The learning environment in upper secondary school physical education

The student perspective

by

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Summary

The overreaching aim of this thesis was to gain a better understanding of the students' perceptions of the learning environment in upper secondary school physical education, with special focus on marginalized subgroups. More specifically, the intention was to explore whether students perceived their learning environment differently depending on their teachers' gender, the learning support they received or the perceived competence they had. Despite the learning environment being a well-researched phenomenon in the more academic school subjects, there was a substantial knowledge gap concerning its influence in physical education. The individual works that form this ensemble aimed to occlude some of those gaps. In an effort to achieve the aforementioned aims, a new instrument measuring teacher learning support in the physical education context was also constructed and validated.

The chosen methodology for the thesis was cross-sectional, comprising of a multicomponent self-report questionnaire. The data was analyzed using various analytical tools, including structural modeling analysis and MANCOVA between group comparisons. The participants were 1133 upper secondary school students (M_{age} = 17.2, SD = 0.86) from Norway (n = 554) and Iceland (n = 579), and 17 Norwegian PE teachers (11 males, 6 females). The sampling of participants was performed using a stratified procedure representing both urban, suburban and rural settlements. Multiple steps were taken to ensure adequate sample representability.

The collective results of the individual papers indicate that the current organizational trends in PE are more in line with the needs of the highly competent students, and less so with the needs of the less competent students. This tendency intensifies the differences between these groups and may be one of the primary drivers behind the negative relationship between age and appreciation for the subject. Further, the students do not appear to be self-regulating their learning to the same extent as they are in other subjects, despite the teachers efforts to facilitate the behavior. The cause of this discrepancy likely being PE's reputation as a recreational subject, underlined by the absence of homework and the playful nature of the lessons. Additionally, the role of the teacher's gender in influencing the PE experience seems to be exaggerated.

Gender matching and positive discrimination of female PE teachers are therefore unlikely to improve the learning environment of female students.

The concluding recommendations are multitudinous and include suggestions to all the stakeholders of the subject. They include an appeal to the policymakers to rely more heavily on the body of research when implementing or adjusting policy, a plea to the teaching institutions educating the physical education teachers to emphasize formative teaching practices to a greater extent in their program, in order to promote learning behavior, and a call to the physical education teachers to address the various challenges related to the less interested and less competent students by reducing the benefits of sporting experience and ameliorating the current curriculum implementations by introducing more non-traditional sports and activities.

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Part I

1 Introduction

Research in physical education (PE) has been increasing steadily in prevalence since the 1950's (Phillips & Roper, 2006). However, the field is fragmented and colored by the interest of the respective authors rather than portraying a complete and holistic image of the subject (McEvoy, MacPhail & Heikinaro-Johansson, 2015). The fragmentation leaves some areas of the field open to exploring, while others have been scrutinized in detail. Quite understandably, motivation has been of great concern in the PE community, resulting in the prominence of research charting the PE experiences of the less motivated and less interested students (e.g. Andrews & Johansen, 2005, Olafson, 2002; Sykes & Mcphail, 2008). These explorations, which center on marginalized students at one end of the spectrum, may skew the public perception of the subject as they often receive unproportioned outward attention. Yet those same studies underline the problems highlighted by Säfvenbom, Haugen & Bulie, (2015), who found that even though most students appreciate PE, up to 43% of student would like the subject to be organized differently. Curricular implementations, biased teacher behavior and favoritism of certain cohorts continue to evoke criticism and they seem to affect these marginalized students especially hard.

While the subject of PE has evolved quite substantially since its inception in antiquity, when it was closely tied to survival and military training, recreation has always played a central role (Phillips & Roper, 2006). Movement and exercise are inherently enjoyable pursuits that are innate to humans (Jónsson, Ólafsdóttir, Bragadóttir, Guðlaugsson & Ingólfsson, 2006), which underscores the subject's popularity, but also makes the pushback that more perplexing. Somewhere along the way something must have gone wrong for the subject to become so divisive. There are many who claim to have identified some of the underlying causes, such as peer relations, varying activity preference, prior athletic experience, perceived competence and curricular implementations (Carrol & Loudimis, 2001; Fairclough, 2003; Klomsten, Marsh & Skaalvik, 2005; Redelius, 2004); all factors that have also been found to be associated with gender (Alfermann, 1999; Cairney et al., 2012; Carrol & Loudimis, 2001; Fairclough, 2003; Klomsten, Marsh & Skaalvik, 2005). As a result, the repercussions are often misappropriated to gender, which in turn is scapegoated for all of the subjects' shortcomings.

Discussions surrounding gender and gender relations are in no way novel; in fact, they have influenced the evolution of the subject heavily. As society's views on females evolved from regarding them as helpless, weak and inferior beings that had to be protected from physical exertion, to something approximate to full-fledged and equal members of the community, the PE community was forced to update its practices and adapt to the new environment (Flintoff & Scraton, 2006). The gender-segregated practices of yesteryear were highly unequitable, which eventually led to their abolishment, even though some persisted (Vertinsky, 1992). The practice is currently unusual, and often illegal (Fagrell, Larsson & Redelius, 2012; Gabbei, 2004; Hill, Hannon & Knowles, 2012; Shimon, 2005); nevertheless, there are some who feel that the decision to desegregate was a faulty one; irrespective of how reasonable the change was at the time (Derry & Phillips, 2004; Gabbei, 2004; Hannon & Williams, 2008). Even though the idea of backtracking by reintroducing gender-segregation, does have some support, there are many who believe it to be a circumvention of dealing with underlying issues facing the subject (Fagrell et al., 2012; Larsson, Fagrell & Redelius, 2009; Shimon, 2005). A more reasonable course of action would be to challenge the status quo by identifying and integrating marginalized students using integratory strategies (Larsson et al., 2009).

However, recognizing what has to be done is only first step; the challenge involves figuring out how to do it (Lirgg, 2006). If a more enjoyable PE environment is to be offered, the behavior that leads to enjoyment and success has to be defined. This involves both curricular implementations and teaching strategies. In fact, teacher education programs should incorporate the construction of positive learning environments and attending to the psychological well-being of the students into their education, in an effort to centralize the pursuit. Additionally, the teachers need to recognize their integral role in facilitating both learning and motivation, while also being able to plan active classes, teach the skills correctly and give adaptive feedback (Lirgg, 2006). These are after all some of the central elements in the subject's mission statement (Menntamálaráðuneytið, 2007; Udir, 2015a).

1.1 This thesis

Hitherto, learning environment research in PE has mirrored the general field and focused heavily on the motivational aspects of the learning experience. Having identified a dearth of research exploring the learning environment from a more holistic perspective, this thesis sought to expand on the current consensus by taking a more holistic approach. As the subject is often criticized for being too recreational, and not conforming to its own mission of educating as well as entertaining, capturing the students' learning experiences was deemed integral to accurately portray the learning environments in question. For the desired objective to be achievable, a new scale measuring the PE teachers' didactical approach had to be formulated; and subsequently validated.

A review of the literature reveals the PE community's concern for the marginalized students, and the willingness of its stakeholders to rectify their predicament (Olafson, 2002; Oliver & Kirk, 2015, 2016; Walseth, Engebretsen & Elvebakk, 2018). The plight of the least content female students has been categorized through the use of qualitative studies, resulting in the malignation of the current system and its gatekeepers; often claiming that biased and prejudicial practices are rampant, and that sections of the population are disregarded (Andrews & Johansen, 2005; Olafson, 2002). This thesis views these claims as the starting point to its analysis on the subject, and seeks to explore whether and to which degree gender, competence and other factors may affect the students' perceptions of their learning environment.

1.2 The aim of the thesis

The main purpose of this thesis was therefore to gain a better understanding of the students' perceptions of the learning environment in PE, with special focus on marginalized subgroups. The main objectives of the individual research papers were:

I. To create and validate a new instrument designed to measure teacher learning support in the physical education context, and use that instrument to investigate the relationship between teacher learning

support, the motivational climate and self-regulated learning in that context.

II. To examine whether a relationship exists between the teacher's gender and the perceived quality of the learning environment in physical education.

III. To explore the relationship between perceived competence and perceived teacher support in physical education.

2 Theoretical framework

The following sections builds a theoretical and empirical foundation on which the subsequent individual research papers rely on, while delineating central constructs and their relationships to one another.

2.1 Ecological systems theory

The theoretical framework of the thesis is grounded in Bronfenbrenner's (1977, 1979) ecological systems theory. The basic premise of that theory is that human behavior and development is a function of the interaction between the individual and the environment (Bronfenbrenner, 1977; Bronfenbrenner & Morris, 2006). In other words, an individuals' behavior is not solely a response to stimuli, but rather the product of a complex interconnected relationship between the immediate and distant surroundings. Understanding the interconnectedness within and between the various systems facilitates a greater understanding of behavior.

Bronfenbrenner's (1977, 1979) ecological system is comprised of five sets of nested structures, each positioned within the next (see figure 1). At the center is the *individual*, who shapes and reacts to the environment he or she finds him- or herself within. Most proximal to the individual is the *microsystem*, which refers to the individual's relationship with the groups that most directly affect the individual's development, such as family, teachers and peers. The next level is the *mesosystem*, which consists of the interrelations between the groups in the microsystem, or more distinctly, a system of microsystems of which the individual is an active participant. The *exosystem* is an extension of the mesosystem, representing both formal and informal social structures that do not affect the individual directly, but do have a significant indirect impact nonetheless. Among the institutions associated with the exosystem are mass media, social services, local politics and the economy. Most distal to the individual is the *macrosystem*, which differs from the other systems, as it does not refer to a specific context, but rather the overarching institutional patterns that affect the contexts in which the individual operates within. The macrosystem includes the sociocultural ideology, views and customs that make up the larger cultural climate of each domain. Additionally, Bronfenbrenner

(1986) introduced the chronosystem, which puts behavior into a temporal perspective. The chronosystem encompasses normative life changes (e.g. starting school, marriage, procreation), non-normative life changes (e.g. natural disaster, loss of a family member, war) as well as socio-historical changes (e.g. increased gender equality, civil rights movement, automation) that shape individual development. Experiencing such transitions may affect the individuals' perceptions of their environment; indeed various individuals often perceive the same environment differently (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2006).

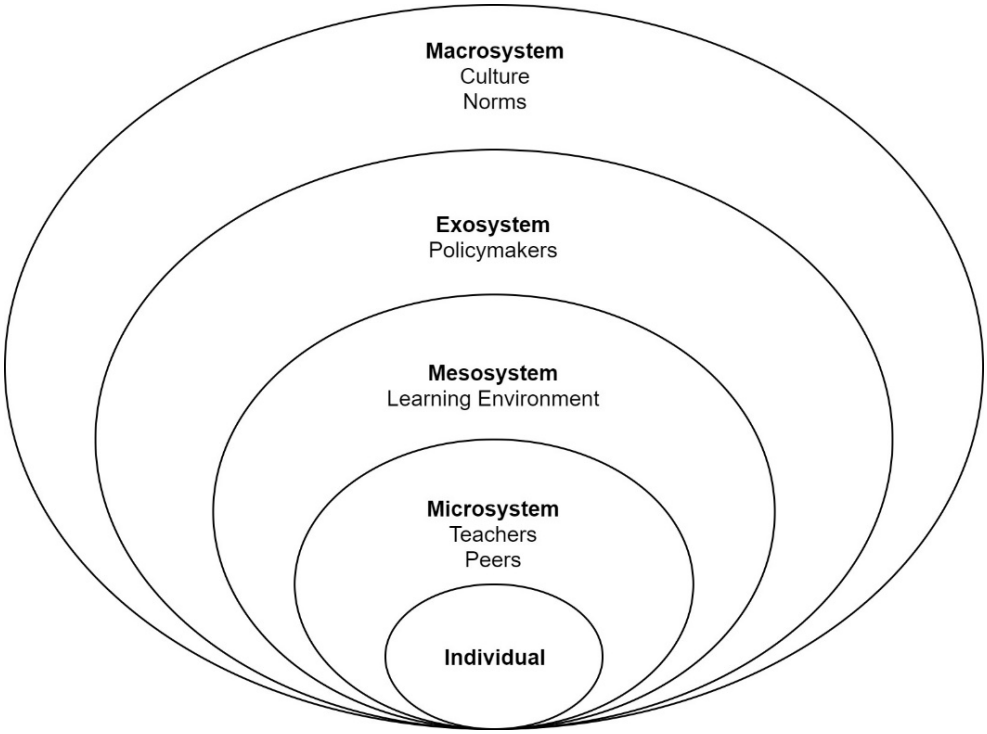

Figure 1. The current thesis viewed through Bronfenbrenner's (1977, 1979) ecological systems theory.

2.2 Putting PE policy into perspective

2.2.1 Normative PE

PE is a core part of the school curriculum all over the world, with 95% of the world's countries enforcing the subject's implementation to some degree (Hardman, 2008). While the subject fights for recognition, academic standing and allocation of time elsewhere, PE is held in relatively high regard in the Nordic countries (Annerstedt, 2005; Hardman, 2008; Moser, Jacobsen & Erdman, 2005; Rønholt, 2005). The subject ranks third in allocated time in compulsory education in Norway, bettered only by Norwegian and mathematics (Utdanningsdirektoratet [Udir], 2017a), and PE teacher education in Iceland and Finland are five-year M.sc. programs with comprehensive entrance requirements (the Finnish program has a 95% rejection rate; Heikinaro-Johansson & Telama, 2005). The subject is highly valued within the academic system, which is highlighted by PE grades being given the same value as academic subjects (Annerstedt, 2005; Moser, Jacobsen & Erdman, 2005).

The overreaching aims of the subject differ slightly depending on the whereabouts; however, certain communalities are constant. PE generally strives to encourage and facilitate independent physical activity through playful activities that promote mastery, competence, self-discovery and a positive body image (Jónsson et al., 2006; Udir, 2015a). While the subject performs an important role in the general education of the student promoting social, emotional and moral development, it also introduces important life skills such as fair play and teamwork (Menntamálaráðuneytið, 2007; Udir, 2015a). Because of the subject's social and interactive characteristics, cooperation, sympathy and respect are also integral elements associated with the PE experience (Jónsson et al., 2006; Udir, 2015a).

The subject remains popular among Nordic students, traditionally topping satisfaction surveys (Kangas, 2010; Moen, Westlie, Bjørke, & Brattli, 2018; Säfvenbom et al., 2015). However, a substantial percentage of students report that they either dislike PE, or they feel that it should be organized differently (Säfvenbom et al., 2015). These students, who are predominantly female, do not necessarily have an aversion to physical activity, but rather the over-

competitive, hyper-masculine, multi-activity institution that PE seems to be (Andrews & Johansen, 2005; Lamb, Oliver & Kirk, 2018; Olafson, 2002). As a result, these students may revert to self-handicapping and various other tactics to avoid participation (Cothran, Kulinna & Garrahy, 2009; Ommundsen, 2001a). Instead of reacting to the problem, too many PE teachers take the path of least resistance and hide behind the preferred activities of the majority, using the benefits of physical activity as an armor against criticism (Crum, 2012). This results in an environment where sections of the students are rewarded for using skills acquired outside the confines of PE to succeed (Aasland, Walseth & Engelsrud, 2019; Crum, 2012; Fagrell et al., 2012). Environments of this nature can create a disconnect between various groups coexisting within any given class: males and females, the sedentary and the active, the athletes and non-athletes, those that partake in traditional sports and those that partake in alternative sports, as well as numerous other groups. The less favored subgroups may start to act out or skip class in rebellion against what they see as unfair or biased treatment (Olafson, 2002). Recognizing which groups are more likely to appreciate the subject, and the pretext for their attitude, can therefore be a valuable tool in the ongoing fight for equivalency in PE.

2.2.2 Predictors of PE appreciation

Appreciation for PE has been found to be negatively impacted by age; meaning that fewer and fewer students enjoy the subject as they progress through their education (Digelidis & Papaioannou, 1999; Prochaska, Sallis, Slymen & McKenzie, 2003). The main impetus behind this decline is believed to be the simultaneous and concurrent decline in both sport participation and leisure time physical activity (Prochaska et al., 2003; Thompson, Baxter-Jones, Mirwald & Bailey, 2003).While Females also tend to report less appreciation for PE than males, resulting in the omnipresence of gender as a topic of debate within the PE community (Prochaska et al., 2003; Säfvenmbom et al., 2015), gender is not considered to be a key determinant of appreciation. The two most prominent predictors of PE appreciation are prior sport participation and perceived athletic competence (Redelius, 2004). The gender disparity in PE appreciation is therefore more likely to be related to the disparity in sporting participation and athletic competency between boys and girls (Dowling, 2016; Redelius, 2004).

The determinants of these discrepancies appear to be both societal and physiological.

During adolescence, both male and female students experience physical changes that influence their self-esteem (Altintas & Asçi, 2008; American Association of University Women [AAUW], 1994). While girls develop breasts and their fat-to-muscle ratio increases (Labbrozzi, Robazza, Bertollo, Bucci & Bortoli, 2013), boys' fat-to-muscle ratio decreases as they grow in size and strength (McCabe & Ricciardelli, 2004; Rosenblum, & Lewis, 1999). Understandably, boys tend to have a more favorable view on these changes, and the possibilities associated with them (AAUW, 1994; Klomsten, Skaalvik & Espnes, 2004; Haugen, Ommundsen & Seiler, 2013). As a result, male students have been found to report a sporting-confidence score that exceeds their female counterparts significantly (AAUW, 1994; Klomsten et al, 2004). Since the PE curricula is heavily dominated by sports, it has to be considered unsurprising that girls tend to feel less competent in PE classes than boys do. Many girls are made to feel embarrassed as their efforts are ridiculed and their mistakes laughed at (Flintoff & Scraton, 2006; Olafson, 2002; van Daalen, 2005). When female friendly activities are on the agenda, the boys tend to behave disruptively and marginalize the girls' accomplishments. As a result, the girls marginalize themselves even further through various loafing strategies in an effort to distance themselves from the action (Cothran et al., 2009; Wright, 1996). These occurrences are the cornerstone of much of the criticism towards the subject, and the premise for much of the media coverage PE receives.

2.2.3 A tale of two crises

The mass media reports on what they view as suboptimal educational environments in the modern school system with some regularity (Vogt, 2018). The fact that boys tend to fare worse than girls in the more academic subjects, and girls tend to fare worse than boys in PE is sensationalized and hyperbolized with labels such as the girl crisis, the boy crisis and the war on boys (Bakken, 2009; Cappon, 2011; Oliver & Kirk, 2016; Tarrant et al, 2015). Allusions are made to systemic discriminations of the respective genders through the feminization of education and the hyper-masculine culture that characterizes PE. Supposedly, males are being set up to fail in the classroom, while females

are neglected and overlooked in the gymnasium. These proclamations are made despite a relatively overwhelming consensus among researchers familiar with this topic that this discourse is an oversimplification of a wide range of factors that have to be viewed in a more nuanced light (Bakken, 2009; Cappon, 2011; Cho, 2012; Sansone 2017; Vogt, 2018). The proposed solutions of positive discrimination and gender matching continue to pop up, and the structural change needed to tackle the root causes receive little attention (OECD, 2017; Tarrant et al., 2015; Vogt, 2018).

Naturally, some gender-dependent variations in teaching behavior still exist; male teachers have for example been found to be more authoritarian and controlling, while female teachers have been found to be more democratic, collaborative and nurturing (Lam, Tse, Lam & Loh, 2010). However, these differences are superseded by more efficacious traits such as pedagogical ability, motivation, engagement, supportiveness and consistency (Carrington et al., 2007; Martin & Marsh 2005).

The problem with the constant and erroneous focus on gender is the opportunity cost (Vogt, 2008, 2018; Jackson, 1998). When most of the attention, focus and time is wasted on correcting or ameliorating the alleged gender-based discrimination, there is little left over for the actual causes of neglect. The underlying problems that are masked by gender remain, and the countermeasures are therefore unlikely to succeed. This tendency of overvaluing gender as a determinant, or gender absolutism, is problematic as viewing all things through a gendered lens can lead to confirmation bias and the exaggeration of subtle nuances (Jackson, 1998). In fact, males and females are more alike than they are different, even though the differences between the extremes may be substantial (Vogt, 2018). Consequently, future improvements to the current system should focus on the variables that have been shown to affect the marginalized, as opposed to their common denominator. One of those is the curriculum.

2.2.4 Curricular conundrum

Curricular implementation seems to be at the core of much of the frustration regarding PE (Fairclough, 2003; Klomsten et al., 2005; Säfvenbom et al., 2015). The most common PE curriculum is based on the multi-activity

approach, which consists of multiple, short-duration units of activity with minimal instructional periods; also known as introducing, informing and entertaining (Annerstedt, 2008; Ennis, 1999; Kretchmar, 2006). To an outside observer the approach may seem ideal, as the students will appear active and involved in a multitude of activities; however, in actuality the approach can be highly inequitable for the less skilled students. Class control is exercised by central authority figures, there is little effort to equalize playing opportunities and public displays of ability are required (Ennis, 1999).

