilities (Ajzen, 1985). Teaching staff expressed various behavioural control to interact with their motivation to adopt classroom-based PA approaches. Campbell and Lassiter (2020) conclude that pupils' behavioural issues (attitude) and testing pressures (subjective norm) negatively impacted on teachers' capability (perceived behavioural control) to try new methods in teaching, e.g. active breaks. Similarly, Mandelid et al. (2024) highlight tensions

between teachers' own values (attitude) and their perceived competence (perceived behavioural control).

Additionally, lack of time as a widely stated barrier seems to also interact with other factors and overall, negatively impact teachers' intention to adopt classroom-based PA. Time has been identified as a persistent barrier in the implementation of classroom-based PA (Densley et al., 2021). Knudsen et al. (2021) found that continuous perception of lacking time can influence teachers in their commitment and willingness to adopt classroom-based PA approaches in their teaching. Campbell and Lassiter (2020) also mention time as hindering teachers themselves to experience the advantages and benefits of active breaks. The current study also finds that perceived behavioural control can be influenced by subjective norms. Quarmby et al. (2019) conclude that school cultures and support from others (subjective norms) can shape teachers' competence and confidence (perceived behavioural control). Intentions to continue the adoption of physically active lessons was clearly indicated by Skage et al. (2020). In their study, reasons for not adopting the approach anymore included lack of support (subjective norm), competing demands (perceived behavioural control), and changes in the evaluation of outcomes (attitude).

Teaching staff's behavioural intentions deriving from thematic synthesis of existing literature can be explained to a certain extent by attributes of the Theory of Planned Behaviour. Furthermore, existing qualitative research on the factors hindering or facilitating the adoption of classroom-based PA may be adequate already. That is, influential factors identified in existing literature have the potential to inform and guide the creation of questionnaires and/ or surveys framed by the Theory of Planned Behaviour framework. The formation of such questionnaire built on teachers' perspectives collected qualitatively can serve to extensively measure the factors that influence teaching staff's intentions and perceived and/ or actual control to implement and sustainably adopt classroom-based PA. In this way, future quantitative studies guided by the Theory of Planned Behaviour could help to predict and understand tendencies in the adoption of classroom-based PA in large population samples or even as part of nation-wide studies, e.g., in countries where schools are required to provide some type of daily physical activity.

5 Discussion and Conclusions

The reviewed studies included a variety of classroom-based PA methods. Whilst most studies focused on physically active learning/ lessons, several studies introduced teaching staff to active breaks. Considering the differences between the didactic and pedagogical approaches behind various classroom-based PA, it is crucial that future studies and interventions identify and examine factors and pedagogical reasoning separately for the different types of classroom-based physical activities. Different modes of classroom-based activities require different skills from teachers and different resources (Vazou et al., 2020). Furthermore, findings of the current study suggest that different types of classroom-based activities involve academic learning to a different extent and depth. A common factor influencing adoption of the approaches reflected the academic relevance of activities, more specifically academic learning and assessing the achievement of academic learning outcomes. Although some teachers may decide that all physically active activities need to relate to academic content (Campbell and Lassiter, 2020; Knudsen et al., 2021) addressing issues regarding the academic relevance of the activities, the results of the literature review do not indicate strategies or methods that could support concerns around the assessment of learning. Skage and Dyrstad (2019) note that the lack of documented learning outcome can lead teaching staff to decide not to adopt the approaches. Similarly, the study by Quarmby et al. (2019) implies that assessment of learning and proof of learning is a key concern among teachers, teaching staff and potentially external school evaluators regarding physically active lessons. Therefore, it would be especially important that future studies and adopters of classroom-based PA address this issue.

According to Madsen et al. (2020), classroom-based PA is a didactical task of teachers. This is because it is the teaching staff's role to select the physically active activities and bodily movements that best supports the specific academic content whilst also yields the perceptual, affective, and interpersonal and relational experiences of pupils. The right pedagogical choices in activities and content can positively shape students' realisation and impact on their conceptual understandings. The findings of the study highlights that several members of the teaching staff noted that physically active learning/ lessons assist students to acquire knowledge and/ or deeper understanding of the academic content compared to traditional teaching (Dorling et al., 2021; Mandelid et al., 2024; Skage et al., 2022). That is, the current study supports that as a result of physically active learning, pupils may acquire conceptual understanding of academic content to greater extents than in regular classrooms. Nevertheless,

there is inconsistency in the effects on cognition more widely in the literature (Peiris et al., 2022; Vazou et al., 2020 Watson et al., 2017). As these results derived from studies focusing on physically active learning, it is possible that such approaches (combination of physical activity and cognitive demand of the academic content) are more cognitively engaging than approaches which does not link physically active activities to the academic content (Best, 2012). It is vital that teaching staff understand their role in designing activities and planning lessons integrated with physical activity from a pedagogical point of view, with pedagogical justification for adopting classroom-based PA approaches. However, it cannot and should not be expected from teaching staff to understand without further learning how to work didactically with physical activity in the classroom. Furthermore, future studies should focus on how different classroom-based PA approaches can be supported with didactical models. If the aim for classroom-based PA (or for physically active learning) is to become a new pedagogical practice (Madsen et al., 2020) and revolutionise teaching (Skage et al., 2022; Webster et al., 2019), then a solid ground needs to be established from an educational theory and learning theory points of view. That is, future studies need to explore the most viable, feasible and applicable pedagogics behind physically active learning (preferably by academic subjects) in order for the practice to adequately support pupils' learning. Thereby, such exploration of pedagogy could potentially also address the issues and concerns around assessment of pupils' learning and provide ways and strategies in which pupils' learning of the academic content can still be assessed. McCullogh et al. (2019) and Mandelid et al. (2024) discuss that taking part in physically active games in the classroom can encourage children to 'open up more' resulting putting their learning into practice. This indicates that the identification of plausible pedagogics behind physically active learning may require or provide new ways for learning to be assessed.

Regarding the current ways of standardised testing, testing cultures and result-orientation, it can be confidently concluded that teaching staff (as well as other stakeholders) fear or are sceptical with the adoption of classroom-based PA approaches. This may be explained with the lack of evidence on the effects on pupils' long-term cognitive functioning and academic performance. It appears that current literature and research lack the exploration of academic outcomes beyond the classroom level, e.g., impact on pupils' performance on standardised tests and later (academic) success. Although teachers generally agree that classroom-based PA approaches meet the different learning needs and preferred learning styles of different students (Campbell and Lassiter, 2020; McCullogh et al., 2019; Skage and Dyrstad, 2019), there is no further study that supports the long-term impact of classroom-based PA on how having their

needs met influence pupils' later achievements or achievements on standardised tests. This suggest that there is need for longitudinal studies which accompanies pupils through their academic journey. Such longitudinal studies could inform and/ or confirm the outcomes of classroom-based PA for children and young people. Currently the variances between physical activity dose (frequency and duration), intensity and type of classroom-based PA in intervention studies makes it challenging to draw universal conclusions on the effects and outcomes (Daly-Smith et al., 2018; Peiris et al., 2022; Vazou et al., 2020). Longitudinal studies adopting different types of classroom-based PA implemented in varying dose and intensity can further assist in identifying the long-term impact on students' learning. In other words, longitudinal studies can make associations between classroom-based PA and academic achievement in contrast to current short-term interventions which tries to make association between classroom-based PA and immediate outcomes for pupils. Such research would provide evidence on the outcomes of classroom-based PA approaches compared to traditional teaching methods, ultimately validating or disproving the pedagogical importance of integrating physical activity into teaching and learning. Thereby addressing concerns around the compatibility of curriculum and physical activity in regards of standardised testing and results (Peiris et al., 2023; Quarmby et al., 2019). Dissemination of results to teaching staff can then further shape their believes and intentions to adopt classroom-based PA, or the results could be significant in determining the future ways of physical activity provision in schools.