When determining curricular implementation, the PE teachers tend to be conservative, opting for the most popular and traditional activities, while relying on their own experiences from the world of sports; which often results in a less than optimal environment (Crum, 2012; Syrmpas, Digelidis, Watt, & Vicars, 2017; Trost, 2004). With activity preference being both gender- and skill-dependent, these decisions can be an important factor in determining PE satisfaction (Couturier, Chepko & Coughlin, 2007: Dudley, Okely, Pearson, & Peat, 2010; Erdvik, Haugen, Ivarsson & Säfvenbom, 2019a; Fairclough, 2003; Klomsten et al., 2005; Westerståhl, Barnekow-Bergkvist, & Jansson, 2005). The curriculum tends to be heavily congested with traditional team-based sports, while activities that are usually labeled as being feminine (e.g. dance, yoga, gymnastics) are often neglected or disregarded (Annerstedt, 2008; Kastrup & Kleindienst-Cachay, 2016; Moen et al., 2018). As most of the allotted time is used to execute and evaluate skills rather than developing them, PE can be seen as a subpar arena for skill development, leaving students who participate in extracurricular sports at a great advantage (Gibbons, 2008; Smith, Lounsbery & McKenzie, 2014). Moreover, these priorities run counter to the aims of the subject, which are to facilitate mastery, develop teamwork and inspire students to live active lives, rather than inciting competition and cultivating a competitive mindset (Fagrell et al., 2012; Udir, 2015a). Still, despite the aims being rather explicit, they are interpreted and implemented rather differently by the various PE teachers, depending on their fundamental views on the subject.

2.2.5 The two polarizing agendas

The PE community is polarized by the dichotomy of two leading agendas: the public health agenda and the educational agenda (O'Sullivan, 2004). Those that adhere to the educational agenda view learning and individual development as paramount, while those adhering to the public health agenda view the subject as a platform to fight hypokinetic disease and the sedentary lifestyle. As the public health agenda gains impetus, learning takes the back seat to fitness and recreation (Crum, 2012). While the intentions are noble, and include stimulating physical activity, hoping that positive experiences will lead to an appreciation for exercise, resulting in a lifelong active lifestyle; the consequences can be dire, as long-term de-emphasizing of learning could ultimately prove catastrophic to the subject and the PE teacher profession (Crum, 2012; Green, 2014). The expertise of PE teachers may become obsolete if the subject is reduced to supervised physical activity without any long-term learning goals (Crum, 2012). As outside pressure from policymakers mounts, going against the health agenda may become taxing (Thomas, 2004).

Conversely, the educational agenda emphasizes the enhancement of knowledge and competence through learning. The students are introduced to a movement culture that equips them with the personal and social capabilities to create their own movement identity by solving problems related to movement, technique, tactics, fair play and exercise (Crum, 2012). To operate within the educational agenda, the teachers need to possess the pedagogical and didactical capabilities required to cope with the complexities of the subject (O'Sullivan, Tannehill & Hinchion, 2010). The distinctiveness of PE as a subject, being the only one that engages both the mind and the body through inherently enjoyable exercise, introduces an added need for explicitly communicating learning goals to the students. Without a clear directive from the teacher, there is bound to be confusion concerning expected student behavior, which may lead to reduced learning enhancing behavior (Cothran, 2010). Furthermore, for learning to be facilitated in PE, the assessment practices should be in congruence with the overarching theme.

2.2.6 Formative vs. summative assessment

The method of assessment can inhibit or facilitate learning as a result of the standards used and the objective of the assessment (Black &Wiliam, 1998, 2010). Summative evaluations are outcome oriented and rank students according to their proficiency (Bloom, Hastings & Madaus, 1971). The assessment is the end-product and serves no change-evoking purpose. Conversely, formative assessments are continuous and interactive, where progress is facilitated through formative procedures and re-evaluations of current abilities (Black, Harrison, Lee, Marshall & Wiliam, 2004; Black & Wiliam, 1998; Hattie and Timperley 2007). The teachers try to meet the learners' needs by constantly adapting to a changing landscape and adjusting their work accordingly (Black et al., 2004). The adoption of formative assessment practices, allows the teacher to promote proactive rather than reactive learning behavior (Nicol & Macfarlane-Dick, 2006).

Hattie and Timperley (2007) sum up the formative process in three simple questions: where am I going? how am I going? and where to next? These questions address the goals in question, what progress is being made to reach those goals, and what is needed to progress even further. In environments where learning is facilitated through formative assessment, both the student and the teacher are likely to make headway as the students are more likely to display proactive rather than reactive learning behavior (Nicol & Macfarlane-Dick, 2006; Ní Chróinín & Cosgrave, 2013).

A Norwegian school reform from 2006 (Kunnskapsdepartementet, 2006), which sought to incorporate Black and Wiliam's (1998) work on formative assessment into the curriculum, makes Norwegian PE an ideal context for this research. In line with the principles of formative assessment the teachers were encouraged to share learning goals, reward effort and make continuous assessments that facilitated learning (Kunnskapsdepartementet, 2006; Tveit, 2014). The reform was particularly important in the PE context, as the previously prevailing assessment practices were controversial and lacked formative purpose (Arnesen, Nilsen & Leirhaug, 2013; Leirhaug, 2016). The reformed assessment guidelines are more interactive and involve the teachers making inferences about the students' current abilities and subsequently applying formative procedures to facilitate progress. (Tveit, 2014).

2.2.7 Teacher qualifications

In recent years, the Nordic countries have been increasing the required educational standard for their teachers (Menntamálaráðuneytið, 2008; Kunnskapsdepartementet, 2014; Sahlberg, 2010). These changes are being made in spite of evidence refuting the relationship between formal qualifications and improved student achievement; as the main purpose is to ensure pedagogic quality (Hattie, 2009; Kunnskapsdepartementet, 2015; Menntamálaráðuneytið, 2008). Moreover, graduates of extended teaching programs have been found to be better prepared, more satisfied with their preparation and more likely to continue their teaching duties than those who attend shorter programs (Andrew, 1990; Darling-Hammond, Chung & Frelow, 2002). In fact, the retention rate of the more educated teachers is so much higher than their less educated counterparts, that when all aspects are taken into account they end up being the less expensive option (Darling-Hammond, 2000). However, there is a possible circularity to the argument, as the more highly motivated teachers may be the ones who seek further education due to them identifying with the profession to a larger extent than those who do not.

As the PE teachers are responsible for supporting and facilitating the students' development by presenting clear, specific and achievable learning goals, while also supporting the learning experience through feedback and various teaching strategies, it would seem preferable to possess pedagogic qualifications of excellent standards (Peeters et al., 2014). By providing a safe and predictable learning environment, using organizational and managerial structures that encourage personal and social responsibility, quality PE teachers can make physical activity an enjoyable process that increases competence and self-efficacy while encouraging students to lead active lives (Ommundsen & Lemyre, 2007; Tannehill, van der Mars & MacPhail, 2013). As Fraser and Tobin (1989) illustrated in their research on science teachers, exemplary teachers were found to create a more favorable learning environment than non-exemplary teachers did.

2.3 Learning environment

But what is the learning environment and how is it measured? The relatively broad definition that was used in this study views the learning environment as

the social, psychological and pedagogical context in which learning occurs (Fraser, 1998). These elements were measured using the students' perceptions of peer- and teacher-student relations, the motivational climate and the perceived learning support provided by the teachers (see more on the instruments in the methodology section). This method of measuring the students perceptions of the learning environment is relatively novel, albeit necessary to fulfill the aims that were put forth. Research on the learning environment in the more academic subjects is plentiful (Fraser, 1981, 1998, 2015); however, there is a dearth of research in the PE context. Obtaining a full overview of the field can be onerous due to the elusiveness of the concept, its widespread use as an umbrella term, and the tendency for it to be used synonymously with related concepts such as school climate, learning climate and school atmosphere. Due to the tendency to conflate the learning climate with the motivation climate (which is an integral element of the learning environment), the current study operationalized its measure thusly.

The learning environment has been found to constrict or enhance students' learning outcomes as well as succoring or mitigating the development of self-regulation (Ommundsen & Lemyre, 2007; Padron, Waxman & Huang, 1999). As students respond to what they think is important, an examination of the students' views and interpretations of their learning environment could further the collective understanding of the phenomenon (Padron et al., 1999). The students' perceptions can be viewed as a sound indicator of the actual situation as their position within the environment, the time spent within it, and their prior experiences within different environments, make them highly qualified to form an accurate impression (Fraser, 1998).

The existing research within the PE context has mainly focused on the motivational properties of the learning environment (e.g. Lynch & Mcloughlin, 2018; Koka & Hein 2003a, 2003b; Ommundsen, 2001b), leaving much to be explored concerning the broader domain. Mitchell (1996), who developed the Physical Education Learning Environment Scale (PELES; subscales include perceived competitiveness, perceived challenge and perceived threat), found that perceived challenge and perceived threat predicted intrinsic motivation in PE for both male and female middle schoolers. In congruence with Mitchell's findings, Koka and Hein (2003b) found that the complexions of the learning environment also predicted intrinsic motivation in Estonian middle schoolers.

The same authors (Koka & Hein, 2003a) also found a relationship between extracurricular sporting participation and feelings of threat to self-worth in secondary school. Those participating in sports feeling less threatened than their non-participating peers did. Furthermore, the sport participating females also perceived more positive feedback than their non-participating schoolmates did. Ommundsen's (2001b) study on Norwegian ninth graders revealed that the motivational aspects of the learning environment in PE influenced the students' perception of their own abilities as well as their optimism for learning.

In a study that somewhat resembles individual paper II in this thesis, Ward (1982), using the Learning Environment Inventory (LEI; Fraser, Anderson & Walberg, 1982), which was designed for use in the classroom, found that the gender of both the students and the teachers influenced the perception American PE students had of their learning environment. Further, Ward also found gender matching to be advantageous, especially to the female students. However, as noted by Ward himself, his results were likely influenced by the tumultuous transitions at the time, following the introduction of title IX (an amendment prohibiting any gender-discrimination in education; Education Amendments Act of 1972, 2018). In addition to the research already mentioned, there are a number of studies that reference the learning environment without measuring it explicitly (e.g. Mitchell, Gray & Inchley, 2015; Subramaniam & Silverman, 2007) or only measure one individual aspect of the learning environment yet still use the hypernym instead of the hyponym (e.g. Perlman, 2010).

Irrespective of the desire to progress beyond motivation, the teaching structures that underline the students' interpretation of achievement and their perception of the social context they are operating within will always be relevant. With PE in essence being a demonstration of ability, the performance evaluation and the standards to which that evaluation is referenced are integral to creating a positive learning environment (Duda, 1993).

2.3.1 Motivational Climate

According to the achievement goal theory (Nicholls, 1984), two distinctive goal orientations have been identified: task-orientation and ego-orientation. The former centers on effort translating into performance and values the

development of competency, while endorsing the value of learning as an outcome in itself. The latter centers on social comparisons, the pursuit of positive judgements and the belief that superior performances are paramount. An individual's goal orientation is likely to affect effort, performance, task choice and persistence (Duda, 1996). Task-oriented learners are therefore more likely to choose moderately challenging tasks, maintain interest and persist in their pursuits, while ego-oriented learners tend to choose unchallenging tasks, lack persistence when facing adversity and attribute failure to the lack of ability rather than effort. Moreover, ego-orientation can be bifurcated into two distinct sub-dimensions: self-enhancing ego-orientation and self-defeating ego-orientation. The former refers to the desire to be the best and to display superior ability, while the latter refers to the desire to avoid looking stupid and receiving negative comments by trying not to be the worst performer in the class (Skaalvik, 1997; Skaalvik, Valas & Sletta, 1994). These two distinct manifestations of ego-orientation may explain the inconsistent results often associated with ego-oriented achievement goals (Ommundsen, 2006; Ommundsen & Lemyre, 2007).

While goal orientations are dispositional individual characteristics, the motivational climate is situational and refers to the collective perception and interpretation of the achievement environment structure (Duda, 2001). Whether the climate is task-involving or ego-involving depends on the collective goal orientation of the group members, and the mediating influences of the teacher (Ames, 1992). It is important to note that goal orientations are not bipolar, but rather orthogonal, meaning that they can coexist to a different degree at the same time as opposed to existing at opposite extremes of a spectrum. In other words, any individual can score high or low on both ego-orientation and task-orientation and any environment can be perceived as being both ego-involving and task-involving at the same time (Duda, 2001; Ferrer-Caja & Weiss, 2000; Young, 2005).

In a task-involving climate, every student is valued, success is regarded as attainable, effort is rewarded, mistakes are regarded as an integral part of the learning process, and optimally challenging tasks and activities ensure that learning occurs (Ames, 1992; Nicholls, 1984; Papaioannou, 1995). Conversely, an ego-involving climate centers on social comparison and competence-based favoritism, where the product is assigned more value than hard work, and

mistakes are punished. In essence, the difference between the two boils down to the lens through which ones competence and ability are viewed; task involvement is introspective and focuses on self-improvement and mastery of skills, whereas ego-involvement is extrospective and focuses on ones position in reference to others. The dominance of either form of involvement has been found to effect satisfaction, motivation, competence and numerous other aspects related to the PE experience (Braithwaite, Spray, & Warburton, 2011).

The matching of individual's with goal orientations compatible to the motivational climates was long believed to have more favorable outcomes for the matched individuals than mismatched ones (compatibility hypothesis); however, those claims seem to have been refuted by Papaioannou, Marsh and Theodorakis (2004), who found no advantages of such matching. Yet, the motivational climate in any given environment has been found to influence the individual orientation its members adopt, as well as influencing individual performance in the same way goal orientations do (Duda & Hall, 2001; Ntoumanis & Biddle, 1999; Papaioannou et al. 2004). Moreover, interventions facilitating a more positive learning environment have been found to have positive effect on both task-orientation and task-involvement (Digelidis, Papaioannou, Laparidis & Christodoulidis, 2003).

In addition to creating a positive mastery-focused climate, the teachers are also expected to assure the fulfillment of the students' basic psychological needs.

2.3.2 Basic psychological needs

The basic psychological needs theory, a mini-theory derived from Deci and Ryan's self-determination theory (1985, 2000), identifies autonomy, competence and relatedness as the three basic psychological needs necessary to function optimally in any social context. According to Deci and Ryan (2000) autonomy refers to the individual's need to perceive his or her actions as being self-endorsed or volitional, competence refers to the need to seek optimal challenges and extend existing capabilities through exercise, and relatedness refers to the need to develop secure relationships with others. For these psychological needs to be fulfilled, a need-supportive environment that facilitates competence, supports autonomy and stimulates emotional

connections has to be in place. Neglecting any of the basic needs can be detrimental and result in functional cost (Deci & Ryan, 2000).

The bulk of research on need support and need satisfaction in PE has focused on the need for autonomy and the role volition and self-determination play in facilitating motivation, learning, physical activity and various other factors within the subject (Garn, McCaughtry, Martin, Shen & Fahlman, 2012; Hagger, Chatzisarantis, Culverhouse & Biddle, 2003; Hagger, Chatzisarantis, Barkoukis, Wang & Baranowski, 2005; How, Whipp, Dimmock & Jackson, 2013; Shen, McCaughtry, Martin & Fahlman, 2009). In general, the relationship between need support and need satisfaction is relatively well documented, both in PE and elsewhere (Chang, Chen, Tu, & Chi, 2016; Cox, Duncheon, & McDavid, 2009; Shen, McCaughtry, Martin, Fahlman, & Garn, 2012; Standage et al., 2005). However, the dependency of an individual's competence levels on external facilitation may not be as clear-cut as the self-determination theory would suggest. Even though perceived competence has been found to be related to competence support (Standage et al., 2005), physical activity levels and sport participation appear to be the main determinants (Anderssen, 1993; Carroll, & Loumidis, 2001; Goudas, Dermitzaki, & Bagiatis, 2001).

2.4 Individual aspects

2.4.1 Competence

According to White (1959) competence refers to the individual's capacity to interact effectively with a given environment, and is usually gained through prolonged learning sequences. However, an individual's perception of his or her own competency can differ significantly from the actual measure of competence, as individual perceptions are often environmentally dependent (Bandura, 1977; Bortoli, Bertollo, Comani & Robazza, 2011). Indeed situational factors can inaccurately ascribe gains or losses in competency depending on the attribution of performance outcomes to ability or external factors (Bandura, 1977).

Previous studies within the PE context have found that males are more likely to report feelings of competence, and that high context-specific competency tends to be associated with more motivation for the subject, higher levels of physical activity, increased enjoyment and more experiences of dispositional flow (Cairney et al., 2012; Carrol & Loumidis, 2001; Fairclough, 2003; González-Cutre, Sicilia, Moreno & Fernández-Balboa, 2009; Ntoumanis, 2001; Robinson, 2011; Timo, Sami, Anthony & Jarmo, 2016). In a sample of French junior high school students, Trouilloud, Sarrazin, Bressoux and Boix (2006) found that the teachers' early expectations were related to the students' end of term competence levels, especially in environments where autonomy support was low. This tendency for students to fulfill their teachers expectations is a relatively well documented phenomenon in the educational sciences, known as the Pygmalion effect (Boser, Wilhelm & Hanna, 2014; Friedrich, Flunger, Nagengast, Jonkmann & Trautwein, 2015; Rosenthal, 2010).

Even though variations in competency occur in all school subjects, PE seems to stand out. The genesis of this particularity likely rooted in the nature of the subject and the way variations in competency are on display for all to see (Fagrell et al, 2012). The physical and exhibitional nature of the activities make concealing ones shortcomings difficult; which may explain why the less competent students tend to opt out of the class, given the opportunity to do so (Fagrell et al., 2012; Ntoumanis, 2005). Providing a supportive mastery oriented environment, devoid of social comparisons, which has been found to be beneficial to perceptions of competence, may ameliorate the PE experiences of the less competent (Bortoli et al., 2011; Cox & Williams, 2008; Ntoumanis & Biddle, 1999); bearing in mind that subpar environments have been found to most adversely affect the least competent (Papaionnou, 1995). Another individual aspect that also appears to be influenced by the environment in which the individual operates in is the self-regulation of learning (Ommundsen & Lemyre, 2007; Padron et al., 1999)

2.4.2 Self-regulated learning

Self-regulated learning, which has been found to differentiate between effective and less effective learners, is a process that involves proactively directing behavior and using strategies to achieve self-set learning goals (Cleary, Platten

& Nelson, 2008; Cleary & Zimmerman, 2004; Kolovelonis, Goudas, Hassandra & Dermitzaki, 2012; Zimmerman, 2006). The behavior is not regarded as an innate trait, but rather as a malleable context-specific environmental response (Zimmerman, 2002). Students who self-regulate their learning focus on self-improvement and self-monitoring while taking advantage of the learning opportunities presented to them (MacNamara, Button & Collins, 2010; Zimmerman, 2008).

Self-regulation is a cyclical process where reflections on earlier experiences are used to ameliorate future learning efforts (Zimmerman, 1998; 2000). The process involves three phases: the forethought phase, the performance phase and the self-reflection phase. As the names suggest they occur before, during and after the performance effort. In essence, self-regulated learning involves knowing how to set goals, realizing what is needed to achieve those goals and determining how to actually achieve those goals (Dabbagh & Kitsantas, 2012). By using the behavioral feedback that is gained from the learning effort, adjustments can then be made to the chosen strategies (Zimmerman, 1989).

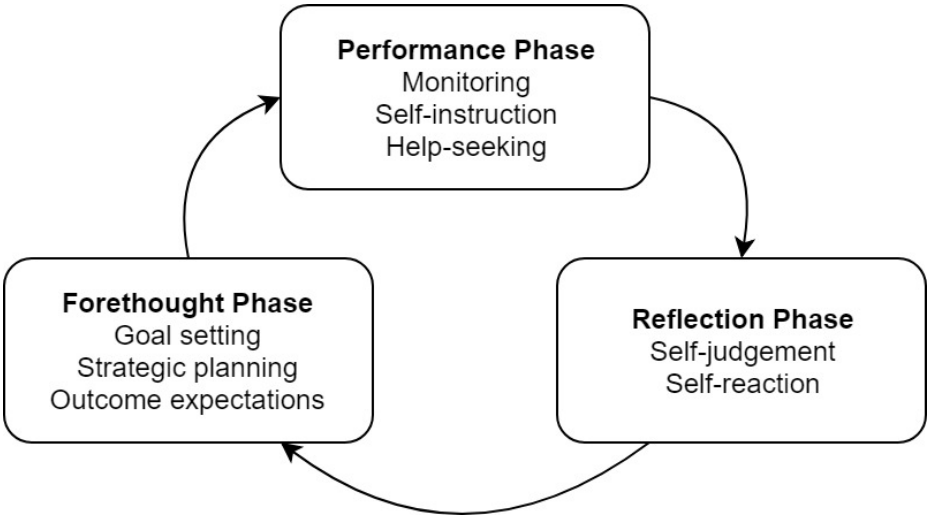

Figure 2. An illustration of the cyclical process of self-regulated learning, based on the principles of Zimmerman (1998, 2000).

The self-regulation profile of expert learners differs significantly from that of novices (Kitsantas & Zimmerman, 2002; Zimmerman, 2002). While experts set specific goals, which they monitor systematically, novices are reactive and seek feedback by comparing themselves to others. Experts attribute their failures to faulty techniques or strategies, while novices blame ability deficiencies (Zimmerman, 2002).

The self-regulation of learning shares some conceptual communalities with formative assessment, which are highlighted by the model for learning enhancing feedback (Hattie & Timperley, 2007). The purpose of all formative behavior, whether internally or externally facilitated, is to reduce the discrepancy between current and desired understanding. That discrepancy is reduced by answering the following questions: 'What are the goals?' 'What progress is being made toward the goals?' and 'What activities need to be undertaken to make better progress?' (Hattie & Timperley, 2007). In a way, these processes appear to make up two sides of the same coin; one acting as the internal while the other acts as the external facilitator of the same behavior. Ultimately, they both aspire to allow the students to take greater ownership over their own development, while adapting their learning goals and strategies to fit their current abilities.

3 Thesis outline

3.1 Research questions

Drawing on the theoretical and empirical background presented in the previous section and in light of the aforementioned aims designated for each individual paper, the following research questions were formulated:

I. How do the perceived teacher learning support and the perceived motivational climate effect the student's self-regulation of their own learning?

II. 1) Do students perceive the learning environment in PE differently depending on the PE teacher's gender?

2) Are there inter-sexual differences in the students' perception of the learning environment in PE?

3) Is gender-matching advantageous to the students' perceptions of the learning environment in PE?

III. To what extent do the perceptions of highly competent and less competent PE students differ concerning teacher support?

3.2 Research model

In an effort to delineate the scope and interconnectivity of the thesis, the following research model (figure 3.) was produced. As illustrated in the figure, the point of departure for the thesis was the learning environment and the way environmental factors may or may not affect and be affected by external factors. The model indicates the relationships that were explored in each of the three individual papers.

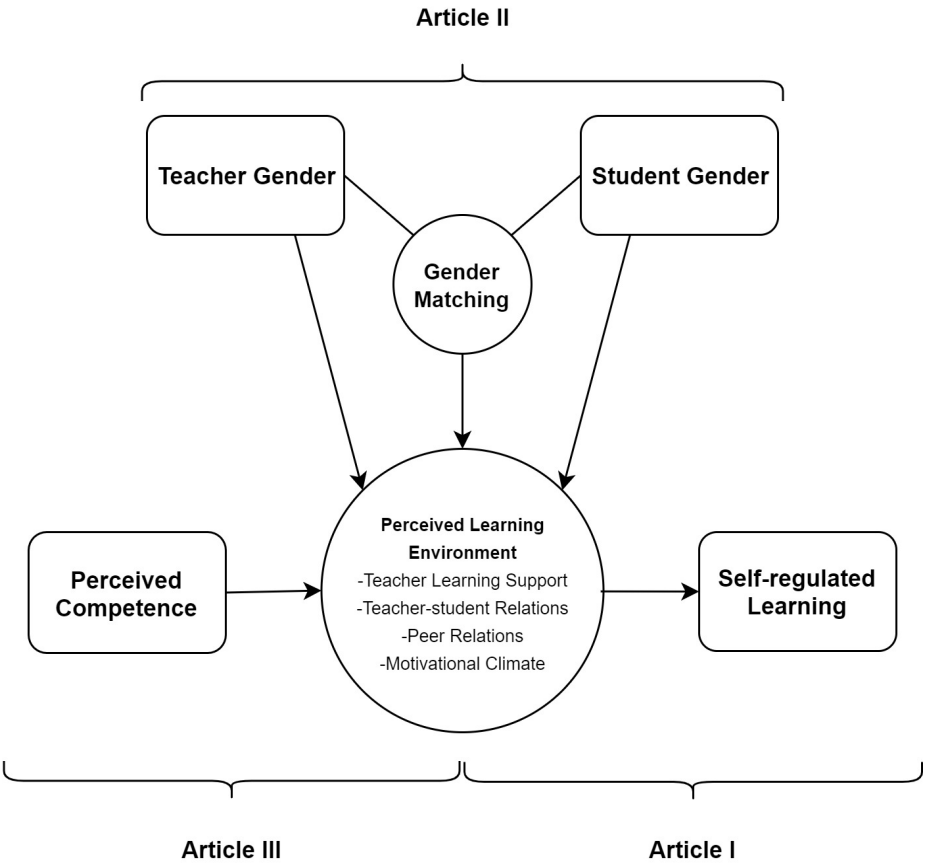

Figure 3. An illustration of the overall research model. The brackets illustrate which section of the model each paper represents.

3.3 Presentation of the individual papers

The following table (Table 1.) represents a preliminary presentation of the individual papers; including title, objective, participants and main findings. The full papers can be located in part II of the thesis.

Table 1. Overview of the articles that make up this thesis

Paper	Title	Objective	Participants	Findings
I	Self-regulated learning in physical education: An analysis of perceived teacher learning support and perceived motivational climate as context dependent predictors in upper secondary school	To create and validate a new instrument designed to measure teacher learning support in the physical education context, and use that instrument to investigate the relationship between teacher learning support, the motivational climate and self-regulated learning in that context	554 upper secondary school students (M_{age} = 17.05, *SD* = 0.91) from the Rogaland district of Norway.	Teacher learning support, ego-involving climate and task-involving climate were all positively related to the degree of self-regulated learning. Collectively they predicted 28% of the variance in self-regulated learning
II	Gender and the perceived learning environment in upper secondary school physical education	To investigate the relationship between student and PE teacher gender and the students' perception of the learning environment in the Norwegian upper secondary school physical education context	554 upper secondary school students (M_{age} = 17.05, *SD* = 0.91) and 17 PE teachers (11 males and 6 females) from the Rogaland district of Norway.	No significant relationship was found between the teachers' gender or gender matching, and the students' perceptions of the learning environment. However, inter-sexual differences were observed between the students.
III	The role of perceived competence in determining teacher support in upper secondary school physical education	To investigate the relationship between perceived competence and the perceived level of support provided by the teacher in the Nordic physical education context	1133 upper secondary school students (M_{age} = 17.2, *SD* = 0.86) from Norway (n = 554) and Iceland (n = 579).	The more competent students perceive the most support and the least competent students perceive the least support on every measured support variable

4 Methodology

4.1 Study design

All data gathered for the completion of this thesis relied on a cross-sectional, quantitative methodology. The data collection took place in the form of a questionnaire with a collection of instruments as well as an assembly of general questions. This methodology was chosen, as it best suited the needs of the project and was well suited to answering the research questions. In spite of the methodology's deficiencies, it allowed for the exploration of relationships between theoretical concepts and the comparison of different groups within the sample.

4.2 Participants

The participants in this thesis were 1133 Students (Mean age = 17.2 SD = 0.86) currently attending upper secondary school in Norway (554 students) and Iceland (579 students), and their PE teachers (only Norwegian sample; their involvement was limited to gender and education status; n=17, males = 11, females = 6). This age group has been chosen specifically as they have been shown to be less active, less motivated for PE and more susceptible to interventions than younger students (van Sluijs, McMinn & Griffin, 2007). Samples were drawn according to a cluster sampling procedure, with classes as the basic unit, where schools were stratified according to location and how they organize the PE subject. This means that the project recruited schools, teachers, and classes of adolescents rather than recruiting individual respondents. Even though there are some disadvantages to non-random sampling, the concerns for cost- and time-effectiveness coupled with the sample needs of the research (access to schools with a designated PE program as well as variations in lesson organization and implementation) constrained the selection. To increase the representability of the sample beyond the regions where the study took place, certain precautions were made.

- Schools representing all three types of settlements were included (urban, suburban and rural), with the number of participants in each settlement type roughly corresponding with the distribution of the population (Statistisk sentralbyrå [SSB], 2017).
- Participants were recruited evenly from all three grade levels of the schools
- Recruitment was confined to students from the general studies department as inclusion of vocational studies would likely have confounded the results
- For the Norwegian sample, results from the national student survey were examined, revealing that the students in the Rogaland district did not differentiate themselves from the rest of the country in any remarkable fashion (Ungdata, 2017).

When viewing the characteristics of the sample, further arguments towards its representativeness can be made.

- 17 % of the total upper secondary school population in Norway are of a non-Norwegian heritage, while the corresponding number in our sample is 18% (Udir, 2017b)
- 4,6% of the total upper secondary school population in Iceland are of non-Icelandic heritage, while the corresponding number in our sample is 4,3% (Hagstofan, 2017)
- As in the upper secondary school population in general, female participants outnumber male participants in both countries (Hagstofan, 2017; SSB, 2017). In the Norwegian sample, the gender composition mirrors the rest of the country with 55 % females and

45 % males, to the total population's 56 % and 44 %, respectively (SSB, 2017). However, females are disproportionally over-represented in the Icelandic sample.

- The participants' leisure time sporting participation corresponds with the designated population to a high degree, with 43% of both the Norwegian and the Icelandic sample being active members of sports clubs, compared to 43% and 45% respectively for Norway and Iceland (Guðmundsdóttir, Sigfússon & Sigfúsdóttir, 2014; Seippel, Strandbu & Sletten, 2011)
- The number of students from the Norwegian sample reporting that they dislike PE corresponds with the numbers reported by Säfvenbom et al. (2015; 12.1 % in our sample versus 12 % in their sample).

4.3 Procedure

When potential candidates had been identified, letters were sent to the school administrators, inviting them to participate in the project. Out of the eight schools invited, only one rejected the offer, claiming a busy schedule at the proposed time of data collection. That school was replaced with a comparable school, which accepted the invitation. When the participating schools had been confirmed, two classes from each grade level were picked at random. The data collection itself was carried out during a PE lesson in the later stages of the semester. The timing of the collection was intended to increase the likelihood that the students had become well acquainted with their teacher and the learning environment. Before the data collection commenced, the students were informed of their rights, and what their participation in the study entailed. They were informed that by filling out the questionnaire they were giving their consent for their information to be used for the purpose of this research. To protect the integrity of the study and the participants' privacy, the questionnaire was filled out in private, without undue pressure or influence from the researcher, persons of authority or peers. Only two potential participants opted

out of the study; however, we do not know how many students were lost due to illness or truancy, as each class was only approached once. Due to practical limitations, the method of collection varied to a certain extent. Most questionnaires were filled out electronically; however, as some of the gymnasiums were not equipped with wireless internet connections, some classes had to answer using the paper version of the questionnaire. According to Brock, Barry, Lawrence, Dey and Rolffs (2012) there is sufficient consistency between pen-and-paper versions and electronic versions to use both interchangeably, especially since measures were made to account for the remaining environmental.

4.4 Instruments

The most challenging element of this thesis was the work that went into assembling the questionnaire. Even though there exist an impressive number of instruments designed to measure the learning environment in an academic context (see Fraser, 1998 for review), there is a lack of quality instruments specific to PE. Through extensive systematic search, only two possible candidates were located, both of which were eventually dismissed. The PELES (Physical Education Learning Environment Scale; Mitchell, 1996), was excluded as the subscales perceived threat to sense of self, perceived challenge, perceived competitiveness and perceived control were not congruent with the project's aims. The second instrument was the SCLES (Sport Class Learning Environment Scale; Dowdell, 2007), which included desirable subscales such as affiliation, teacher-student communication and organization. However, the quality of that instrument was put into question when repeated attempts to verify the internal consistency of the subscales failed. As the source material was carefully forward-backward translated from the source language to the target languages, and the original results had seemingly never been replicated outside the original context, the instrument was discarded.

As no PE specific instruments were deemed appropriate for the project, re-contextualizing instruments created for the academic context was attempted. However, having identified potential candidates containing the desirable subscales it became apparent that they were too contextualized for appropriate modification into the PE context. The difference between the classroom setting

and the gymnasium, and the different type of interactions that dominate each setting, made the two contexts incompatible and re-contextualization impossible. As no existing instruments were available, and the process of creating a new one being long and arduous, the solution was to measure each different element of the learning environment individually. The drawback was that the number of items increased substantially, and calculating a combined score was impossible. On the other hand, the advantages include increased flexibility and being able to use reliable and valid instruments that are context specific. Additionally, individual elements within the learning environment could be investigated in greater detail. The process of selecting which elements of the learning environment to include in the collection was based on the needs of the project, the review on learning environment research by Fraser (1998) and work on the self-determination theory (Deci & Ryan, 1985, 2000). The eventual list was comprised of the following elements:

- Peer relations
- Student-teacher relations
- Teacher learning support
- Motivational climate

These elements were measured using the following instruments:

Peer relations

Peer relations was measured using a PE specific version of the acceptance subscale of the Need for Relatedness Scale (Richer & Vallerand, 1998). Originally designed to measure the need for relatedness in the workplace, the scale has previously proved successful in the PE context (Standage et al., 2003, 2005). The respondents were asked to rate the degree to which they felt 'supported', 'understood', 'listened to', 'valued' and 'safe' around their peers in PE class. The answers were given on a 7-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). The subscale has displayed satisfactory construct validity and internal consistency in the PE context previously (Standage et al., 2005).

Student-teacher relations

Student-teacher relations support was measured using a 5-item PE-specific scale developed by Standage et al (2005) aimed at measuring relatedness support. Answers were given on a 7-point Likert scale ranging from strongly agree (1) to strongly disagree (7). Examples of items are 'In this PE class the PE teacher supports us' and 'In this PE class the PE teacher has respect for us'. Standage et al.'s (2005) study on secondary school PE students demonstrated the measurement's satisfactory construct validity and internal consistency.

Teacher learning support

Due to the dearth of research relating to learning support and pedagogical activity in the PE context, no context-specific measurements of adequate quality were found. As the measure was deemed to be an integral part of the environment that was up for analysis, a new scale had to be constructed. The degree to which teachers provided learning support to their students was therefore measured using a context-specific measure designed by Laxdal, Mjåtveit, Leibinger, Haugen and Giske (2019, paper I). The scale was constructed with the aim of measuring the prevalence of integrated learning enhancing teaching processes that sought to improve learning, increase student involvement, assess current performances and communicate appropriate progression strategies (López-Pastor, Kirk, Lorente-Catalán, MacPhail & Macdonald, 2013; Sadler, 2010). The foundation of the measurement was based on the model for learning enhancing feedback, the regulation for meaningful assessment and the basic principles of formative assessment (Black & Wiliam, 1998; Hattie and Timperley, 2007; Hopfenbeck, 2014). The final measure consists of eight items intended to measure the students' experiences with different elements related to teacher learning support, such as the dissemination of learning goals, use of feedback and willingness to modify behavior. Items include questions such as 'It is important to the PE teacher that we learn new skills' and 'The PE teacher concludes the lesson with a short recap of what we learned during that lesson.' Responses were given on a 6-point Likert scale ranging from 'never' (1) to 'always' (6). As can be seen in paper I, the instrument demonstrated satisfactory construct validity and internal consistency in the current context.

Perceived Motivational Climate

The students' perception of the motivational climate was measured using the PE-specific version of the Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Seifriz, Duda and Chi, 1992), which consists of two subscales measuring task mastery (9 item), and performance orientation (11 items). Each item was measured on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Items measuring task mastery focus on effort and teamwork, while performance oriented items focus on individuality and competition. Examples of items are: 'In this PE class, trying hard is rewarded' and 'In this PE class, doing better than others is important'. The instrument has demonstrated satisfactory construct validity and internal consistency in the PE context previously (Solmon, 1996), as well as in the Norwegian context (Ommundsen, Roberts, Lemyre & Treasure, 2003).

In addition, the following instruments were also used:

Competence support

Competence support was measured using a 4-item PE-specific instrument developed by Standage et al. (2005). Answers were given on a 7-point Likert scale ranging from strongly agree (1) to strongly disagree (7). Examples of items are 'In this PE class the PE teacher helps us to improve' and 'In this PE class the teacher makes us feel like we are good at PE'. Standage et al.'s (2005) study on secondary school PE students provided satisfactory construct validity and internal consistency.

Autonomy Support

Autonomy support was measured using a 6-item PE-specific version of the Learning Climate Questionnaire (LCQ; Williams & Deci, 1996). Answers were given on a seven point Likert scale ranging from strongly agree (1) to strongly disagree (7). Examples of items are 'In this PE class the PE teacher encourages us to ask questions' and 'In this PE class we feel that the teacher provides us with choices and options'. Satisfactory construct validity and internal consistency have been demonstrated in the PE context previously (Standage et al., 2005; Ommundsen & Kvalø, 2007).

Perceived Competence

The students' perception of their PE specific competence was measured using a 5-item modified short version of the 18-item Intrinsic Motivation Inventory (IMI; McAuley, Duncan & Tammen, 1989). Answers were given on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Examples of items are 'I am pretty skilled at PE' and 'I am satisfied with my performance in PE'. The instrument has repeatedly displayed satisfactory construct validity and internal consistency in the PE context, both internationally and in Norway (Standage et al., 2005; Ommundsen & Kvalø, 2007).

Self-regulated learning

Self-regulated learning was measured using a PE-specific version of the Self-Regulation subscale of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, & De Groot, 1990). The subscale, which was partially based on Zimmerman and Pons' (1986, 1988) theories on metacognitive strategies, composed of 9 items and was measured on a 7-point Likert scale ranging from 'Not at all true of me' (1) to 'Very true of me' (7). 'Before the activities start, I think about the things I will need to do to learn' and 'When the lesson is over, I reflect on what I have learned.' The scale has been found to demonstrate satisfactory construct validity and internal consistency in the academic context previously (Pintrich & De Groot, 1990).

4.5 Translation and validation of instruments

Because of the binational approach of this research project, there was a need for translating and adapting some of the questionnaires into new languages. The process was arduous and resource-intensive, yet necessary to attain equivalency between the original and the target material (Beaton, Bombardier, Guillemin & Ferraz, 2000; Sperber, 2004). The chosen method was the forward-backward translation method, which has become the gold standard for cross-cultural and cross-national adaptations and translations (Sperber, 2004). The process required time, resources, effort and the help of multiple bilingual individuals; however, it was worth the effort, as it provides the required equivalence (Weeks, Swerissen & Belfrage, 2007).

The translators were advised to seek idiomatic translations rather than literal or word-for-word translations so that the original meaning translated, and the target language version became equivalent to the source material. During the translation process, the following was considered to maximize parity between the source and target version: *Semantic equivalence*, which refers to the equivalent meaning of words and phrases. Short sentences with simple key words using language comprehensible to 10-12 year olds was recommended. *Idiomatic equivalence,* which refers to finding equivalent expressions in the target language that convey the same message as idioms and colloquialisms do in the source language. *Conceptual equivalence,* which refers to the in-equivalent meaning sometimes attributed to semantically equivalent concepts. The concept of 'family' may for example be viewed differently across cultures as some only use the concept to refer to their immediate family while others include additional relatives. *Experiential equivalence,* which refers to the need for situations and experiences included in the items being known and culturally relevant for the target population. *Criterion equivalence*, which refers to the instrument's ability to differentiate between groups (Guillemin, Bombardier & Beaton, 1993; Kvamme et al., 1998)

Translated and adapted instruments have to be validated in every new context, irrespective of the number of previous validations in other contexts (Kvamme et al., 1998), which is why we piloted all translations in both countries. The administering of the instrument to adequately sized group of individuals, representative of the target population, allowed problematic items to be detected and improved. Pilot studies often lead to changes in the initial version, which underlines the importance of the procedure (Gudmundsson, 2009)

4.6 Ethical Considerations

As highlighted by Wester (2011), ethical considerations are not an afterthought, but rather a map that guides a researcher through the terrain that is his research. Although being aware of the different ethical challenges that can arise is important, the way they are handled is integral. Every decision that was taken during the planning, execution and reporting of this research project was made with ethical considerations in mind. Below is an inventory of considerations made during the different phases of the research project to ensure the ethical

gathering, storage and publishing of information. These steps were taken to protect the integrity of the project, the respondents and everyone else affected by the study.

- The social validity of the research was established
- No more respondents were recruited than necessary
- The anonymity of the respondents was preserved (that included the teachers and the schools)
- The research caused no harm or undue strain to any of the participants
- Only relevant information, which was intended for use, was collected.
- No sensitive personal information was collected
- No authority figures were allowed to apply undue pressure or influence
- No unauthorized or irrelevant individuals were given access to any information
- Any substantial findings will be published, regardless of their desirability

The relevant population, the chosen method, the subject matter and the variables of interest all have the potential to pose ethical challenges. By being aware of the required considerations, the likelihood of acting correctly was increased. As in any study involving human participants the main challenges of the current study included preserving the anonymity of the respondents, acquiring informed consent and ensuring ethical handling of data.

The lay meaning of anonymity is to withhold, or to be without, a name (*Merriam-Webster)*, but in research, it also refers to withholding any additional information that could be used to identify an individual participant (Walford, 2005). Supplied with the right information, motivated individuals possessing the correct tools can figure out the origin of the collected information, resulting in personal, social or economic harm to the respondents (Walford, 2005). Therefore, much thought was put into which variables were measured and which ones were excluded in the current study. As per the recommendations of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (NCPHSBBR; 1978) and the National Committee for

Research Ethics in the Social Sciences and the Humanities (NESH; 2016) the collection of any identifying information was avoided.

As per the guidelines enforced by the NCPHSBBR (1978) and NESH (2016) informed consent was acquired before any data was collected. The information on which the participants made their decision included the aim of the study, which agency funded the research, who had access to the collected data, and the rights the participants had during the process. All the information was clear, culturally and linguistically appropriate, and delivered in a neutral manner as to avoid undue pressure to comply. As no sensitive personal information was collected, per the laws of each governing country, participants exceeding the age of 16 were able to consent without parental permission.

To ensure that the students were not placed under undue stress or influence in their decision-making during the data collection, the teachers were not allowed to roam the area or to look over the students' shoulders. The teachers were not allowed to retrieve the questionnaires either, as that would have given them the opportunity to see the students' answers. This was integral as many of the questions pertained to their teaching proficiency, their relationship with the students and their ability to construct a positive leaning environment. As peer pressure and social desirability have also been found to influence decision-making, privacy was also a concern during the process. Giving each student ample room to fill out the questionnaire was therefore deemed necessary. Safeguarding the information we were entrusted with was also of great concern as access to any data was restricted to anyone not directly involved in the project. All published information will be on a group level, with no means of tracking information back to its source. No information beyond that which will be published, will be made available to any entities, schools, or teachers. As the research project concludes, all the collected data will be destroyed.