As pupils grow older, the more resistance teachers face towards participation in classroom-based PA activities, hindering their willingness to incorporate such activities in their lessons (Webster et al., 2017). The findings of the current study also indicate that more refusals to participate in classroom-based PA activities is expected among fifth graders compared to first year pupils (Campbell and Lassiter, 2020) and that lower school grades are easier to engage in classroom-based PA than higher grades (Walker et al., 2022). Cross-sectional design of interventions limits the possibility to find out whether pupils who are exposed to classroom-based PA from an early grade would also develop resistance towards the approach in later school years. As part of cross-section interventions, pupils in higher grades are likely to be introduced to classroom-based PA in the first time, evoking different reactions and behaviour than if it would have been part of their education in long-term or for several years. Intervention studies should focus on pupils' resistance, reaction to and behaviour during classroom-based PA both at the beginning and at the end of the intervention when it is less new.

Furthermore, research shows that only few studies have focused on providing evidence on the long-term use of classroom-based PA and those even conclude that it decreases over time (Turner et al., 2019). Skage et al. (2020) completed a follow-up study two years after an intervention in which teachers delivered physically active lessons for an academic year (10 months). Lack of variety in the activities, competing demands and lack of encouragement played a role in influencing the intentions and ability of teachers to carry on with classroom-based PA. It is unclear whether teachers who felt the lack of variability in activities utilised or designed activities other than the ones provided to them during the intervention. This may indicate the importance of ownership in adopting classroom-based PA. Gråsten (2017) notes that sustained adoption of classroom-based PA approaches can depend on the extent to which teaching staff feels ownership over the practices they use. Ownership over classroom-based PA can be achieved when teaching staff feels that it is not a practice that is imposed on them (Ogborn, 2002). Therefore, it would be important that intervention studies provide resources which can enable and motivate teachers to design and modify physically active activities in their classrooms rather than using the same set of activities provided by researchers. Although the Theory of Planned Behaviour is mainly used to explain and predict behaviour in different fields, it can further support behavioural interventions in their design to change intention and behaviour of teaching staff (Ajzen, 2005). Interventions can be guided by one or more of the theory's determinants, that is, by attitude, subjective norms, perceived behavioural control. Changes in factors under each determinant can enhance changes in behavioural intentions. Interventions could be guided by the Theory of Planned Behaviour in order to achieve change in teaching staff's perceptions regarding their ownership of classroom-based PA approaches by focusing on changing their behaviour in adopting the approaches. That is, there is need for classroom-based PA interventions that target change in teaching staff's beliefs and practices. Interventions could be designed for teaching staff in a way that supports and empowers them to design and plan their own physical activities. Additionally, such interventions must make sure that teaching staff's new intentions are carried out and the behaviour (implementation or adoption of classroom-based PA) is performed under appropriate circumstances (Ajzen, 2005).

Thoughtful and extensive planning has been demonstrated in the current review to contribute greatly to the successful adoption of classroom-based PA, as well as to achieving positive outcomes and benefits for pupils. Despite the time requirements, teachers engaged in detailed planning of lessons integrated with physical activity in order to encourage participation of and collaboration between pupils, to improve their own professional practice, as well as to sense

control during teaching situations (Øien and Solheim, 2019). The importance of detailed and careful planning of physical activity integrated lessons has also been appraised and acknowledged by pre-service primary teachers (Webster et al., 2019) and lecturers of pre-service teachers (Lander et al., 2023). Planning and preparation must include details regarding classroom management (such as signals for pupils when activities start and end, guide on how to use materials, etc.) instructions, and selected and designed activities (Webster et al., 2019). Moon et al. (2022) notes that classroom-based PA best works with effective instructional and proactive classroom management strategies, whilst reactive management strategies are negatively associated with the successful integration of physical activities. Additionally, Lander et al. (2023) highlight that teachers must reflect and evaluate their own practice, including the examination of the suitability of physical activities chosen for academic content, consideration of pupils' feedback, making revisions to improve pupils belonging and learning in and as a result of PA integrated lessons. Teachers in the study of Øien and Solheim (2019) demonstrate that extensive planning and attentiveness during the lessons contribute to the success of classroom-based PA regarding meeting pupils' needs, fostering belonging and inclusion, being able to shift actions and interactions in emerging challenging situations.

The above discussion demonstrate that training should not simply provide information, guidelines and set of activities, but should facilitate teaching staff's capabilities in planning and designing integrated lessons and in managing the classroom during activities. Even though it is partly in contrast with the findings, that is, teachers request training specifically to learn some new games and activities (Martyn et al., 2022). Ajzen (2005) state that interventions using the Theory of Planned Behaviour often extends only to the assessment of effects on beliefs, attitudes, intentions and behaviour after research participants are provided information or engaged in discussions. Instead, interventions for teaching staff that are guided by the Theory of Planned Behaviour should focus on attacking particular beliefs, e.g. perceptions of classroom management as a barrier, by exposing them to alternative ways and developing specific plans to implement classroom-based PA, e.g. actual classroom management strategies. According to Kupers et al. (2023), professional development interventions and training have much higher likelihood of improving teacher instruction when interventions and/ or training are intended at the didactical elements of the lessons. In other words, interventions and training for teaching staff should focus on the didactics and pedagogy of classroom-based PA rather than merely informing about the benefits of it, or providing a set of activities, e.g., skills to successfully plan, implement and deliver physical activities in their classrooms. Teachers'

beliefs in their own capacity to deliver classroom-based PA has already been highlighted to be prioritised in implementation strategies (Walker et al., 2021). These type of interventions for teaching staff could enable the formulation of more favourable intentions towards the adoption of classroom-based PA through the elimination of some perceived barriers and shaping control beliefs.

Integration of classroom-based PA in initial teacher education is believed to be more effective and sustainable approach than when it is offered as professional development for in-service teachers (Lander et al., 2023). Whilst the idea to normalise the use of classroom-based PA from early on in one's teaching journey, beginning in teacher education is supported, the importance of professional development for those already working as teachers should not be devalued. The findings of this study showcase that there are members of the school staff who are motivated to attend training, implement, and adopt classroom-based approaches and are willing to make physical activity initiatives into a school approach (Walker et al., 2022). Moreover, in the study of Dinkel et al. (2017) half of the participating teachers believed that they could implement more PA in their classrooms, whilst a majority was motivated to obtain more ideas on how to implement classroom-based PA. The importance of the provision of continuous professional development is further supported by the fact that teaching staff changes their beliefs over time, which may make them motivated to attend training and learn more about classroom-based PA approaches. A shift can be observed in teachers' attitudes and intentions to increase physical activity in the classroom. Morgan and Hansen (2008) and Evenson et al. (2009) reported that teachers' attitudes and lack of interest was a significant barrier towards the implementation of physical activity in the classroom. Less than a decade later, studies report positive attitudes and beliefs among teaching staff about integrating physical activity and movement in the classrooms (Webster et al., 2017; Dinkel et al., 2017). In other words, it is possible that teaching staff nowadays hold favourable attitudes towards adopting classroom-based PA approaches, however their perceived behavioural control may be a stronger determinant in actually adopting the approaches. Thus, the need for effective interventions and training that encourage behaviour change among teaching staff is further supported.

In summary, current literature on teaching staff's perceptions, beliefs and attitudes towards classroom-based PA was systematically reviewed and thematically synthesised. Analysis and examination of the studies included in the thematic synthesis provided an opportunity to evaluate the viability and sustainability of classroom-based PA not only to increase pupils' physical activity levels, but also as a pedagogical and didactical approach. By drawing on the

Theory of Planned Behaviour, it was possible to explore the factors that constrain or support teaching staff in their intentions to implement and adopt classroom-based PA as a new of teaching and learning in the classroom.