4.7 Statistical Analysis

During the course of this research project, multiple statistical analyses were completed, using both SPSS 25 (IBM, Armonk, NY) and Mplus 8 (Muthén & Muthén, Los Angeles, CA). The analyses were both parametrical and non-parametrical of nature, and included an Independent-samples Kruskal-Wallis test, one-way and two-way Multivariate Analysis of Covariance

(MANCOVA), Confirmatory Factor Analyses (CFA) and Structural Modeling Analyses. Effect sizes were measured using Cohens d and partial eta squared, the benchmarks for them being .2 for small, .5 for medium and .8 for large and .0099 for small, .0588 for medium and .1379 for large, respectively (Cohen, 1969). For all analysis, significance was accepted at $p < .05$.

Due to normality being a criterion to perform many of the relevant statistical analyses, non-normally distributed variables were transformed to normality using the Rankit procedure. The Rankit procedure (Bliss, Greenwood and White, 1956) was chosen as it has been found to be the most reliable normalizing procedure, irrespective of sample size and distribution (Solomon & Sawilowsky, 2009).

In an effort to facilitate comparison between groups, the sample was divided into three groups depending on their level of perceived competence. Participants who scored in the 66th percentile and above were placed in the highly competent group, while those who placed at or below the 33rd percentile were placed in the less competent group. The remaining participants that scored between the 33rd and the 66th percentile were regarded as being moderately competent.

The internal consistency of the applied measures was assessed using Raykov's composite reliability coefficient (Raykov, 1998). As opposed to the more conventional Cronbach's alpha (Cronbach, 1951), Raykov's rho does not require equal contribution of items to factorial variance, as well as accounting for correlated error variance. Having been found to be less prone to both under- and over-estimating scale representability than Cronbach's alpha, Raykov's rho has now become the preferred measure (Yang & Green, 2010).

5 Results

5.1 Pilot results

Pilot data was gathered from 389 students spanning all three levels of lower education in Norway (elementary school [n = 169], lower secondary school [n = 113] and upper secondary school [n = 107]) and 100 upper secondary school students from Iceland. Exploratory factor analysis was performed to determine whether the translation process had influenced the underlying factor structure of the measures. Satisfactory factor loadings and reliability scores indicated adequate translations. A confirmatory factor analysis (CFA; Jöreskog, 1969) was subsequently performed on the Norwegian data to confirm the hypothesized single-factor structure of the newly constructed teacher learning support scale (see figure 4). While the initial measurement model indicated less than acceptable fit, a revised model resulted in excellent fit indices (see article I), indicating that the measurement was ready for further analysis.

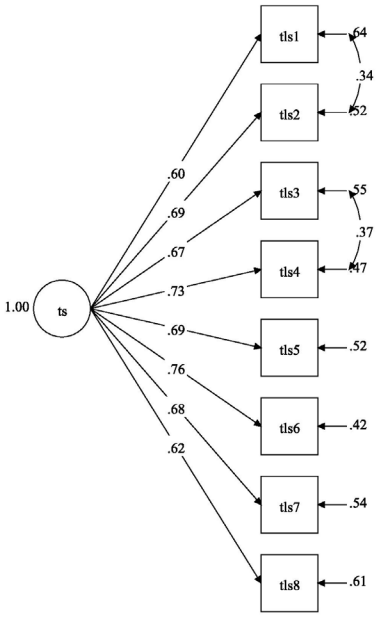

Figure 4. Confirmatory factor analysis of the revised teacher learning support scale, from the pilot sample.

5.2 Descriptive statistics

As illustrated in table 2 below, the sample displayed many of the common themes that characterize upper secondary school students: An over-representation of females, males that are more active, more likely to participate in sports and more likely to report their PE experiences in a favorable light. With the exception of a slightly over-exaggerated gender imbalance in the Icelandic sample, the trends mirror the characteristics of the designated populations (Hagstofan, 2017; SSB, 2017; Udir, 2017b).

Table 2. Descriptive statistics

	Norway	Iceland	Total	Females	Males
Females	55,4 %	65,1 %	60,0 %	-	-
Males	44,6 %	34,9 %	40,0 %	-	-
Of native heritage	81,6 %	95,7 %	88,4 %	89,6 %	87,7 %
Of foreign heritage	18,4 %	4,3 %	11,1 %	10,4 %	12,3 %
Appreciate PE	87,8 %	74,2 %	81,0 %	73,4 %	92%
Dislike PE	12,1 %	25,7 %	19,0 %	26,6 %	7,8%
Active in sports	42,9 %	43,4 %	43,2 %	38,2 %	50,8 %
Not active in sports	57,1 %	56,4 %	56,7 %	61,8 %	49,2 %
Exercise regularly	91 %	94,1 %	92,6 %	91,3 %	93,4 %
Do not exercice	9 %	5,9 %	7,4 %	8,7 %	6,6 %
Age	17,05 (0,91)	17,32 (0,785)	17,2 (0,86)	17,2 (0,86)	17,2 (0,86)
Organised exercise hpw*	2,51 (3,68)	3,54 (4,88)	3,04 (4,36)	2,69 (4,20)	3,56 (4,55)
Self-initated exercise hpw*	3,57 (3,19)	3,21 (2,87)	3,38 (3,37)	3,17 (2,69)	3,71 (3,47)
Total exercise hpw*	6,11 (4,83)	6,8 (5,23)	6,46 (5,05)	5,91 (4,63)	7,29 (5,54)

Note: * hours per week, (SD)

5.3 Results from Article I

Self-regulated learning in physical education: An analysis of perceived teacher learning support and perceived motivational climate as context dependent predictors in upper secondary school

The objectives of this study were twofold: firstly, to create and validate a new instrument designed to measure teacher learning support in the physical education context, and secondly, to use that instrument to gain a better understanding of the potential role teacher dependent environmental factors play in shaping the learning behavior of the individuals within the Norwegian upper secondary school PE. To achieve these objectives the relationship between teacher learning support, motivational climate and self-regulated learning was investigated. The specific research question that guided this research was 'How do the perceived teacher learning support and the perceived motivational climate effect the student's self-regulation of their own learning?'

A sample consisting of 554 upper secondary school students from Norway answered a survey pertaining to their everyday experiences in PE. A multiple regression based structural equation model indicated that teacher learning support, ego-involving motivational climate and task-involving motivational climate were all significant positive predictors of self-regulated learning, with teacher learning support emerging as the most prominent predictor (S-B χ^2 = [df = 265, N = 550] = 541.04, $p < .001$; TLI = .95; CFI = .95; RMSEA = .04 [.04 - .05]; and SRMR = .05. Collectively, teacher learning support and the motivational climate accounted for 28 % of the variance in self-regulated learning ($R^2 = .28$, SE = .05, $p < .001$).

5.4 Results from Article II

Gender and the perceived learning environment in upper secondary school physical education

This study set out to explore the relationship between gender and the learning environment in upper secondary school PE by examining whether the student's perception of the learning environment was related to the teachers' gender, the student's gender or the interplay between them. For that purpose, the following

research questions were formulated: (1) Do students perceive the learning environment in PE differently depending on the PE teacher's gender? (2) Are there inter-sexual differences in the students' perception of the learning environment in PE? (3) Is gender-matching advantageous to the students' perceptions of the learning environment in PE?

A sample of 554 Norwegian upper secondary school students completed a questionnaire assessing the social, psychological and pedagogical aspects of the learning environment measured using peer relations, teacher-student relations, the motivational climate and teacher learning support. A two-way MANCOVA indicated no significant differences in student perceptions based on their PE teacher's gender (Pillai's Trace = .02, F= 1.44, df = (5,435), p = .210) or the interplay between student and teacher gender (Pillai's Trace = .01, F= .84, df = (5,435), p = .523). On an individual level, significant differences were found between male and female students on four out of the five measured variables (Pillai's Trace = .1, F = 9.98, df = (5,435), p <.001), with the males reporting more favorable perceptions than the females on all accounts.

5.5 Results from Article III

The role of perceived competence in determining teacher support in upper secondary school physical education

The objective of this study was to investigate the relationship between perceived competence and the perceived level of support provided by the teachers in the Nordic PE context. The expectation was to find a positive relationship between the students' perceived competence and the level of support provided by the teachers on teacher learning support, competence support, relatedness support and autonomy support. .

The cross-sectional study relied on the self-reporting of 1133 upper secondary school students from eight schools in Norway and Iceland. One-way MANCOVA analysis of the students reported perception revealed significant differences between the less competent, the moderately competent and highly competent students on all measured support variables (Pillai's Trace = .1, F = 14.57, df = (8,2116), p < .001). Between groups post-hoc comparisons revealed that the more competent groups outscored the less competent groups

consistently. Analyzing each country separately did not affect the conclusion. To further verify the validity of the results, the untransformed data was tested using the Kruskal-Wallis nonparametric one-way ANOVA, resulting in the same conclusion. The between-group differences were quantified using Cohen's d estimation of effect size, resulting in scores ranging from .20 - .70.

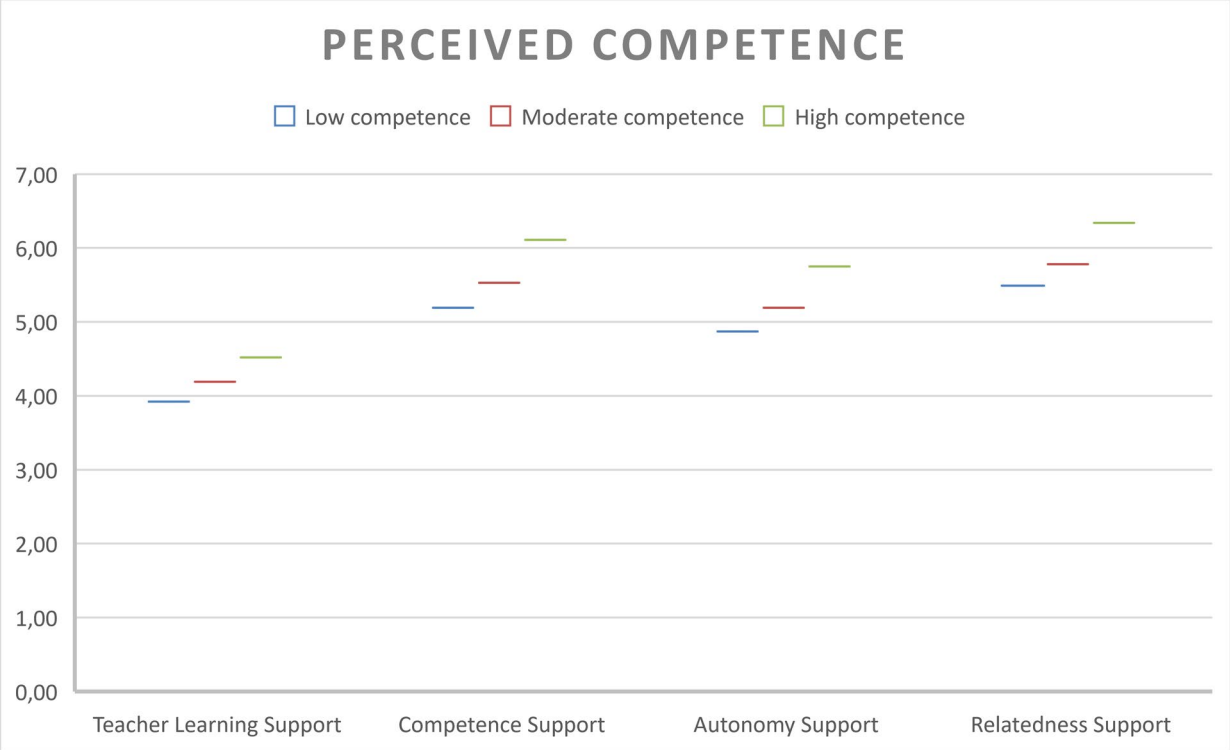

Figure 5. Comparing perceived support, depending on competence levels

6 Discussion

The main purpose of this thesis was to gain a better understanding of the students' perceptions of the learning environment in PE. To that end three individual research papers, each focusing on a distinct research question, or questions, sought to expand the current knowledge in the field by challenging some common conceptions. As the results of the individual papers indicated, some of the conceptions hold up, while others appear to be misconceptions.

The primary objective of the *first individual paper* was to create a new instrument specifically designed to measure teacher learning support in the PE context. The initial analysis of the scale looks promising, as the internal consistency, psychometric properties and the interaction with theoretically related concepts all show signs that the scale is true to form. However, further validation is required.

Furthermore, the study found indications that teacher dependent environmental factors influence the degree to which PE students self-regulate their learning. The prevalence of the behavior may not have been substantial; however, these findings give support to the claims that teachers can play a role in determining whether and to which degree PE students regulate their learning (Peeters et al., 2014; Tay, 2015). Even though certain individual characteristics, such as intellectual curiosity and social identity have been found to predict self-regulation, the students still depend on the teachers to be successful, at least to a certain degree (Hattie & Timperley, 2007; Torrano Montalvo & González Torres, 2004; Wang & Holcombe, 2010).

Drawing any definitive conclusions regarding the cause of the disparity between the relatively high degree of facilitation and the relatively low prevalence of the behavior from these findings is untenable. However, postulations are possible, and the following list represents probable explanations that are likely to contribute to the aforementioned disparity, either independently or collectively. 1) the subject is inherently enjoyable, often drawing comparisons to recess (O'Sullivan, 1989; Kinchin & O'Sullivan, 2003), 2) after prolonged periods of stimulation without information the thought of PE as a learning arena may be abstruse for many students, 3) the

lessons are traditionally more centered on displaying skills than learning them (Digelidis & Papaioannou, 1999; Smith et al., 2014), 4) while the overarching aims of the subject are quite explicit, the learning goals can be construed as unclear (Udir, 2015a), 5) lesson debriefings tend to focus on what to do rather than what to learn, which can deemphasize the purpose of the activities (Westergård, Ertesvåg & Rafaelsen, 2018) and 6) there is little or no homework, resulting in minimal expectations of self-initiated extracurricular work (Kinchin & O'Sullivan, 2003; Tannehill, Romar, O'Sullivan, England & Rosenberg, 1994).

In congruence with previous research (Ommundsen, 2006; Theodosiou & Papaioannou, 2006), the motivational climate was found to effect the prevalence of self-regulatory behavior, depending on the predominance of ego-involvement or task-involvement. What was surprising was the strength of the positive relationship between the ego-involvement and self-regulated learning. The results run counter to the normative goal theory, which would have predicted the opposite result. However, these findings are not revolutionary, as both Ommundsen (2006) and Pintrich (1999, 2000) have previously found ego-involvement to impact motivation, self-regulation and learning positively.

The discrepancy between the study's findings and the normative goal theory may be explained by the more proximal effect motivational orientations have on self-regulated learning, as opposed to the more distal motivational climate has (Ommundsen, 2006). In other words, self-enhancing and self-defeating ego-orientations supersede the effect the motivational climate has on self-regulated learning. Seeing as PE lacks well-defined learning criteria, peer performances are constantly on public display, and (at least in Norway) effort counts towards the final grade, these results may very well be unique to the current context (Udir, 2015a). The students who perceive a greater degree of ego-involving motivational climate may therefore feel compelled to regulate their learning as a response to the unavoidable social comparisons that follow. As long as the students are of a self-enhanced disposition or highly competent, the fallout is likely to be positive.

The structural equation model was able to explain 28 % of the total variance in self-regulated learning. Even though that number is quite respectable, 72 % of the variance remains unaccounted for. Various other predictors of self-

regulatory behavior that may be able to bridge the gap collectively include task engagement, persistence, motivation, self-regulatory knowledge and attitude towards the chosen pursuit (Yen, Bakar, Roslan, Luan & Abd Rahman, 2005; Zimmerman, Schunk & DiBenedetto, 2015).

The *second individual paper* found indications suggesting that the effect gender is alleged to have on the students' PE experience may be exaggerated. While students do seem to perceive the learning environment differently depending on their gender, those perceptions do not seem to be influenced by the teachers' gender or the matching of student and teacher gender.

These findings are congruent with the research from other school subjects, where teacher gender has generally been found to have a negligible effect on student performance, well-being or satisfaction (Carrington et al., 2007; Cho, 2012; Martin & Marsh 2005; Marsh, Martin & Cheng, 2008; Neugebauer, Helbig & Landmann, 2010; Sansone, 2017). Research that has reported gender related differences usually have low effect sizes and fail to control for known covariates such as content knowledge or experience (Antecol, Eren, & Ozbeklik, 2014; Cho, 2012; Sansone, 2017). By controlling for those variables, the 5-10% effect formerly attributed to the teachers' gender becomes negligible (Cho, 2012; Drudy, 2008; Sabbe & Aelterman, 2007). In the PE context, various elements of the learning environment, such as class climate and feedback patterns have also been found to invariant to the teacher's gender (Lirgg, 1994; Nicaise, Bois, Fairclough, Amorose & Cogérino, 2007; Nicaise, Cogérino, Fairclough, Bois & Davis, 2007).

Contrary to the presumptions of the gender-stereotypic model, and in line with the available contemporary literature, boys were not found to fare better when taught by males, and girls were not found to fare better when taught by females (Cho, 2012; Neugebauer et al., 2010; Sansone, 2017). Instead, gender-invariant abilities such as supportiveness, consistency, pedagogical capabilities and interpersonal skills seem to determine the students' experiences (Carrington et al., 2007; Martin & Marsh 2005).

Unsurprisingly, the current study's findings are mostly at odds with the findings of Ward (1982), who explored the students' perceptions of the learning environment in post Title IX USA. As the axiom behind the chronosystem of

the ecological systems theory would suggest, the societal changes that have occurred since the time of Ward's study are of such magnitude that the contexts in which the respected studies take place are now distinct. Progressions in gender equality and egalitarianism reverberate through the entire ecological system, affecting the various microsystems, resulting in different individual perceptions than were commonplace during the 1980's.

Despite the numerous findings mentioned above, that illustrate the negligible effect teacher gender has on the scholastic experience, many proponents of the gender-stereotypic model still propose inefficient solutions such as positive discrimination and gender matching to ameliorate the female PE experience (Kiley & Robinson, 2016; OECD, 2017; Tarrant et al., 2015; Vogt, 2018). However, those solutions do nothing to tackle the underlying cause of the problems, which have more to do with the misalignment and discordance of values. Female teachers do not necessarily diverge themselves from their male counterparts when it comes to activity choices, even though they might want to (Kastrup & Kleindienst-Cachay, 2016).

In the interest of full transparency, it is worth mentioning that positive discrimination may have a positive effect on the least enthusiastic females, who are often the ones proposing the solution (Kiley & Robinson, 2016; Olafson, 2002). It may also pave the way for more females to join the profession and create role models to whom the female students can look up to; however, as the findings allude to, it is not likely to improve the PE experiences of females in general.

Gender matching in single-gender PE classes has long been the proposed as the ultimate solution to the current problem (Gabbei, 2004; Hill et al., 2012; Klomsten, 2016). Numerous researchers have found the environment to be advantageous, especially for the female population (Hill et al., 2012; Klomsten, 2016; Slingerland, Haerens, Cardon & Borghouts, 2014). However, there are documented tendencies of hegemonic heteronormativity and gender-specific typecasting being reinforced within such contexts (Martin, 2013; Thompson & Ungerleider, 2004). As Berg and Lahelma (2010) reported in their research on Finnish secondary school students, the dichotomization of gender can create a hierarchical structure that places higher value on male ability and creates an environment where undesirable behavior goes unpunished. In other words, the

female teachers will be viewed as inferior to the males, due to them not being allowed to teach males. As teaching males will be regarded as more challenging, a false equivalency will be made between being male and being a better teacher. Furthermore, gender-stereotypical behavior will be written off as boys being boys or girls being girls, which will entrench the behavior as acceptable. The merit of the findings can be underlined by juxtaposing them against Lahelma's (2000) earlier work in the same context, where the only subjects that segregate and match gender (PE and technical handicraft) were found to align with the gender-stereotypic model, the remaining subjects being more in line with the gender-invariant model. In addition to reducing gender role prejudice, coeducational classes have been found to promote tolerance, empathy and consideration towards the opposite gender, as well as reducing performance orientation (Pühse, Gerber, Menigsen & Repond, 2005).

The *third and final individual paper* found indications of a positive relationship between the students' level of competence and the support they receive from their PE teachers. These findings fit in line with the sentiments of previous research exploring the PE experiences of unsatisfied students, giving support to the claims that PE is an arena for the athletically competent, where the less competent are at a disadvantage (Andrews & Johansen, 2005; Dowling, 2016; Erdvik, Haugen, Ivarsson & Säfvenbom, 2019b; Olafson, 2002). Curiously enough, this trend appears to be confined to the PE context, as research from the other school subjects has yielded opposite results (Baker, 1999; Mercer, Nellis, Martínez & Kirk, 2011). Classroom research has found that the less able students tend to receive supplemental support intended to even out the playing field, as opposed to favoring the already accomplished. The disproportionate support of the competent is likely to stem from the sports realm, from which many of the PE teachers have strong ties to, where such practices are commonplace (Dowling, 2016; Trost, 2004). The reasons could arguably be relational in nature, stemming more from the compatibility of interests and values than the students competence levels; however, those explanations fall short of explaining the incongruity between PE and the other subjects.

Even though sport and PE share many similarities, there are stark philosophical differences between the two. Sports always looking for the next big star who will catapult the club forward, causing a top-heavy approach, while PE aims to invigorate the masses and facilitate a healthy relationship to physical activity

through carefully constructed learning activities. A more encompassing approach accommodating the less competent may not be considered productive behavior in the sporting context; however, everyone should be entitled to an opportunity to succeed in PE. Therefore, the teachers are expected to provide appropriate tasks for all students, and to facilitate progress irrespective of prior knowledge and experience (Udir, 2015b).