Physical education cannot be considered the sole solution to provide adequate opportunities for children to meet the required daily physical activity levels as recommended in international guidelines. Therefore, it is necessary to look for alternative options to support and meet children's physical activity needs. Classroom-based PA is identified as a possible approach to increase pupils' time spent physically active without reducing educational and academic time. Ruhland and Lange (2021) believe that classroom-based PA can be realistically integrated into the school day, and academic lessons over a long period of time. However, this requires that the approach is supported, maintained, and continued by schools and members of the teaching staff. In order to identify potential factors that influence the long-term sustainability of classroom-based PA, the current study explored teaching staff's beliefs, perceptions and intentions. The (perceived) conditions in which teaching staff is expected to adopt changes and integrate physical activity in their classroom is a vital point in informing future research and interventions.

Teaching staff's perceptions and beliefs point out that majority hold positive attitudes towards classroom-based PA and value the approach due to its importance for pupils' physical development and meeting pupils' movement needs. Furthermore, teaching staff seemingly values the health, social and emotional outcomes and benefits of physical activity in the classroom, however behavioural challenges among pupils makes it difficult for them to sustain intention towards classroom-based PA. Negative attitudes are expressed with concerns especially in regard to pedagogical and didactical implementation of the approach in practice. This maybe explained by the integrative nature of the approach, i.e., physical activity and learning are understood as two separate activities (Skage and Dyrstad, 2019) and there is a lack of vision of how they can be incorporated in the classroom. That is, how activities may be planned in order to be responsive for both to the curriculum and to the pupils. Whilst some members of the teaching staff acknowledge pupils' needs for a variety of teaching approaches and different activities, educational values and views of classroom organisation still represent traditional teaching and didactic methods.

Traditional teaching and didactic methods appear to be reinforced also on a wider, societal level. Teaching staff expressed cultural norms and societal expectations regarding the way how

pupils are taught at schools in the classrooms. Additionally, expectations and pressures arise from standardised teaching and result-oriented mindsets and priorities. Curriculum demands and preparing pupils for standardised tests are great concerns across the teaching staff in the reviewed articles. The lack of pedagogical justification and reasoning (e.g. how learning is assessed when integrating academic content with physical activities) further discourages teachers to implement classroom-based PA considering that they are required to provide evidence on what pupils learn and how they succeed academically. Without sound grounds on how classroom-based PA can contribute to overall academic achievement and how it can be part of learning with an educational relevance, teaching staff may be less likely to prioritise and adopt this approach in their teaching. School cultures and whole-school approaches, including support provision, can also facilitate or hinder teaching staff's intentions and motivations to adopt classroom-based PA approaches. Some teachers expressed that they would be more likely to adopt the approaches if it was done at a school level. That is, if (classroom-based) physical activity is prioritised in the school, or by school management too, teachers are more likely to incorporate physical activity into their lessons and classrooms.

Teaching staff's perceived competence (knowledge and skills) and availability of resources are dominant factors in increasing or reducing their intentions to adopt classroom-based PA approaches. As a relatively new way to teaching and learning or innovation in education, it is understandable that teaching staff feel they lack knowledge or understanding of the methods in integrating physical activities with the academic learning. Due to this, it is no surprise that most members of the teaching staff did not experience classroom-based PA as part of their teacher education and request or believe that professional development trainings could enhance their competence. Additionally, time is the most commonly referred resource that is needed for the successful implementation and adoption of classroom-based PA. Time is highlighted as a resource for both planning and delivering physical activities in the classroom. Nonetheless, it is a promising findings that teachers who were experienced with classroom-based PA sought ways to overcome time barriers. These members of the teaching staff do not necessarily perceive time as a barrier or hindrance, indicating that planning a physically active lessons does not require more time than planning for a normal lesson (Skage et al., 2020).

At the beginning of this study, it was discussed that the realities of physical education in its current form cannot be matched with its theoretical potentials. This was argued on the basis that the subject lacks a clear purpose and objectives; it gets lost in meeting the expectations and other curriculum demands; and that teachers lack confidence and competence to teach it.