As the less competent drop out of organized sports at an increased rate, they lose their most important arena for developing athletic competence (Digelidis & Papaioannou, 1999). Because of PE's tendency to focus more on performance than development, especially at the later stages, the less competent have no platform to learn new skills or hone their existing ones. Without some efforts of counterbalance, the advantage of those that continue their leisure time sport participation continues to increase while the rest is left behind. The expected trajectory of the competent and the less competent will continue to diverge, in line with the expectations of the Matthew effect. According to the Matthew effect, a well-documented principle from the social sciences, advantages lead to further advantages, and disadvantages subsequently lead to further disadvantages (Merton, 1968; Petersen, Jung, Yang & Stanley, 2011). The effect has been observed across a broad spectrum of social contexts, pertaining to economic, cultural, symbolic and social capital (Petersen et al., 2011; Rigney, 2010). In an effort to counteract this phenomenon, classroom teachers have been found to give additional support to the least competent students, bestowing some level of uniformity to the class (Baker, 1999; Bruggink, Meijer, Goei & Koot, 2014; Mercer et al., 2011).

In light of the aforementioned assertion, it is worth mentioning that all three subgroups of students reported relatively high support scores (above the arithmetic mean of the scale), which indicates a generally supportive learning environment. Nevertheless, the consistent unconscious bias favoring the competent is of concern. The favoritism emerges through other aspects of the PE experience as well, as curricular implementations have also been found to be biased (Downing, 2016; Dudley et al., 2010; van Daalen, 2005).

One criticism that could be aimed at the current findings relates to the direction of the previously established relation between competence support and perceived competence (Standage et al., 2005). An argument can be made that

the differing levels of competence are the result of varying levels of competence support, rather than the support being contingent on competence. In other words, the competent students may be more competent because they receive more competence support, as opposed to receiving more competence support because they are competent. The criticism is warranted to some degree; however, it does not take into consideration the fact that competence in PE has been found to be predicted primarily by external factors (Anderssen, 1993; Carroll, & Loumidis, 2001; Goudas et al., 2001), and it also fails to address the effect reaching beyond competence, permeating all the measured support variables.

The findings of *this thesis* portray PE in a rather familiar light, confirming many of the apprehensions concerning the subject. The relative absence of learning behavior, despite efforts from both teachers and policymakers to facilitate the practice is worrying, and suggests further actions may be required. Furthermore, the teachers' tendencies to favor the competent when the marginalization of the less competent is so well documented is worrisome; their only reprieve being that it may be unconscious and unintentional (Moen et al., 2018; Dowling, 2016).

Some conservatives may argue that making substantial changes to a subject that routinely tops the rankings for the most popular subjects would be unwise. Their argument can be summed up using a common phrase from the world of sports, which goes something like this: "you never change a winning team." However, as it is in the sporting context, this advice is far from true. Additionally, few would call the current situation winning, as being the most popular in a competition that is so heavily tipped in your favor is no great feat. In fact, interventions aimed at ameliorating the PE experiences of the marginalized have been found to be immensely successful, without compromising the positive experiences of the remaining students (Lamb et al., 2018; Nicaise, Cogérino, Bois, & Amorose, 2006; Walseth et al., 2018). The findings of those studies just about completely negating the aforementioned argument and demonstrating further the necessity for action.

When the thesis is viewed through the socio-ecological perspective, the interactions between the various systems are evident. The temporal changes to the macrosystem, in terms of changing social norms and expectations

reverberate down the system, affecting policy and relations within the mesosystem as well as the individuals' perceptions of his or her environment. As the theory suggests, the interconnected relationships between the systems do not appear to be unidirectional, but rather reciprocal, indicating that the learning environment is indeed affected by multiple factors across a variety of structures. Individual characteristics such as competence appear to affect the teachers' relationship with their students and how the learning environment is perceived, while the learning environment appears to affect the degree to which the individuals self-regulate their learning. Furthermore, while changes in policy are likely to have changed the teachers approach to teaching and their relations to their students (mesosystem), the research that is done on the mesosystem, when compelling enough, may eventually influence policy. The learning environment

6.1 Methodological reflections

The results of this thesis have to be interpreted with its limitations in mind. The cross-sectional nature of the study design presents common-method variance problems and does not allow for any determination of causality. Non-random sampling diminishes the probability of the sample being representative of the general population, thus potentially limiting the transferability of the results. However, the sampling procedure included several measures designed to increase representability. These measures appear to have been successful, as certain key characteristics of the sample mirrored the designated population (e.g. age, gender composition, ethnicity, sporting participation and urban settlement). Intercountry transferability of the results is limited and should be done with caution. Self-reporting presents certain obstacles which can skew the results, such as social desirability and reference bias (van de Mortel, 2008). However, measures were taken during the data collection to minimize the impact of those phenomena (e.g. participants were informed that it their perceptions that were of interest and that there were no right or wrong answers, each participant was given ample space, and teacher access was restricted). The possible discrepancy between the actual and the perceived prevalence of the measured behavior was also a concern. The students' perceptions only gives an indication of the actual support that is offered; the students' perceptions can be confounded by numerous factors. However, students respond and react in

accordance with their perceptions, which underlines the importance of documenting and understanding those perceptions. Additionally, Norway and Iceland are highly egalitarian countries, with high female sporting participation (Green, Thurston, Vaage, & Moen, 2015; World Economic Forum, 2017), which may impact the results. Because of a mistake during the data collection in Iceland, the students' questionnaires could not be paired with the teacher information, resulting in incomplete data. This resulted in the exclusion of the Icelandic data from article II, leaving the final product depreciated.

The thesis also has several strengths, which should be noted as a counterweight to the limitations. Sampling participants from two countries strengthens the findings of individual paper III and the similarities in results across borders makes transnational application of the findings more feasible. The use of validated context specific measurements increases the likelihood of valid findings that may be replicated elsewhere. Furthermore, the response rate was incredibly high, with 99,8 % of the eligible students filling out the questionnaire.

6.2 Recommendations

The findings of this thesis, complemented by the review of the relevant literature, have resulted in the following practical recommendations for the various stakeholders of PE.

Policy makers

Policymakers should only make decisions regarding PE based on empirically sound evidence, and not on conjecture or subjective opinions. Excessive preoccupation with anti-sedentary initiatives can come at the expense of learning, and have detrimental long-term effects on the future of the subject. If the subject is to thrive, there is a need to use the abundance of research that is available and apply it to practice. The days of conjecture should be over.

With regard to the omnipresent discussion on gender, teacher gender and gender matching, there are strong indications that gender is nothing more than a confounder when it comes to PE. The students generally appear to thrive in any grouping, as long as the teacher displays emotional and subject-specific competence. Positive discrimination of female PE teachers or reintroducing

gender-segregated practices is not likely to change the underlying issues plaguing the subject, which appear to stem from conservative activity choices and biased teaching practices.

PE teacher educators

The institutions responsible for educating the next generation of PE teachers have to address what appears to be a potentially existential crisis for the subject. The minority of students who dislike the subject do so with an intensity that can leave a lasting scar and possibly influence their relationship to physical activity and exercise. This runs counter to the most central aim of the subject, which is the facilitation of an active lifestyle. Challenges related to the students who show less appreciation for the subject must therefore become more prominent in the PE teacher education. If the students are expected to display learning enhancing behavior, such as the self-regulation of learning, formative teaching practices should become more prominent in the education.

PE Teachers

The PE teachers, who appear to be unperceptive to their biases, and overly conservative in their curricular implementation, should look beyond their own experiences and make concessions to their students by diversifying activity choices, reducing the prominence of the most traditional games and attempt to make the environment more equitable.

The result of impeding the most prominent students in favor of advancing the less prominent ones will most likely result in a net gain due to the much improved experiences of the previously dissatisfied. Trying new and exciting forms of exercise, games or even traversing is likely to engage the whole class and alienate no one, while also allowing the PE teachers to facilitate learning.

Despite indications that an ego-involved climate can facilitate self-regulatory behavior, unrestrained reinforcement of ego-involvement and social compassion should not be advocated; due to the negative consequences it might have on motivation, satisfaction and feelings of competence. Instead, mastery-involvement, self-determination and intrinsic motivation should be facilitated.

Students

The students themselves should take ownership of their PE experience and evolve from being passive participants to proactive learners. The teachers can only do so much to facilitate self-regulatory behavior; the rest is up to the students. The students could also make sure that their need for autonomy is met, by co-opting some of the responsibilities from the teacher.

Researchers

The recommendations for future research are multitudinous and address ways of furthering the current research as well as the field in general. Firstly, despite indications of adequate internal consistency and psychometric properties, further validation of the teacher learning support in PE scale is warranted. Secondly, the replicability of the results across grade levels should be investigated. So should the replicability across cultures, as the results may be limited to the Nordic context. Thirdly, the chosen methods of measurement should be experimented with, as different measurements may yield different results. There are various ways of measuring self-regulated learning, e.g. thinking aloud protocols, classroom observations, event measures and learning diaries, while many of the other elements that were measured can be measured using more objective methodologies. Fourthly, longitudinal design should be utilized to assess possible changes to the learning environment over time. Likewise, randomized controlled trials should be done, to explore the efficacy of the interventions and determine causal attribution. Finally, more research categorizing the PE experiences of the most competent female students should be carried out, as a counterweight to the abundance of research addressing the experiences of the marginalized females

Most of the aforementioned recommendations are in line with the recently released reform to the Norwegian PE curriculum (Udir, 2019), which signals a transition away from traditional sports. Instead, alternative activities that center on practice, playfulness and mastery are to be prioritized. Furthermore, the PE teachers are urged to encourage self-determination, student reflection and indiscriminatory inclusion (Udir, 2019).

6.3 Conclusion

The collective results of the individual papers indicate that the current organizational trends in PE are more in line with the needs of the highly competent students, and less so with the needs of the less competent students. This tendency intensifies the differences between these groups and may be one of the primary drivers behind the negative relationship between age and appreciation for the subject. Further, the students do not appear to be self-regulating their learning to the same extent as they are in other subjects, despite the teachers efforts to facilitate the behavior. The cause of this discrepancy likely being PE's reputation as a recreational subject, underlined by the absence of homework and the playful nature of the lessons. Additionally, the role of the teacher's gender in influencing the PE experience seems to be exaggerated. Gender matching and positive discrimination of female PE teachers are therefore unlikely to improve the learning environment of female students.

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7 References

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Part II

Article I

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Self-regulated Learning in Physical Education: An Analysis of Perceived Teacher Learning Support and Perceived Motivational Climate as Context Dependent Predictors in Upper Secondary School

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ABSTRACT

The aim of this cross-sectional study was to investigate the relationship between teacher learning support, motivational climate and self-regulated learning in upper-secondary school physical education. A sample consisting of 554 upper secondary school students from Norway ($M_{age} = 17.05$, $SD = 0.91$) answered a survey pertaining to their everyday experiences in physical education. A multiple regression based structural equation model indicated that teacher learning support, ego-involving motivational climate and task-involving motivational climate were all significant positive predictors of self-regulated learning, with teacher learning support emerging as the most prominent predictor. These results add to the cumulative knowledge that exists on the relationship between teacher dependent environmental factors and individual behavior within the physical education context.

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Assessment for learning; formative assessment; learning environment; self-regulation

The physical education (PE) community is characterized by the clash of two leading agendas; the public health agenda and the educational agenda (O'Sullivan, 2004). Those adhering to the educational agenda believe that learning and individual development are paramount in the PE context. Conversely, those adhering to the public health agenda believe the subject to be a platform to fight hypokinetic disease and disrupt the sedentary quotidian that permeates our society. As the public health agenda gains impetus, fitness and recreation become more prominent in the curriculum, at the expense of learning (Crum, 2012). The educational agenda, on the other hand, emphasizes the enhancement of knowledge and competence using carefully constructed teaching strategies. Adhering to the educational agenda requires qualified teachers, who possess the pedagogical and didactical capabilities to effectively navigate the complex landscape of PE (O'Sullivan, Tannehill, & Hinchion, 2010). Because of PE's distinctiveness, as a subject that engages both the mind and the body, and due to the subject's inherently enjoyable nature, there is an added need to explicitly communicate learning goals, and how they can be achieved, to the students. Without a clear directive from the teacher, the students may be inclined to view the subject as being recreational, which might reduce their incentives to engage in learning enhancing behavior (Cothran, 2010).

In an effort to advance the debate on these polarizing agendas, the current study attempted to shed some light on the prevalence of such behavior and the environment in which it may be facilitated. One such behavior that has been found to differentiate between effective and less effective learners, in PE and elsewhere, is the self-regulation of learning (Cleary, Platten, & Nelson, 2008;

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Kolovelonis, Goudas, & Dermitzaki, 2011a, 2012; Kolovelonis, Goudas, Hassandra, & Dermitzaki, 2012; Zimmerman, 2006). Self-regulated learning is a process that involves proactively directing behavior and using strategies to achieve self-set goals (Cleary & Zimmerman, 2004). The aforementioned behavior, which is recognized by Hattie (2012) as being a key factor in understanding the process of learning, is not viewed as an innate trait, which an individual either possesses or not, but rather as a malleable context-specific environmental response (Zimmerman, 2002). Students who self-regulate their learning have been found to be more likely to monitor their progress, focus on self-improvement, take advantage of learning opportunities and to seek help, than their peers (MacNamara, Button, & Collins, 2010; Zimmerman, 2008). Measuring an individual's propensity for regulating his or her own learning can be achieved in various ways, including but not limited to, thinking aloud protocols, classroom observations, self-reporting, event measures and learning diaries (Dugan & Andrade, 2011; Greene, Robertson, & Costa, 2011; Panadero, Klug, & Järvelä, 2016; Perry & Rahim, 2011; Winne & Perry, 2000).

According to Zimmerman (1998, 2000), self-regulated learning is a cyclical process where reflections on earlier experiences are used to improve upon impending learning efforts. The process can be divided into three phases: The forethought phase, which occurs before the learning effort and involves goal setting, strategic planning and the acquisition of task related knowledge. The performance phase, which occurs during the learning effort, involves the implementation of the strategies proposed in the previous phase and the self-observation required to track personal functioning. The final phase is the self-reflection phase, which occurs after the learning effort and involves performance evaluation, causal attribution and adaptive reactions to learning strategies (Zimmerman, 2002). Depending on the behavioral feedback observed during the learning effort and whether the initial goals were achieved, adjustments may be made to the learning strategies used (Zimmerman, 1989). More specifically, self-regulated learning involves knowing how to set goals, realizing what is needed to achieve those goals and determining how to actually achieve those goals (Dabbagh & Kitsantas, 2012).

Most of the research on self-regulated learning in PE to date centers on the mastery of specific skills (e.g., Kolovelonis et al., 2011a, 2011b, 2012; Kolovelonis, Goudas, Hassandra, et al., 2012), and to a lesser degree on the general prevalence of the behavior, and the way it interacts with various other elements of the PE lessons. Kolovelonis et al. (2011a, 2011b, 2012) stress the teachers' role in facilitating the use of self-regulatory behavior such as task analysis, self-talk, self-recording and goal setting in PE, as this behavior does not appear to occur naturally in the context. If the teachers were to capitalize on the students' comparatively high motivation to participate in PE tasks and activities, especially during the formative years, the behavior would likely be more prevalent and occur more naturally.

The Norwegian context makes for an interesting setting due to the 2006 school reform, which built on Black and Wiliam's (1998) work on formative assessment. In line with the principles of formative assessment the teachers have been encouraged to share learning goals, reward effort and make continuous assessments that facilitate learning (Forskrift til opplæringsloven, 2006; Tveit, 2014). The reform has been particularly important in the PE context, where the previously prevailing assessment practices were controversial and devoid of formative purpose (Arnesen, Nilsen, & Leirhaug, 2013; Leirhaug, 2016). The reformed assessment guidelines are more interactive and involve the students in their own evaluation to a larger extent than before (Tveit, 2014). They involve the teachers making inferences about the students' current abilities and subsequently applying formative procedures to facilitate progress. By adopting formative assessment practices, the teachers are able to promote proactive rather than reactive learning behavior (Nicol & Macfarlane-Dick, 2006).

As indicated by the model for learning enhancing feedback there are conceptual communalities between formative assessment and self-regulated learning (Hattie & Timperley, 2007). All formative behavior, whether internally or externally facilitated, aims to reduce the discrepancy between current and desired understanding by answering the three questions of: (1) what are the goals? (2) what progress is being made toward the goals? and (3) what activities need to be undertaken to make better

progress? (Hattie & Timperley, 2007). In a way, these processes can be viewed as two sides of the same coin, internal and external facilitators of the same behavior, aspiring to the same outcome; allowing students to take greater ownership over their own development, and adapting their learning goals and strategies to fit current abilities. Henceforth, formative teaching behavior will be referred to as teacher learning support.

Previous research in PE, and elsewhere, has found that different teacher dependent environmental aspects, including the motivational climate, influence the degree to which individuals self-regulate their learning (McCaslin et al., 2006; Ommundsen, 2006; Peeters et al., 2014; Theodosiou & Papaioannou, 2006; Young, 2005; Zimmerman, 2002). The motivational climate refers to the collective perception of the situational achievement goal structure, and is generally considered as being predominantly task- or ego-involving (Ames, 1992; Duda, 2001). A task-involving climate describes an environment where every student is valued, success is regarded as attainable, effort is rewarded, and learning is important. The various activities and tasks presented are designed to be optimally challenging and mistakes are regarded as an integral part of the learning process (Ames, 1992; Papaioannou, 1995). Contrastingly, an ego-involving climate describes an environment of social comparison and competence-based favoritism, where the outcome is valued above effort and mistakes are punished. Goal orientations are not bipolar, meaning that they do not exist at opposite extremes of a spectrum, but rather orthogonal, meaning that both can coexist to a different degree at the same time. In other words, students can perceive an environment as being both ego-involving and task-involving at the same time, and any individual can score high or low on both ego-orientation and task-orientation (Duda, 2001; Ferrer-Caja & Weiss, 2000; Young, 2005). The degree to which task- or ego-involvement is predominant within a given environment, has been found to have positive or negative influence, respectively, on numerous aspects within the PE context; including motivation, satisfaction, competence, motor-skills and fitness (Braithwaite, Spray, & Warburton, 2011).

Research into the relationship between the motivational climate and self-regulated learning is limited, in both the PE context and elsewhere. However, there are indications of a distal relationship between the constructs. Ommundsen (2006) and Theodosiou and Papaioannou (2006) reported a positive relationship between a task-involving climate and self-regulation, while reporting inconsistent relations with an ego-involving climate. The inconsistency appears to be caused by the more proximal self-enhancing and self-defeating ego-orientations, and the diverging influences they have on self-regulation (Ommundsen, 2006).

The objective of this study was to gain a better understanding of the potential role teacher dependent environmental factors play in shaping the learning behavior of the individuals within the Norwegian upper secondary school physical education context. The specific research question that guided this research was "How do the perceived teacher learning support and the perceived motivational climate effect the student's self-regulation of their own learning?" A hypothesized model illustrating the expected nature of the relationships between the measured variables can be seen in Figure 1. The inconsistent findings of previous research concerning the relationship between an ego-involving climate and self-regulated learning hindered our ability to make a meaningful prediction on that particular relationship in the current study.

Method

Sample and Procedure

554 upper secondary school students ($M_{age} = 17.05$, $SD = 0.91$) from four schools in the Rogaland district of Norway participated in this study. The participants were recruited from schools representing both urban, suburban and rural settlements, using a stratified sampling procedure. Informed consent was obtained from all participants and school representatives before any data was collected. A project leader administered the questionnaire during PE class. The data

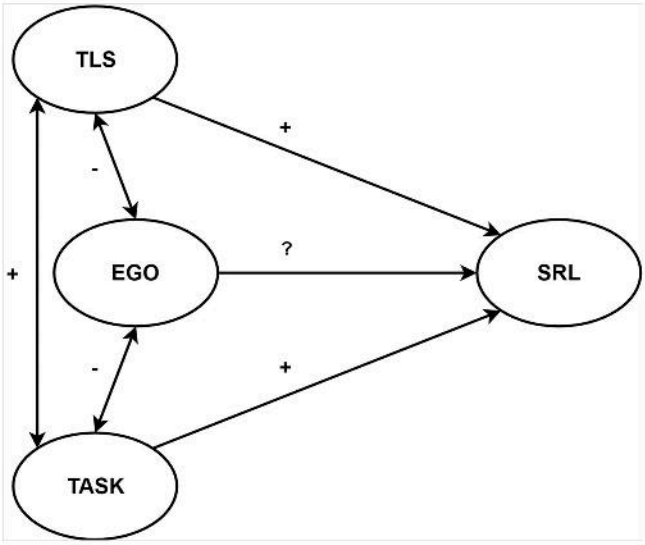

Figure 1. A hypothesized model for the study (TLS = teacher learning support, EGO = ego-involving motivational climate, TASK = task-involving motivational climate, SRL = self-regulated learning).

collection took place in the fall of 2017 and was approved by the Norwegian Social Sciences Data Service (NSD).

Measures

The degree to which the students self-regulated their learning was measured using a PE-specific version of the Self-Regulation subscale of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich & De Groot, 1990). This subscale from the original version of the MSLQ was partially based on Zimmerman and Pons (1986, 1988) theories on metacognitive strategies. The subscale composed of nine items and was measured on a 7-point Likert scale ranging from "Not at all true of me" (1) to "Very true of me" (7). Examples of items include "Before the activities start, I think about the things I will need to do to learn" and "When the lesson is over, I reflect on what I have learned." The scale was found to demonstrate satisfactory construct validity and internal consistency in the academic context (Pintrich & De Groot, 1990).