It was concluded that physical education is unable to contribute to coherent and meaningful experiences for all students and facilitate lifelong physical activity enjoyment and participation, therefore there is a need for an approach which overcome these limitations. Classroom-based PA has the theoretical potential to supplement pupils' physical activity and movement needs throughout the school day and provide opportunities which require less resources. However, the findings and results of this study denote the challenges of practical implementation of the approach. The challenges of classroom-based PA in practice corresponds to the argument that physical education is losing sight of its purposes. That is, classroom-based PA has not yet found its purposes.

There cannot be an overall aim of classroom-based PA identified besides increasing pupils' physical activity levels due to the variances in modes how physical activities can be delivered in the classroom. A more thorough classification is needed to combine the pedagogical approaches with the classroom as the delivery environment (Daly-Smith et al., 2018). This study note especially active breaks and physically active lessons/ learning as two different approaches within the concept of classroom-based PA. The aim and pedagogical justification of these approaches need to be looked at separately, and as a combined effort too. That is, adopting physically active learning approach in one lesson does not mean the exclusion of active breaks in other lessons. Additionally, schools and teaching staff might adopt classroom-based PA approaches for different reasons which further limits the possibility to identify the overall aim. The findings point out that teaching staff may utilise a classroom-based PA approach to fulfil different learning needs and styles or for other positive outcomes and benefits for pupils' learning rather than to increase pupils' physical activity levels.

In contrast to physical education where grouping of students was particularly based on movement competence and abilities (Hastie et al., 2023) resulting in marginalisation and negative feelings among pupils, some teachers in the reviewed articles in this study expressed the composition of functional groups of pupils (Øien and Solheim, 2019). The results point out that functional grouping may contribute to collaborative interaction among pupils and assists in dealing with and overcoming potential behavioural issues or negative attitudes among peers. Nevertheless, further studies are needed on the methods that best support teaching and learning. Such studies may provide evidence and support for the pedagogical methods behind the approach. Although, most members of the teaching staff reported student enjoyment, such studies could help to identify and avoid potential instances for inequities in relation to learning opportunities in physical activity-integrated classrooms.

Time constraints of teaching staff are common barriers in education. It has been highlighted that perceived lack of time limits teachers' capacity to implement adequate pedagogical approaches or to listen to their pupils in physical education (Escrive-Boulley et al., 2021). Competing curriculum demands has been acknowledged as a hindrance towards providing adequate quality physical education (Harvey et al., 2018). The findings of this study showcase that classroom-based PA face similar challenges. Lack of priority for classroom-based PA is not only an individual factor for teaching staff but can also be present on an organisation (i.e. school) level. School-wide approaches and values play a prominent role in teaching staff's intentions to integrate physical activity into their lessons. Just as physical education (Rainer and Jarvis, 2018), in an already crowded curriculum, classroom-based PA becomes gesture for good behaviour. The findings show that teaching staff often did not continue using classroom-based PA due to the challenging behaviours of pupils. Physical education has been used as a reward for good behaviour rather than being appraised for its benefits for pupils (Coulter et al., 2020). If classroom-based PA is to be sustained long-term, attitudes and perceived behavioural control among teaching staff must shift.

Lack of knowledge and skills remain major factors for teaching staff in primary schools to deliver physical activities during or as part of lessons. These factors also stand as the main hinders for primary teachers to teach physical education. confidently. It was pointed out in the context of physical education that teachers' underlying beliefs and assumptions about the subject are central. When exposed to stressful situations in the classroom, teachers may return to familiar ways of teaching the curriculum and to their established pedagogical practices. Similarly, findings of the current review demonstrate that stressful situations (e.g., deriving from the lack of competence in classroom management in integrated lessons, lack of time to plan and prepare for classroom-based PA, etc.) may also drive teaching staff back to routines, negatively impacting on their intentions to adopt classroom-based PA approaches. Professional development opportunities must be provided for teaching staff in order to promote their sustained use of classroom-based PA. Besides increasing teaching staff's knowledge on and awareness about classroom-based PA, its methods and activities, professional development should target increasing skills in classroom management, and planning activities and modes for delivery.

A Theory of Planned Behaviour perspective enabled an exploration of teaching staff's behaviour regarding classroom-based PA. Identification of factors that influence teaching staff in adopting classroom-based PA also contributed to an increased understanding of their

intentions to do so. Future research is still a long way to finding or clarifying the purposes of classroom-based PA. However, the current study emphasises that taking a Theory of Planned Behaviour perspective could assist in predicting and understanding tendencies in the adoption of classroom-based PA in large populations, and/ or in explaining behaviour and intentions to adopt such approaches in smaller population sizes over time. By adopting a Theory of Planned Behaviour approach, future studies have the possibility to start laying down the grounds for classroom-based PA as a pedagogical approach, and to follow adoption or intentions to adopt the approaches over time (e.g. before and after professional development provision for teaching staff). Utilising a Theory of Planned Behaviour perspective could enable future interventions to identify and target particular beliefs in order to change intentions for the more favourable. That is, the journey of teaching staff from idea to implementation, to professional development to adoption of classroom-based PA can be framed under the Theory of Planned Behaviour, which could serve to explain how teaching staff becomes proficient users of the approach, thereby informing future practice on behavioural change regarding this kind of new innovations in education.

The current study is limited in the scope of the articles included for thematic analysis. In this study, articles were included only when teaching staff's perceptions, beliefs and intentions were approached and considered from qualitative perspectives separately from intervention fidelities. This excluded the possibility to explore studies which may have explored teaching staff's perceptions and the factors influencing them in the implementation or adoption of classroom-based PA using quantitative measures, such as questionnaires including items related to barriers and facilitators. Thus, this review may not reveal the full picture of teaching staff's perceptions on the factors that influence them to adopt classroom-based PA in the long-term. Additionally, the study included articles in which teaching staff were questioned about or utilised various modes of classroom-based PA (physically active learning, active breaks, unspecified, mixture of many). The variability of different classroom-based PA approaches makes it difficult to summarise the factors influencing teaching staff in their intentions to implement and adopt the methods for the individual modes of physical activity being delivered in the classrooms. For more concrete analysis and exploring the sustainability and viability, it is recommended that studies separate and compare the modes of physical activity and teaching staff's intentions considering the potential differences in resources needed and academic relevance and in other factors. Furthermore, the study is limited in drawing more in-depth conclusions based on teaching staff's experience with classroom-based PA and based on the

grades/ pupils' age they were teaching as the reviewed studies were inconsistent in the extent of personal characteristics and demographic data collected. Furthermore, the current study only included articles in the review which were written and published in English language. As the field of education may be overly contextual due to the differences between educational systems in different countries, it is possible that there are more studies concerned with the topic but specifically address researchers, policy makers and stakeholders who are subject to that given education system, i.e., there are possibly other relevant studies published in different languages.

In conclusion, the current study reports a thematic synthesis - as a type of systematic literature review - of teaching staff's perceptions and beliefs about classroom-based PA in order to explore the factors which influence, facilitate or hinder the adoption and viability of such approaches among primary school teaching staff. 13 articles were collected and analysed in order to explore the implementation and long-term adoption of classroom-based PA from teaching staff's perspectives. This study explored what teaching staff's perceptions, beliefs and intentions on classroom-based PA show us about the implementation and viability of such approaches in education. There is still a long way before classroom-based PA may be normalised or become part of everyday teaching and learning practices if there is even a need for that. Teaching staff face many demands on what and how they should be teaching to pupils, and societal or cultural expectation and norms may not enhance the prioritisation of such approaches over traditional, lecture-based teaching. The findings of this study point to suggesting the use of the Theory of Planned Behaviour in future studies too to explore teaching staff's beliefs or carry out/ support interventions. By drawing on the Theory of Planned Behaviour, the present study was able to identify factors that constrain or support teaching staff's in implementing and adopting classroom-based PA. The current study attempted to increase our understanding of the factors that influences teaching staff's behavioural intentions for implementing and adopting classroom-based PA and understanding the relevance of a Theory of Planned Behaviour perspective in assisting future studies in the field.

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