Using Hopfenbeck's (2014) Regulation for Meaningful Assessment, Hattie and Timperley's (2007) model for learning enhancing feedback, and the principles of formative assessment as reference, a nine item single factor PE-specific scale measuring perceived teacher learning support was constructed for the purpose of this study. The items measured the students' experiences with key elements of teacher learning support, such as the dissemination of learning goals, use of feedback and willingness to modify behavior. Items include questions such as "It is important to the PE teacher that we learn new skills" and "The PE teacher provides us with clear advice on how we can improve our performance" (the full list of items can be seen at the bottom of this article). Responses were given on a 6-point Likert scale ranging from "never" (1) to "always" (6). This measure was constructed as a means of measuring the prevalence of the integrated teaching processes that aim to improve learning, increase student involvement in the learning process, assess current performances and communicate appropriate action for progression (López-Pastor, Kirk, Lorente-Catalán, MacPhail, & Macdonald, 2013; Sadler, 2010).

The students' perception of the motivational climate was measured using a PE-specific version of the Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Seifriz, Duda, & Chi, 1992), which consists of two subscales measuring task-involving climates (9 items), and ego-involving

climates (11 items). Each item was measured on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Items measuring task-involvement focused on effort and teamwork, while ego-involving items focused on individuality and competition. Examples of items are "In this PE class, trying hard is rewarded" and "In this PE class, doing better than others is important." The instrument has previously been found to demonstrate satisfactory construct validity and internal consistency in the Norwegian context (Ommundsen, Roberts, Lemyre, & Treasure, 2003).

Statistical Analysis

Using M*plus* 8 statistical software, a structural model consisting of three exogenous (teacher learning support, ego-orientation and task-orientation) and one endogenous variable (self-regulated learning) was examined in this study. All variables were measured as latent constructs. To account for missing values and potential non-normality of data, a maximum likelihood estimation method with robust standard errors was utilized. Prior to placing each latent construct into the structural model, the factor structure of each construct was analyzed through a measurement model. The fit of each model was assessed using the Satorra-Bentler chi-square (S-B χ^2; Satorra & Bentler, 1994), which has been found to be sensitive to sample size, and should therefore be assessed in conjunction with the Tucker-Lewis index (TLI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR; Byrne, 2012). The benchmarks for acceptable fit using the aforementioned measures are as follows: CFI and TLI should be close to or above .95, while RMSEA and SRMR should be $\leq .06$ and $\leq .08$ respectively (Hu & Bentler, 1999). For the purpose of scaling the latent variables to a common metric, one indicator per latent variable was fixed to 1.0. As recommended by Byrne (2012), any re-specifications of measurement models were reported. The internal consistency of the latent constructs was assessed using Raykov's rho (ranges from 0-1; Raykov, 1998), which is now preferred to the more traditional Cronbach's alpha (Cronbach, 1951) as it is believed to yield more accurate estimates (Yang & Green, 2010). Contrary to Cronbach's alpha, Raykov's rho does not require equal contribution of items to factorial variance, and accounts for correlated error variance (Raykov, 1998).

Results

Preliminary Analysis

A confirmatory factor analysis (CFA; Jöreskog, 1969) was performed on pilot data from 389 students from various school levels in Norway (elementary school (n = 169), lower secondary school (n = 113) and upper secondary school (n = 107)) to confirm the hypothesized single-factor structure and analyze the internal validity of the teacher learning support in PE scale. The initial measurement model indicated less than acceptable fit (S-B χ^2 = [df = 27, N = 388] = 94.77, $p < .001$; TLI = .90; CFI = .93; RMSEA = .08 [.06–.10]; and SRMR = .04). Inspection of factor loadings indicated that one item ("The PE teacher concludes the lesson with a short recap of what we learned during that lesson") contributed modestly to the latent construct (< .50). That item was subsequently removed from the scale. The measurement model for the revised eight-item scale indicated improved model fit (S-B χ 2 = [df = 20, N = 388] = 78.97, $p < .001$; TLI = .91; CFI = .93; RMSEA = .09 [.07–.11]; and SRMR = .04); however, not to the degree that the model would be deemed acceptable. Upon inspection of modification indices, high covariance was discovered between two pairs of items ("The PE teacher informs us as to what we are supposed to learn" had high covariance with "The PE teacher provides us with clear aims for the lesson, and tells us what is expected of us," and "The PE teacher gives feedback that is indicative of the quality of our work" had high covariance with "The PE teacher provides us with clear advice on how we can improve our performance"). An item examination revealed that although they intended to measure different elements of the latent construct, the wording of the items could make them difficult to discern from one another,

Table 1. Descriptive statistics, Raykov's rho coefficients and correlations for all latent variables.

	Mean	SD	Range	Raykov's ρ	1.	2.	3.
1. Self-regulated learning	3.14	1.32	1–7	.82	–		
2. Teacher learning support	4.21	1.09	1–6	.91	.39**		
3. Task-involving climate	3.85	.76	1–5	.85	.28**	.60**	
4. Ego-involving climate	2.34	.85	1–5	.85	.11*	−.28**	−.27**

Note: Reported values represent the modified scales, bivariate correlation is indicated using Spearman's ρ, *$p < .05$, **$p < .01$.

especially for the younger participants. Allowing these two pairs of items to co-vary in line with Byrne's (2012) recommendations resulted in excellent fit indices for the re-estimated model (S-B χ 2 = [df = 18, N = 388] = 19.96, $p = .335$; TLI = 1.0; CFI = 1.0; RMSEA = .02 [.00–.05]; and SRMR = .02).

Descriptive Statistics

Descriptive statistics, internal reliability scores and the correlation matrix for all latent variables can be seen in Table 1. All measurements displayed satisfactory levels of internal consistency (>.70; DeVellis, 1991), with Raykov's rho ranging from .82-.91.

Confirmatory Factor Analysis

To confirm the hypothesized factor structure of the latent variables, both the exogenous and the endogenous variables were analyzed using a CFA. Initial results on every measured variable indicated non-acceptable fit; however, close inspection of both the measurement models and the content of the items gave cause to re-specify the models in line with Byrne's (2012) recommendations. The re-estimated models were all found to have adequate fit.

The initial measurement model of the nine-item self-regulation subscale of the MSLQ yielded non-acceptable fit (S-B χ 2 = [df = 27, N = 554] = 332.52, $p < .001$; TLI = 0.56; CFI = 0.67; RMSEA = 0.14 [0.13–0.16]; and SRMR = 0.12). Inspection of the factor loadings revealed that four (three of which were reversed) out of the nine items contributed modestly or not at all ($p > .05$) to the latent construct, indicated by low factor loadings (< .20) and high residuals (> .90). The less than adequate fit may have been influenced by the negative wording of the items, which can cause an agreeing-response effect or acquiescence (i.e., the tendency to answer items in a positive way regardless of their content; Bentler, Jackson, & Messick, 1971; Billiet & Davidov, 2008). In line with Byrne's (2012) recommendations these items were omitted, which resulted in acceptable model fit for the remaining five items (S-B χ 2 = [df = 2, N = 554] = 14.55, $p = .012$; TLI = .96; CFI = .98; RMSEA = .06 [.03–.10]; and SRMR = .02). The omitted items all pertained in some way to focus and perseverance. As the remaining items still include the three basic elements from Zimmerman's framework for self-regulated learning (forethought, performance and self-reflection), which was foundational to the original measure (Pintrich & De Groot, 1990), the abbreviated scale was deemed acceptable.

The initial measurement model for the eight-item teacher learning support in PE scale indicated non-acceptable fit (S-B χ^2 = [df = 20, N = 549] = 123.48, $p < .001$; TLI = .92; CFI = .95; RMSEA = .10 [.08–.11]; and SRMR = .04). Repeating the same modifications to the measurement model that yielded excellent fit in the pilot study yielded acceptable fit (S-B χ 2 = [df = 18, N = 549] = 53.96, $p < .001$; TLI = .97; CFI = .98; RMSEA = .06[.04 -.08]; and SRMR = .03; Hu & Bentler, 1999).

The initial measurement model for the two factor PMCSQ yielded non-acceptable fit (S-B χ 2 = [df = 169, N = 542] = 836.98, $p < .001$; TLI = .77; CFI = .80; RMSEA = .09 [.08–.09]; and SRMR = .08). An inspection of factor loadings revealed that four items from each subscale contributed modestly to the latent construct, indicated by low factor loadings (< .50). Omitting these items from the model resulted in a better, but still non-satisfactory fit (S-B χ 2 = [df = 53, N = 542] = 454.66, $p < .001$; TLI = .79; CFI = .83; RMSEA = .12[.11–.13]; and SRMR = .07). An inspection of

modification indices revealed high covariance between two items on the ego-subscale ("in this class, outperforming classmates is important" had high covariance with "in this class, doing better than others is important") and two items on the task-subscale ("in this class, the teacher focuses on skill improvement" had high covariance with "in this class, each student's improvement is important"). A content examination of the items revealed similarities in phrasing and meaning which could explain the high covariance. Allowing these items to co-vary resulted in acceptable fit for the re-estimated model (S-B χ 2 = [df = 51, N = 542] = 124.09, $p < .001$; TLI = .96; CFI = .97; RMSEA = .05[.04–.06]; and SRMR = .04). Despite the modifications made to the measure, the remaining items still envelop the key principles of task-involving climate, such as self-improvement, learning and affiliation.

Regression-based SEM-analysis

As can be seen in Figure 2, the structural model includes three exogenous (teacher learning support, ego-orientation and task-orientation) and one endogenous variable (self-regulated learning). The

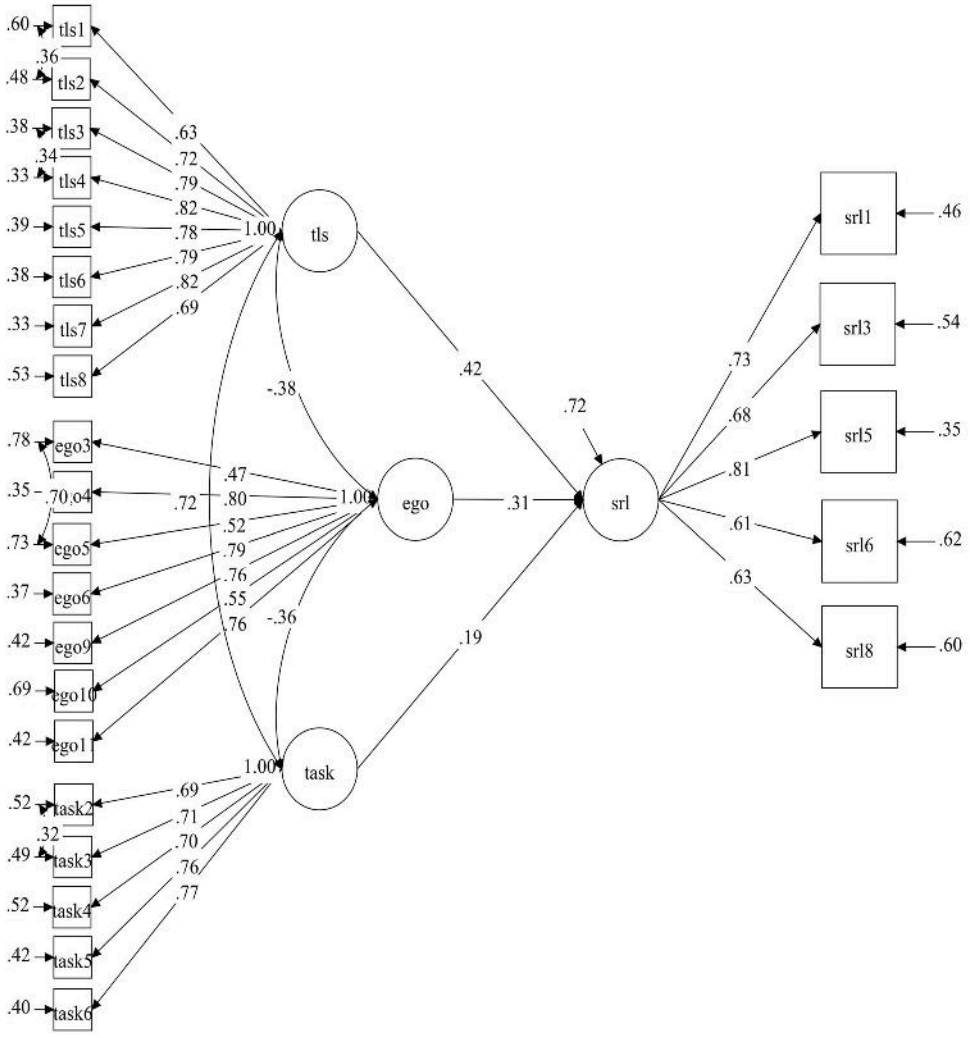

Figure 2. A visual representation of the standardized β coefficients for the complete model. As illustrated by the missing items, the EGO, TASK and SRL scales have been tolerably modified.

model yielded acceptable fit-indices (S-B χ^2 = [df = 265, N = 550] = 541.04, $p < .001$; TLI = .95; CFI = .95; RMSEA = .04 [.04–.05]; and SRMR = .05), according to the guidelines outlined by Hu and Bentler (1999). The β coefficients, which indicate the strengths of the relationships between the latent variables, were all significant ($p < .01$). All three exogenous variables had a positive relationship with self-regulated learning, with teacher learning support emerging as the most prominent predictor. The complete model explained 28% ($R^2 = .28$, SE = .05, $p < .001$) of the variation in self-regulated learning among students.

Discussion

The aim of this study was to investigate the relationship between teacher learning support, motivational climate and self-regulated learning in upper secondary school PE. In other words, to explore whether and to which degree teacher dependent environmental factors influenced the learning behavior of the students in the chosen context. In line with our expectations, the structural model indicated significant relationships between the environmental factors and self-regulated learning. Collectively, teacher learning support and the motivational climate accounted for 28% of the variance in self-regulated learning. The mean score for self-regulated learning was relatively low (below the arithmetic mean of the scale) compared to the mean scores reported in previous studies in the academic context (Pintrich, Smith, Garcia, & McKeachie, 1993; Saks, Leijen, Edovald, & Õun, 2015; above the arithmetic mean of the scale), indicating that self-regulatory behavior is not particularly prevalent in the Norwegian PE context. However, the score for teacher learning support (above the arithmetic mean of the scale) indicates that the students perceive that PE teachers do actively engage in learning enhancing behavior. The mean scores for ego- and task involving motivational climates mirrored results from previous research in the field, indicating that while both are prevalent, task-involving climates are more dominant (Ferrer-Caja & Weiss, 2000; Solmon, 1996).

In line with our expectations, the structural model indicated a significant inter-variable relationship between the exogenous variables (teacher learning support, ego-involving climate and task-involving climate). As expected, the nature of these relationships varied. Congruent with previous research, the relationship between ego-and task-involving climates was negative (Moreno-Murcia, Sicilia, Cervelló, Huéscar, & Dumitru, 2011). As hypothesized, the relationships between teacher learning support and ego-involving climate on one hand and teacher learning support and task-involving climate on the other, were respectively negative and positive. The strength of the relationship between teacher learning support and a task-involving climate, illustrated by a *r*-coefficient of .60 and a β-coefficient of .72, was in accordance with our expectations. The two constructs share some underlying principles; such as the tolerance of failure, support for learning and a preoccupations with acquiring and improving both skill and knowledge. These findings give further support to the validity of the teacher learning support scale, and indicate theoretically meaningful relations between the constructs.

Congruent with our expectations, the relatively strong relationship between teacher learning support and self-regulated learning was positive. These findings give further support to the claims that teachers can play an integral role in determining the degree to which their students self-regulate their learning (Peeters et al., 2014; Tay, 2015). Even though certain individual characteristics, such as intellectual curiosity and social identity (Torrano Montalvo & González Torres, 2004; Wang & Holcombe, 2010), have been found to predict self-regulation, the students still depend on the teachers to disseminate learning goals, give feedback on progress and make adjustments to the learning goals and strategies, for the endeavor to be successful (Hattie & Timperley, 2007).

Because of the inconsistency of prior research on the relationship between ego-involvement and cognitive engagement (Ommundsen, 2006), expectations concerning that particular relationship were unclear. Irrespective of the lack of presupposition, the strength of the relationship between ego-involvement and self-regulated learning was somewhat unexpected. These results are at odds with normative goal theory, which supposes that social comparison and concern with besting others

creates an environment that undermines self-regulated learning (Pintrich, 1999; Randi & Corno, 2000). However, our findings are in line with the results of a handful of studies, which claim that preoccupation with outperforming others can, in certain circumstances, have a positive impact on motivation, self-regulation and learning (Ommundsen, 2006; Pintrich, 1999; 2000).

According to Skaalvik and colleagues (Skaalvik, 1997; Skaalvik, Valåns, & Sletta, 1994) the positive or negative effects an ego-involving climate has on an individual's behavior is heavily influenced by the complexion of the individual's ego-orientation, and whether the genesis of social comparison is self-enhancing or self-defeating. In other words, the response to an ego-involving climate, is largely determined by whether the individual's ego-orientation stems from the yearning to be the best and to display superior ability, or the desire to avoid looking stupid, being the worst performer in the class or avoiding negative comments. In light of Skaalvik and colleagues' assumptions, the results of this study seem to indicate that self-enhancing ego-orientation is more prevalent than self-defeating ego-orientation in the Norwegian PE context. These results may very well be unique to the current context; PE in general lacks well-defined learning criteria, peer performances are constantly on public display, and in Norway, effort counts towards the final grade (Utdanningsdirektoratet, 2015). The students who perceive a greater degree of ego-involving motivational climate may feel compelled to regulate their learning as a response to the unavoidable social comparison that ensues.

The relatively low mean score for self-regulated learning in the current study was interesting. As previously mentioned, the reported score was substantially lower than previously reported figures from different, more academic, school subjects (Pintrich et al., 1993; Saks et al., 2015). No definitive conclusions to the cause of this disparity can be drawn from the data gathered for the purpose of this study; however, postulations are possible. This is by no means an exhaustive list, nevertheless, it would be reasonable to assume that the relative absence of self-regulatory behavior in PE could be attributed to (1) the subject being inherently enjoyable, often drawing comparisons to recess (Kinchin & O'Sullivan, 2003; O'Sullivan, 1989), (2) the lessons having traditionally focused more on displaying skills than learning them (Digelidis & Papaioannou, 1999; Smith, Lounsbery, & McKenzie, 2014), and (3) there being little or no homework, resulting in minimal expectations of self-initiated extracurricular work (Kinchin & O'Sullivan, 2003; Tannehill, Romar, O'Sullivan, England, & Rosenberg, 1994).

From an applied perspective, the findings of this study are of interest to all the stakeholders involved in PE. The lack of clarity concerning the subject's aims and purpose, coupled with the polarizing agendas that determine the curricular execution and modus operandi of the teachers, seem to create confusion concerning expected student behavior. If the students are expected to learn and regulate their own learning, that behavior should be actively facilitated. Policymakers may be satisfied as long as the students are stimulated to be physically active; however, us PE teacher educators should have loftier ambitions. We should acknowledge the formative role we play in shaping the next generation of PE teachers and the influence we have over the subject's direction, and utilize it to promote the application of formative practices and encourage the facilitation of learning enhancing behavior. Preoccupation with anti-sedentary initiatives does not have to be mutually exclusive from learning; however, increases in self-regulatory behavior in an environment dominated by the health agenda without a rebranding of the subject as a learning arena is unlikely. Despite the indications the results of the current study offer, we do not recommend unrestrained reinforcement of ego-involvement and social comparison, due to the negative consequences it might have on motivation, satisfaction and feelings of competence (Braithwaite et al., 2011).

We acknowledge that this study has several limitations. Firstly, the cross-sectional nature of this study presents common-method variance problems and excludes any notion of causal attribution. Secondly, self-reporting presents certain obstacles, which can skew the results, such as social desirability and other response biases. However, steps were taken during the data collection to minimize the impact of those phenomena. Thirdly, questions can be raised concerning the generalizability of the results, as the participants were recruited from a constrained school district. To compensate for the relatively low number of schools and lack of geographical variance, certain measures were

made to maximize the representability of the schools. These measures appear to have been successful, as the sample resembled the designated population with reference to age, gender composition, ethnicity, and urban settlement. Moreover, the teacher learning support in PE scale was developed specifically for this study, and despite indications of adequate internal consistency and psychometric properties, further validation is warranted. Finally, the necessary adjustments made to the remaining measurements should be considered when interpreting the results. The modifications make the transfer of external validity and psychometric properties to and from other studies somewhat cumbersome. Nevertheless, the fit indices and internal consistency measures were considered acceptable. Despite these limitations, the results of the study are interesting and have important practical implications. Our recommendations for future research include reproducing the current study in different contexts and examining whether different measures of self-regulated learning yield different results. Even though the 2006 educational reform makes the Norwegian PE context an interesting setting, it also differentiates it from most otherwise compatible contexts, and may make any generalizations across borders fruitless. Randomized control trials determining causal attribution would also be recommended.

Conclusion

Based on the findings of this study, inferences can be made regarding the relationship between teacher dependent environmental factors in PE and the self-regulatory behavior of the students. Firstly, the student's learning behavior appears to be indicative of learning support provided by the teachers. Secondly, an ego-involving motivational climate does not appear to hamper the students' propensity to self-regulate their learning, as suggested by normative goal theory, but rather to stimulate it. Finally, in spite of the teachers engaging in learning enhancing behavior and cultivating a climate where learning is facilitated, the students do not appear to actively engage in self-regulating behavior in the PE context. This may be due to the inherently enjoyable nature of the subject, and the fact that many students view PE as a welcome break from the quotidian of school life, and not as a learning arena.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

Unverified English language version of the TLS scale

In this PE class …

(1). The PE teacher informs us as to what we are supposed to learn
(2). The PE teacher provides us with clear aims for the lesson, and tells us what is expected of us
(3). The PE teacher gives feedback that is indicative of the quality of our work
(4). The PE teacher provides us with clear advice on how we can improve our performance
(5). It is important to the PE teacher that we learn new activities
(6). The PE teacher gives us open tasks that give us the opportunity to try various solutions
(7). The PE teacher listens to our commentary and takes it into account during the lessons
(8). The PE teacher gives us the opportunity to evaluate our own effort and development
(9). The PE teacher concludes the lesson with a short recap of what we learned during that lesson*

Original Norwegian version of the TLS scale

I kroppsøvingstimene …

(1). Informerer læreren oss om hva vi skal lære
(2). Presenterer læreren klare mål for timen, og hva som blir forventet av oss
(3). Gir læreren tilbakemeldinger som forteller om kvaliteten på vårt arbeid
(4). Gir læreren tydelige råd om hvordan vi kan forbedre våre prestasjoner
(5). Er læreren opptatt av at vi lærer nye aktiviteter
(6). Gir læreren åpne oppgaver hvor vi kan prøve ut ulike løsninger
(7). Er læreren lydhør for våre tilbakemeldinger, og tar hensyn til denne i senere undervisning
(8). Gir læreren oss mulighet til å vurdere eget arbeid og egen faglig utvikling
(9). Avslutter læreren timene med en kort samtale om hva vi har lært i dagens økt*

*not included in the final version of the scale due to modest contribution to the construct

Article II

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Gender and the perceived learning environment in upper secondary school physical education

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ABSTRACT

Discussions surrounding gender are omnipresent in physical education. Outdated views based on stereotypical ideas on gender and gender relations are rampant, and research outlining the positive development in recent years is often overlooked or ignored. This study set out to explore the relationship between gender and the learning environment in upper secondary school physical education by examining whether the student's perception of the learning environment was related to the teachers' gender, the student's gender or the interplay between them. A sample of 554 Norwegian upper secondary school students completed a questionnaire assessing the social, psychological and pedagogical aspects of the learning environment measured using peer relations, teacher-student relations, the motivational climate and teacher learning support. A multivariate analysis indicated no significant differences in student perceptions based on their physical education teacher's gender or the interplay between student and teacher gender. On an individual level, significant differences were found between male and female students on four out of the five measured variables, with the males reporting more favorable perceptions than the females on all accounts. These results indicate that the effects of teacher gender on the learning environment, in the current study, are nonexistent.

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Learning support; teacher gender; peer relations; student-teacher relations; motivational climate; gender stereotypes

Introduction

Despite consistently being found among the top of the most liked school subjects (Moen, Westlie, Bjørke, & Brattli, 2018; Säfvenbom, Haugen, & Bulie, 2015), physical education (PE) is also the subject that invokes the strongest negative feelings from the students who dislike it (Andrews & Johansen, 2005; Säfvenbom et al., 2015). Even though gender is not the premier predictor of students' attitude towards PE (Redelius, 2004), females are greatly overrepresented among those who view the subject in a negative light (Prochaska, Sallis, Slymen, & McKenzie, 2003; Säfvenbom et al., 2015). As a result, gender continues to dominate discussions on student experiences within the subject. Even though the subject has traditionally been found to be male-dominated (Ennis, 1999; Napper-Owen, 1994), there are indications of a shifting landscape where equality may be approximate (Constantinou, Manson, & Silverman, 2009; Subramaniam & Silverman, 2007), even though we are not there yet (Lamb, Oliver, & Kirk, 2018). Some of the subject's masculine tendencies have been attributed to the overrepresentation of male PE teachers in the profession, and the stereotypical views they often have on gender-roles (Andrews & Johansen, 2005; Kastrup & Kleindienst-Cachay, 2016). They tend to have comprehensive experience from competitive sports and a tendency to approach their lessons with a modus operandi more in line with sports clubs than educational institutions

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(Syrmpas, Digelidis, Watt, & Vicars, 2017). According to various research findings, many of the females who have expressed distain for the subject are not necessarily averse to physical activity, but rather the way the subject is organized and carried out (Andrews & Johansen, 2005; Lamb et al., 2018; Olafson, 2002). Female students and teachers alike seem to be in agreement that an overhaul of the curriculum, with an emphasis on introducing and prioritizing activities that are traditionally categorized as feminine, would have a liberating effect on the currently circumscribed PE experience of females (Kastrup & Kleindienst-Cachay, 2016; Kiley & Robinson, 2016; Olafson, 2002). Some students have also expressed the belief that having a female PE teacher would likely influence the PE experience of females in a positive way (Kiley & Robinson, 2016; Olafson, 2002).

The aforementioned views on content and curricular-reform are understandable, as gender-stereotypical activity preference is known in the literature (Couturier, Chepko, & Coughlin, 2007; Klomsten, Marsh, & Skaalvik, 2005) and current practices appear to favor boys significantly (Dowling, 2016; Moen et al., 2018); which is supported by the findings of several researchers who have reported positive results from interventions designed to increase participation, physical activity and enjoyment through increased autonomy, cooperation, and choice for female students (Lamb et al., 2018; McNamee, Timken, Coste, Tompkins, & Peterson, 2017; Mitchell, Gray, & Inchley, 2015). However, the claims of the possible advantageousness of gender matching are more questionable. These views fall under the gender-stereotypic model, which is an enduring supposition that does not appear to hold true anymore (Carrington et al., 2007; Cho, 2012; Marsh, Martin, & Cheng, 2008; Martin & Marsh, 2005; Neugebauer, Helbig, & Landmann, 2011; Spilt, Koomen, & Jak, 2012). The idea that boys fare better when their teacher is male, and that girls fare better when their teacher is female may have been true in a bygone era (Ward, 1982); however, research from the classroom indicates that different factors are at play in what has been described as a gender-invariant model (Carrington et al., 2007; Marsh et al., 2008; Martin & Marsh, 2005). By controlling for known covariates, the effects of teacher gender have increasingly been found to be negligible or non-existent (Antecol, Eren, & Ozbeklik, 2015; Cho, 2012; Sansone, 2017). Many of the studies that have found gender-differences report inconsistent results, have low effect sizes, and fail to control for content knowledge or experience, which have been found to negate the 5–10% effect formerly attributed to the teachers' gender (Cho, 2012; Drudy, 2008; Sabbe & Aelterman, 2007).

Despite a relatively overwhelming consensus among researchers on this topic, laymen and policy-makers continue to suggest positive discrimination of teachers of certain genders and gender matching as possible solutions to what is often referred to as the boy crisis in academic education and the girl crisis in PE (i.e. the supposed systemic discrimination of boys and girls through the feminization of school and the hyper-masculine and male dominant culture in PE, respectively, which perceivably facilitates suboptimal conditions for performance and enjoyment [Mitchell et al., 2015; Neugebauer et al., 2011; Oliver & Kirk, 2016; Tarrant et al., 2015]; OECD, 2017; Tarrant et al., 2015; Vogt, 2018). However, these crises appear to be an oversimplification of a wide range of factors that have to be viewed in a more nuanced light.

Understandably, there may be gender variations in behavior; male teachers have for example been found to be more authoritarian and controlling, while female teachers have been found to be more democratic, collaborative and nurturing (Lam, Tse, Lam, & Loh, 2010). However, these differences appear to have marginal effects on student performance and well-being as they are superseded by more efficacious traits such as pedagogical ability, motivation, engagement, supportiveness and consistency (Carrington et al., 2007; Martin & Marsh, 2005).

One of the scholastic elements that have been found to be teacher-dependent is the learning environment (Hill, Hannon, & Knowles, 2012). In this study, the learning environment is referred to as the social, psychological and pedagogical context in which learning occurs, which was measured through the students' perceptions of peer and teacher-student relations, the motivational climate and teacher learning support. The chosen variables were selected as they were believed to give a reasonably accurate impression of the social (peer and teacher-student relations), psychological (the motivational climate) and pedagogical (teacher learning support) aspects of the learning

environment and have all been used in the PE context previously. As noted by Fraser (1998), the students' collective perceptions of their environment can be viewed as a sound indicator of the actual situation as their position within the environment, the time spent within it and their prior experiences within different environments, make them highly qualified to form an accurate impression.

Research on the learning environment within the PE context is quite sparse (e.g. Koka & Hein, 2003a, 2003b; Mitchell, 1996), with many studies only referencing the term in passing without measuring it (e.g. Mitchell et al., 2015; Subramaniam & Silverman, 2007), while others focus solely on the motivational aspects of the learning environment (e.g. Lynch & Mcloughlin, 2018; Ommundsen, 2001). A review of the literature reveals a dearth of research measuring multiple aspects of the learning environment, while also exploring how those aspects may be influenced by gender, at least within the PE context.

The purpose of this study was to capitalize on that knowledge gap and expand the discussion on gender in PE by investigating the possible relationship between the teacher's gender and the students' perception of the learning environment in PE. Research questions included: (1) Do students perceive the learning environment in PE differently depending on the PE teacher's gender? (2) Are there inter-sexual differences in the students' perception of the learning environment in PE? (3) Is gender-matching advantageous to the students' perceptions of the learning environment in PE?

Method

Participants and procedure

The participants in this study were 554 upper secondary school students (247 males, 307 females; $Mean_{age} = 17.05$ $SD = 0.91$) and 17 teachers (11 males, 6 females) from four schools in the Rogaland district of Norway. A furcation of the student's by gender and teacher gender can be seen in Table 1. The schools were selected through a stratified sampling procedure representing both urban, suburban and rural settlements. Individual participants were sampled evenly across grade levels, with all participants attending semiweekly mixed-gender PE classes. Data were collected in the last month of the semester, using an electronic questionnaire. If technical difficulties arose, pen and paper substitutes were used. The questionnaire was administered by a project leader during PE class. Informed consent was obtained from both the schools and the participants before the data collection took place. No additional efforts were made to collect data from students who were absent during the data collection.

Instruments

Peer relations were measured using a PE specific version of the acceptance subscale of the Need for Relatedness Scale (Richer & Vallerand, 1998). Originally designed to measure the need for relatedness in the workplace, the scale has previously proved successful in the PE context (Standage, Duda, & Ntoumanis, 2005). The respondents were asked to rate the degree to which they felt 'supported', 'understood', 'listened to', 'valued' and 'safe' around their peers in PE class. The answers were given on a 7-point Likert scale, ranging from strongly disagree (1) to strongly agree (7). The subscale has displayed satisfactory construct validity and internal consistency in the PE context previously (α: .87; Standage et al., 2005).

Table 1. Furcation of the participants by gender and teacher gender.

	Male students	Female students
Male teacher	154	182
Female teacher	82	117
Missing teacher information	11	8
Total	247	307

Teacher-student relations were measured using a 5-item PE-specific scale developed by Standage et al. (2005). The scale was designed to measure relatedness support in the PE context. Answers are given on a 7-point Likert scale ranging from strongly agree (1) to strongly disagree (7). Examples of items are 'In this PE class, the PE teacher supports us' and 'In this PE class, the PE teacher has respect for us'. Satisfactory construct validity and internal consistency has been demonstrated previously in a study on English secondary school PE students (α: .88; Standage et al., 2005).

The students' perception of the motivational climate was measured using a PE-specific version of the Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Selfriz, Duda, & Chi, 1992), which consists of two subscales measuring task-involving climates (9 items), and ego-involving climates (11 items). Each item was measured on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Items measuring task-involvement focused on effort and teamwork, while ego-involving items focused on individuality and competition. Examples of items are 'In this PE class, trying hard is rewarded' and 'In this PE class, doing better than others is important'. The instrument has previously been found to demonstrate satisfactory construct validity and internal consistency in the Norwegian context (α: TASK .70, EGO .79; Ommundsen, Roberts, Lemyre, & Treasure, 2003).

To measure the perceived teacher learning support, an 8-item PE specific scale developed by Laxdal, Mjåtveit, Leibinger, Haugen, and Giske (2019, submitted manuscript) was used. Answers were given on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). Examples of items are 'In PE class, the teacher wants us to acquire new skills' and 'The PE teacher provides us with clear advice on how we can improve our performance'. The scale was found to display satisfactory construct validity and internal consistency in the Norwegian PE context by Laxdal et al. (ρ: .93; submitted manuscript, 2019).

The teachers' education level was measured in completed ECTS credits in PE, kinesiology or sports science. The benchmarks for rudimentary, standard and advanced levels were 60, 180 and 300 ECTS respectively.

Statistical analysis

All statistical analysis was performed using SPSS statistical software (version 25; IBM, Armonk, NY). The internal reliability of the applied measures was assessed using Raykov's composite reliability coefficient (Raykov, 1998). The relationship between variables was assessed using Spearman's rank correlation coefficient and a two-way multivariate analysis of covariance (MANCOVA), where the teachers' education level was used as a covariate. As normality is a criterion to perform a MANCOVA, non-normally distributed variables were transformed to normality using the Rankit procedure (Bliss, Greenwood, & White, 1956). The Rankit procedure was chosen as it has been found to be the most reliable normalizing procedure, irrespective of sample size and distribution (Soloman & Sawilowsky, 2009). For all analysis, significance was accepted at $p < .05$.

Results

Descriptive statistics, internal reliability scores and the correlation matrix for all observed variables can be seen in Table 2. All measures displayed satisfying levels of internal consistency, with

Table 2. Descriptive statistics, internal reliability scores and correlations for all observed variables.

Variable	*M*	SD	Range	ρ	1	2	3	4
(1) Peer Relations	5.63	1.33	1–7	.97	–			
(2) Teacher-Student Relations	5.95	1.34	1–7	.96	.46*	–		
(3) Teacher Learning Support	4.21	1.09	1–6	.93	.38*	.61*	–	
(4) Task-involved climate	3.75	.66	1–5	.80	.44*	.55*	.60*	–
(5) Ego-involved climate	2.55	.75	1–5	.80	−.26*	−.38*	−.23*	−.21*

Note: ρ = Raykov's Rho, * $p < .001$.

composite reliability coefficients ranging from .80 to .97 (Raykov, 1998). Out of the seventeen teachers involved in the study, three had rudimentary levels, five had standard levels, and nine had advanced levels of PE specific education.

Table 3 reveals the results from the two-way MANCOVA. The results indicate significant differences between male and female students on four out of the five learning environment variables (Pillai's Trace = .1, $F = 9.98$, df = (5,435), $p < .001$). No differences were found with respect to teacher gender (Pillai's Trace = .02, $F = 1.44$, df = (5,435), $p = .210$), or the interaction between teacher and student gender (Pillai's Trace = .01, $F = .84$, df = (5,435), $p = .523$). For all analysis, the teachers' education level served as a covariate. The inclusion or exclusion of the covariate in the analysis did not affect the final conclusion.

Discussion

The first objective of the study was to investigate the relationship between the students' perception of the learning environment in PE and the PE teacher's gender. Incongruent with the findings of Ward (1982), who found indications of teacher gender influencing student perceptions of the learning environment in the post gender-segregated US, no indications of teacher gender influencing the students' perceptions of the learning environment were found in this study. The results were more in line with the findings of numerous researchers who have reported similar tendencies in other subjects (Cho, 2012; Lahelma, 2000; Sabbe & Aelterman, 2007; Sansone, 2017), and the findings of Lirgg (1993) and Nicaise, Bois, Fairclough, Amorose, and Cogérino (2007; Nicaise, Cogérino, Fairclough, Bois, & Davis, 2007), who found various individual elements of the learning environment in PE to be invariant to the teachers' gender. These findings seem to underscore the exaggerated saliency generally accredited to the teachers' gender, while supporting the gender-invariant model, at least in relation to the students' perception of the learning environment.

The second objective of the study was to examine whether there were any inter-sexual differences in the students' perceptions of their learning environment. In congruence with the findings of Kim, Fisher, and Fraser (2000), Koul, Roy, and Lerdpornkulrat (2012), and Ward (1982) gender-related differences were found in the student's perception of the learning environment in our sample. Male students reported a more positive view with regards to peer relations, teacher learning support, and both measures of the motivational climate than their female counterparts. These results are in line with previous studies that have found that males and females perceive various aspects of the PE experience differently (e.g. Couturier et al., 2007; Lentillon, Cogérino, & Kaestner, 2006; Nicaise et al., 2006), which also applies to other contrasting groups (Koka & Hein, 2003b). Even though there are uncertainties associated with the cause of these gendered perceptions, there have been

Table 3. The results of the two-way MANCOVA.

Measured variables		df	F	p	η_p^2
Peer Relations	Teacher gender	1	1.692	.166	.004
	Student gender	1	**11.70**	**.001**	**.026**
	Interaction	1	.10	.748	<.001
Teacher-Student Relations	Teacher gender	1	.68	.409	.002
	Student gender	1	2.66	.103	.006
	Interaction	1	.61	.435	.001
Teacher Learning Support	Teacher gender	1	.68	.409	.002
	Student gender	1	**24.62**	**<.001**	**.053**
	Interaction	1	1.03	.310	.002
Task-involved climate	Teacher gender	1	.28	.595	.001
	Student gender	1	**15.70**	**<.001**	**.035**
	Interaction	1	.01	.929	<.001
Ego-involved climate	Teacher gender	1	1.63	.202	.004
	Student gender	1	**5.60**	**.018**	**.013**
	Interaction	1	2.73	.099	.006

Significant differences highlighted in bold; covariate not presented for the purpose of clarity.

suggestions attributing them to differences in involvement, competitiveness, competence, risk preference, social preference and fear of social comparison (Croson & Gneezy, 2009; Koul et al., 2012; Laxdal, Johannsson, & Giske, in press). Interestingly, the only variable in the current study that appears to be devoid of inter-sexual variations is teacher-student relations, which underscores the previous argument. The gender-dependency of the remaining variables has been established previously (Bakirtzoglou & Ioannou, 2011; Lentillon et al., 2006; Ntoumanis, 2001; Viira & Koka, 2010).

The third and final objective was to determine whether gender-matching was advantageous to the student's perceptions of the learning environment. In contrast to Ward's (1982) findings, there are no indications that the Norwegian PE students preferred teachers matching their own gender. The results were more in line with previous findings from the academic context, where the gender-stereotypic model has repeatedly been found to be deficient (Carrington et al., 2007; Cho, 2012; Marsh et al., 2008; Martin & Marsh, 2005; Neugebauer et al., 2011). Contrary to the suppositions of the gender-stereotypic model, boys do not seem to fare better when taught by males, and girls do not seem to fare better when taught by females. Instead, gender-invariant abilities such as pedagogical and interpersonal skills, and the tendency to be supportive and consistent appear salient in determining the students' experiences (Carrington et al., 2007; Martin & Marsh, 2005).

Proponents of the gender-stereotypic model may argue that the homogeneity of PE teachers counteracts the stereotypic response that would be expected in a less homogenous setting. The underlying values of PE, which tend to be associated with masculinity, aggression and assertiveness, may facilitate the artificial selection of female individuals who thrive in that setting, resulting in a less than representative sample of the population (Kastrup & Kleindienst-Cachay, 2016; Spittle, Petering, Kremer, & Spittle, 2012). However, this reasoning supports the arguments put forth in this study in a way, as it indicates that the individual characteristics of the teachers are central to the student's perception of the subject, as opposed to gender-variant characteristics. The underlying issues facing the subject do therefore appear to have more to do with the misalignment and discordance of values, as opposed to gender structures. No adjustments to those structures are likely to ameliorate the female PE experience without addressing the underlying cause.

Some researchers have argued that reverting back to single-gender PE classes, as opposed to the currently prevailing coeducational classes, would be advantageous, especially for the female population (Hill et al., 2012; Klomsten, 2016). However, there are well documented tendencies of hegemonic heteronormativity and gender-specific typecasting being reinforced within such contexts (Thompson & Ungerleider, 2004). These views can be observed in Berg and Lahelma's (2010) research on Finnish secondary school students, where the dichotomization of gender was found to create a hierarchical structure that placed higher value on male ability and created an environment where undesirable behavior was likely to go unchastised. The lack of exposure to qualified teachers of the opposite gender may also reduce the opportunities to overturn socially constructed stereotypes, which may enforce the implicit idea that if they could they would. When these findings are juxtaposed against Lahelma's (2000) earlier work in the same context, it becomes apparent that the subjects that segregate and match gender (PE and technical handicraft) are the only ones that align with the gender-stereotypic model, at least in that context, the remaining subjects being more in line with the gender-invariant model. These findings are supported by Martin (2013), who found that gender matching was likely to limit and polarize the students' views on both masculinity and femininity.

The current study has several limitations. The cross-sectional nature of the research presents common-method variance problems and does not allow for the determination of causality. Questions can be raised concerning the generalizability of the results, as the participants were recruited from a constrained school district. To compensate for the relatively low number of schools and lack of geographical variance, certain measures were made to maximize the representability of the schools. These measures appear to have been successful, as the sample resembled the designated population with reference to age, gender composition, ethnicity, and urban settlement. Self-reporting presents certain obstacles which can skew the results, such as social desirability and reference bias (Van de Mortel, 2008). However, measures were taken during the data collection to minimize the impact of

those phenomena (e.g. participants were told that there were no correct or incorrect answers, it was their perceptions that were of interest, ample space was given to each participant, peer discussions were prohibited during the data collection and teacher access was restricted). Furthermore, Norway is a highly egalitarian country, with high female sporting participation (Green, Thurston, Vaage, & Moen, 2015; World Economic Forum, 2017). Further investigation is therefore required to determine whether these findings are specific to the Norwegian context, or if they can be applied elsewhere.

Conclusion

Despite the enduring supposition that the differing experiences of boys and girls in PE are dependent on the teachers' gender, the current research found no indications of such a relationship in connection to the perceived learning environment. Neither the teachers' gender nor gender matching were found to account for the varying perceptions that were observed between the male and female PE students. Based on the results of this study, gender matching and the positive discrimination of female PE teachers appear unlikely to improve the learning environment of female students. It would be more advisable to base recruitment solely on merit and proficiency.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Article III

The role of perceived competence in determining teacher support in upper secondary school physical education

Aron Laxdal, Erlingur Johannsson & Rune Giske

Abstract

Background and purpose: Physical education remains one of the most liked school subjects irrespective of grade level or geography. Nevertheless, there are sections of the student body who dislike the subject immensely, and even more who think it should be organized differently. There have been longstanding accusations from the less competent students claiming that the physical education teachers and the curriculum favor the competent. Despite clear refusals of any conscious favoritism from the teachers themselves, perceived competence is one of the premier predictors for liking and being motivated to participate in the subject, the other being participation in organized sport. The purpose of this study was therefore to refute or confirm the veracity of the aforementioned claims by investigating the relationship between perceived competence and teacher dependent support in upper secondary school physical education.

Participants and methodology: 1133 upper secondary school students (M_{age} = 17.2, *SD* = 0.86) from Norway (n = 554) and Iceland (n = 579) participated in a cross-sectional survey. Four different teacher dependent support variables were measured using self-reporting: perceived competence support, perceived relatedness support, perceived autonomy support and perceived teacher learning support. To simplify comparison between groups the sample was divided into three units, highly competent students, moderately competent students and less competent students.

Results and conclusion: A one-way multivariate analysis of covariance (MANCOVA), with gender as a covariate, found indications of biased teacher behavior, thus supporting the aforementioned accusations. Even though some discrepancy may exist between the reported and the actual support levels, the students respond and react in accordance with their perceptions, which is why their perceptions are of concern. These findings are incongruent with the aims

of the subject, and indicate that modified practices are needed if a more equal learning environment for all students is desired. To reverse the current trend, we have provided three measures that we believe can reduce the aforementioned discrepancy. Firstly, PE teachers must become more aware of their own biases, recognizing their tendency to treat the competent more favorably. Secondly, challenges related to the students who show less appreciation for the subject should become more prominent in the physical education teacher education. Finally, the advantage those who participate in leisure time sporting activities have, over those who do not, should be reduced by reevaluating the current curricular implementation.

Key words: basic psychological needs, high school, self-determination theory, teacher bias.

Introduction

Physical Education (PE) remains among the most popular school subjects, irrespective of grade level or geography (Kangas, 2010; Moen, Westlie, Bjørke & Brattli, 2018; Säfvenbom, Haugen & Bulie, 2015). However, the students who dislike the subject tend to dislike it with an intensity not associated with other subjects (Andrews, & Johansen, 2005; Olafson, 2002). PE teachers have often been accused of favoring certain sections of the population, whether it were males, active athletes or the more competent students (Ennis, 1999; Leslie et al., 1999; Säfvenbom et al., 2015). The fact that a plethora of studies have found males to dominate just about every occurrence and interaction within the PE context (Alfermann, 1999; Derry & Phillips, 2004; Duffy, Warren & Walsh, 2001; Hannon & Ratliffe, 2007; Shimon, 2005) and that the greatest predictors for PE appreciation are perceived competence and leisure time sporting participation (Redelius, 2004, 162; Säfvenbom et al., 2015), give credence to these accusations.

The main phenomena of interest in this study is perceived competence. Competence refers to the capacity to interact effectively with a given environment, and is usually the result of prolonged learning (White, 1959). According to the basic psychological needs theory, which is a mini-theory derived from Deci and Ryan's self-determination theory (1985, 2000),

competence is one of three basic psychological needs an individual relies upon to function optimally in any social context (the other two being autonomy and relatedness). For the basic psychological needs to be fulfilled, need-supportive environments that facilitate competence, support autonomy and stimulate emotional connections have to be in place. Neglecting any of the basic needs can result in functional costs (Deci & Ryan, 2000).

In accordance with the theoretical postulations of Deci and Ryan (2000), Standage et al. (2005) found the degree of need satisfaction to be indicative of the degree of perceived need support in secondary school PE. Those findings are congruent with other research findings, which affirm the relationship between relatedness support and relatedness on one hand (Chang, Chen, Tu, & Chi, 2016; Cox, Duncheon, & McDavid, 2009), and autonomy support and autonomy on the other (Shen, McCaughtry, Martin, & Fahlman, 2009; Shen, McCaughtry, Martin, Fahlman, & Garn, 2012). However, the same does not necessarily apply to competence; at least not to the same degree. Competence seems to separate itself from the other two psychological needs, at least in the PE context, as it is not as dependent on external facilitation. Even though perceived competence tends to be higher in environments that are mastery oriented, and evaluate on individual criteria as opposed to comparative ones (Kalaja, Jaakkola, Watt, Liukkonen, & Ommundsen, 2009; Ntoumanis, 2001), most of the variance appears to be determined by physical activity levels and sport participation (Anderssen, 1993; Carroll, & Loumidis, 2001; Goudas, Dermitzaki, & Bagiatis, 2001).

Previous studies within the PE context have found that perceived competence is associated with the degree of motivation for the subject (Ntoumanis, 2001), can predict future levels of physical activity (Timo, Sami, Anthony & Jarmo, 2016), and is consistently more prominent in male students than female ones (Cairney et al., 2012; Carrol & Loudimis, 2001; Robinson, 2011). Even though variations in competence occur in all school subjects, PE stands out as the nature of the subject puts these variations on display to a greater extent (Fagrell, Larsson & Redelius, 2012). The physical and exhibitional nature of PE makes concealment of shortcomings onerous, which may explain why, given the opportunity to opt out of participating, less competent students tend to do so (Fagrell et al., 2012; Ntoumanis, 2005).

In line with the rest of the western world, PE in the Nordic countries is based on a multi-activity approach that is heavily congested with traditional team-based ball sports (Annerstedt, 2008). Many of the PE teachers have backgrounds in these same sporting activities, and as a result PE lessons tend to be organized in line with the modus operandi of sports clubs (Moen et al., 2018; Syrmpas, Digelidis, Watt, & Vicars, 2017; Trost, 2004). In addition, PE classes have been found to be a subpar arena for skill development as most of the time is allotted to the execution and evaluation of skills at the expense of actually acquiring them (Digelidis, & Papaioannou, 1999; Gibbons, 2008; Smith, Lounsbery & McKenzie, 2014). Students who actively participate in sports outside the PE context are therefore at a great advantage. Instead of reacting to the challenge, too many PE teachers choose the path of least resistance and hide behind the preferred activities of the majority, as opposed to using pedagogical tools to design inclusive activities that benefit everyone (Crum, 2012). This results in an environment where sections of the students are rewarded for using skills acquired outside the confines of PE to succeed, while others are left behind (Crum, 2012; Fagrell et al., 2012). This trend comes across as curious seeing as previous research within the PE context indicates that the more capable students are likely to thrive irrespective of their environment, while the disadvantaged have been found to benefit greatly from facilitation (Dudley, Okely, Pearson, & Peat, 2010; Gabbei, 2004; Nicaise, Cogérino, Bois, & Amorose, 2006). Likewise, these priorities are incongruent with the aims of the subject which do not include improving proficiency or incite competition, but rather teach the basic rules of the games, develop teamwork and inspire students to live active lives (Fagrell et al., 2012).

To date, most research into psychological need satisfaction in PE has centered on the integral role autonomy plays in determining well-being within the subject, and how internalizing the reasons for participation is paramount to mediating motivation (Prusak, Treasure, Darst, & Pangrazi, 2004; Shen et al., 2009; Shen et al., 2012). This study attempted to expand the ongoing discussion on the subject by illuminating the tacit importance competence plays in teacher-student interactions. The objective of this study was therefore to investigate the relationship between perceived competence and the perceived level of support provided by the teachers in the Nordic PE context. Based on the aforementioned empirical rationale, our expectation was to find a positive relationship between

the students' perceived competence and the level of support provided by the teachers on all observed support variables.

Method

Participants and procedure

The participants in this study were 1133 upper secondary school students (M_{age} = 17.2, *SD* = 0.86) from Norway (n = 554) and Iceland (n = 579). The eight participating schools, four from each country, were selected through a stratified sampling procedure representing both urban, suburban and rural settlements. Informed consent was obtained from all participants and school representatives before the data collection commenced. The data was collected through a questionnaire, administered by a project leader, in a group setting, during PE class.

Instruments

The students' perception of their PE specific competence was measured using a 5-item modified short version of the 18-item Intrinsic Motivation Inventory (IMI; McAuley, Duncan & Tammen, 1989). Answers were given on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Examples of items are 'I am pretty skilled at PE' and 'I am satisfied with my performance in PE.' The instrument has repeatedly displayed satisfactory construct validity and internal consistency in the PE context, both internationally and in Norway (Standage et al., 2005; Ommundsen & Kvalø, 2007).

Competence support was measured using a 4-item PE-specific instrument developed by Standage et al., (2005). Answers were given on a 7-point Likert scale ranging from strongly agree (1) to strongly disagree (7). Examples of items are 'In this PE class the PE teacher helps us to improve' and 'In this PE class the teacher makes us feel like we are good at PE.' The instrument has displayed satisfactory construct validity and internal consistency in the PE context previously (Standage et al., 2005).

Autonomy support was measured using a 6-item PE-specific version of the Learning Climate Questionnaire (LCQ; Williams & Deci, 1996). Answers were given on a 7-point Likert scale ranging from strongly agree (1) to strongly

disagree (7). Examples of items are ‘In this PE class the PE teacher encourages us to ask questions’ and ‘In this PE class we feel that the teacher provides us with choices and options.’ Satisfactory construct validity and internal consistency have been demonstrated in the PE context previously (Standage et al., 2005; Ommundsen & Kvalø, 2007).

Relatedness support was measured using a 5-item PE-specific scale developed by Standage et al. (2005) intended to measure the quality of the interpersonal relationship between the teacher and the students. Answers were given on a 7-point Likert scale ranging from strongly agree (1) to strongly disagree (7). Examples of items are ‘In this PE class the PE teacher supports us’ and ‘In this PE class the PE teacher has respect for us.’ Standage et al., (2005) study on secondary school PE students demonstrated the measurement’s satisfactory construct validity and internal consistency.

To measure the perceived teacher learning support an 8-item PE specific scale developed by Laxdal, Mjåtveit, Leibinger, Haugen & Giske (2019) was used. The items measured the students’ experiences with different elements related to teacher learning support, such as the dissemination of learning goals, use of feedback and willingness to modify behavior. Items include questions such as ‘It is important to the PE teacher that we learn new skills’ and ‘The PE teacher provides us with clear advice on how we can improve our performance.’ Answers were given on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The scale was found to display satisfactory construct validity and internal consistency in the Norwegian PE context by Laxdal et al. (2019).

Statistical analysis

All statistical analyses were performed using SPSS statistical software (version 25; IBM, Armonk, NY). When the data had been processed, the sample was divided into three groups depending on their level of perceived competence. The participants who were placed in the highly competent group were the ones who scored above the 66th percentile, while the less competent group consisted of the ones who scored below the 33rd percentile. The moderately competent group consisted of the remaining individuals, who placed between the 33rd and the 66th percentile. The internal reliability of the applied measures was assessed

using Raykov's composite reliability coefficient (Raykov, 1998). The relationship between variables was assessed using Spearman's rank correlation coefficient and a one-way multivariate analysis of covariance (MANCOVA). Gender and nationality were used as covariates. Between group differences were examined using LSD post-hoc tests. As normality is a criteria to perform a MANCOVA, non-normally distributed variables were transformed to normality using the Rankit procedure (Bliss, Greenwood and White, 1956). The Rankit procedure was chosen as it has been found to be the most reliable normalizing procedure, irrespective of sample size and distribution (Solomon & Sawilowsky, 2009). To quantify the differences between groups, Cohens d (for comparison between two groups; benchmarks .2 for small, .5 for medium and .8 for large (Cohen, 1969)) and partial eta squared (for comparison between three groups; benchmarks .0099 for small, .0588 for medium and .1379 for large (Cohen, 1969)) were computed. For all analysis, significance was accepted at $p < .05$.

Results

Table 1. Descriptive statistics, composite reliability coefficients and correlations for all observed variables

Variable	M	SD	Range	ρ	1	2	3	4
(1) Perceived Competence	5.66	1.25	1-7	.91	-			
(2) Perceived Competence Support	5.63	1.40	1-7	.95	.35*	-		
(3) Perceived Relatedness Support	5.89	1.40	1-7	.96	.33*	.85*	-	
(4) Perceived Autonomy Support	5.29	1.41	1-7	.95	.28*	.78*	.82*	-
(5) Perceived Teacher Learning Support	4.32	1.08	1-6	.92	.27*	.64*	.62*	.69*

Note: ρ = Raykov's Rho; Correlation is indicated using Spearman's ρ, * $p < .001$

Descriptive statistics, internal reliability scores and the correlation matrix for all observed variables can be seen in table 1. Mean scores for all variables were relatively high, which explains the negatively skewed distribution of the data. The measurements displayed high levels of internal consistency, with composite reliability coefficients ranging from .91-.96 (Raykov, 1998). Table 2 illustrates the gender representation in each of the three groups.

Table 2. Gender distribution across the various competence groups

	Boys	**(n = 449)**	**Girls**	**(n = 684)**
Low perceived competence	27.8 %	(n = 125)	34.1 %	(n = 233)
Moderate perceived competence	29.4 %	(n = 132)	35.4 %	(n = 242)
High perceived competence	42.8 %	(n = 192)	30.6 %	(n = 209)

As can be seen in table 3, a one-way MANCOVA, with gender as a covariate, revealed significant differences between groups on all measured support variables (Pillai's Trace = .1, F = 14.57, df = (8,2116), $p < .001$). Between groups post-hoc comparisons revealed that the more competent groups outscored the less competent groups consistently. Analyzing each country separately did not affect the conclusion. To further verify the validity of the results, the untransformed data was tested using the Kruskal-Wallis nonparametric one-way ANOVA, resulting in the same conclusion (not reported). The between-group differences were quantified using Cohen's d estimation of effect size, and can be seen illustrated in figure 1.

Table 3. Mean scores by confidence levels and MANCOVA results for all support variables

	Perceived Competence *M (SD)*						
	Low	**Moderate**	**High**	**df**	***F***	***p***	η_p^2
Perceived Competence Support	5.19 (1.40)	5.53 (1.40)	6.11 (1.23)	2	52.60	< .001	.09
Perceived Relatedness Support	5.49 (1.43)	5.78 (1.45)	6.34 (1.18)	2	52.17	< .001	.09
Perceived Autonomy Support	4.87 (1.38)	5.19 (1.48)	5.75 (1.24)	2	37.81	< .001	.07
Perceived Teacher Learning Support	3.99 (1.05)	4.29 (1.13)	4.65 (.95)	2	29.64	< .001	.05

Covariates (gender and nationality) are not included in the table for the sake of clarity

Discussion

The purpose of this study was to investigate the relationship between perceived competence and the perceived level of support provided by the teacher in the Nordic PE context. As previous studies within the field of physical education have indicated that perceptions of both competence and teacher support were gender-dependent, gender was controlled for in all analysis (Cairney et al., 2012; Carrol & Loudimis, 2001; Lentillon, Cogèrion & Kaestner, 2006; Robinson, 2011). In line with the findings of the aforementioned studies, the current study found that males reported higher scores than females on both variables.

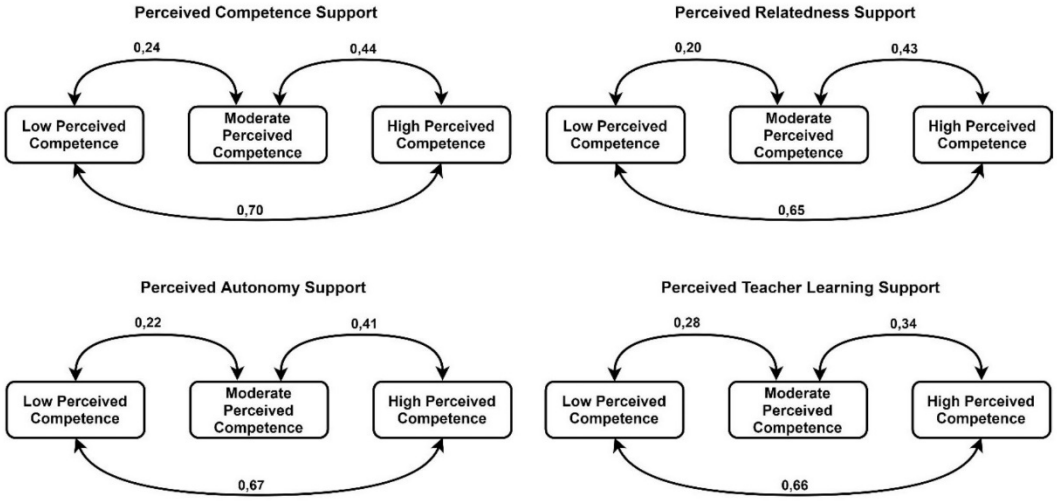

Figure 1. Cohens d was used to quantify the difference between groups. Whole lines indicate significant differences at the $p < .01$ level.

Congruent with our expectations, the results of this study indicated varying levels of support, depending on the students' competence levels, on all measured support variables. The different subgroups of high, moderate and low perceived competence reported significantly different scores, with the highly competent group scoring the highest and the less competent group scoring the

lowest, consistently across all variables. These results give further support to the claims that PE is an arena for the athletically competent and that the less competent are at a disadvantage (Dowling, 2016).These findings are incongruent with previous findings from the more academic subjects, where the less able students have been found to receive higher levels of support than their peers, using both observation and self-reporting (Baker, 1999; Mercer, Nellis, Martínez & Kirk, 2011). In the academic context, the less competent students are consistently identified as needing additional support, which is reasonable as they are likely to be less familiar with the subject matter and to be less comfortable within the context, compared to the more competent students (Bruggink, Meijer, Goei & Koot, 2014). Disproportionate levels of support in favor of the less competent appears to be a shrewd method of counteracting the Matthew effect, which has been found to be prevalent in the school system (Merton, 1968; Stanovich, 2009).The Matthew effect is the tendency for those who already possess desirable capital, whether it is money, power, recognition or ability, to accrue more of it over time, while those who are without tend to remain so; in other words, the rich-get-richer and the poor-get-poorer (Merton, 1968).

At first glance the discrepant teaching behavior between these two contexts may seem illogical, however, these results fit in line with our expectations and the available empirical evidence in the field (Dowling, 2016; Ennis, 1999; Olafson, 2002). As previously mentioned, PE lessons are heavily influenced by the modus operandi of sports clubs, and PE teachers tend to have backgrounds as active participants or coaches in various sports (Moen et al., 2018; Syrmpas et al., 2017; Trost, 2004). Ideally, sports clubs and educational institutions operate according to a different set of principles, that although not bipolar, should find themselves leaning towards the different ends of a spectrum. Sports clubs should, to a much greater extent than the educational institutions, allow for the cultivation of the competent, as they are more likely to act as catalysts in future sporting successes (Abbott & Collins, 2004; Digelidis & Papaioannou, 1999). Even though acquiring an understanding of the rules of the game, encouraging teamwork and promoting fair play are all integral components of sports at a grass-root level, the ultimate objective tends to be winning (Ring & Kavussanu, 2018). Therefore, a system designed to accommodate the less competent rather than the most competent would be counterproductive in the

sporting context. However, everyone should be entitled to an opportunity to succeed in the educational system, and the teachers ought to provide appropriate tasks for all students, in an effort to facilitate progress irrespective of prior knowledge and experience (Norwegian Board of Education, 2015).

Nevertheless, it would be simplistic to allocate the teachers sole responsibility for the differing perceptions reported by the various competency groups; as the students should be viewed as active rather than passive participants in their own learning process. There are indications from both sports and higher education that individuals who are more successful, confident and motivated are more likely to seek support, as well as being better equipped to detect and make use of said support, than their less successful counterparts (Karabenick & Sharma, 1994; Van Yperen, 2009). In addition, repeated negative experiences, confusion and general discomfort within the PE context can result in a state of learned helplessness for certain students. Likewise, the less successful may be incentivized to mask their own shortcomings by blaming a dearth of support instead of coming to terms with their own deficiencies.

In congruence with previous research, the inter-variable correlation between the different support variables was relatively high (Zhang, Solmon, Kosma, Carson, & Gu, 2011). The average score for all three sub-groups of students for said support variables was also relatively high (above the arithmetic mean of the scale), which indicates a generally supportive learning environment. The concern is the consistent unconscious bias in favor of the competent students, which they are bound to benefit from. Curricular implementation has also been raised as a cause of concern, as activity preferences have been found to be both skill- and gender-dependent (Dudley et al., 2010; Olafson. 2002). According to Dudley et al. (2010), less skilled students tend to prefer recreational activities focusing on fitness, while the more skilled students tend to prefer sport specific competition, which focuses on individual performances. In addition, female students have expressed their frustration at the superfluous focus on competition in the PE context, and the lack of priority traditionally feminine activities have in the curriculum (Gibbons, 2008; Olafson, 2002; van Daalen, 2005).

The results of this study have to be interpreted with its limitations in mind. The cross-sectional nature of the study design does not allow for any determination

of causality. Non-random sampling diminishes the probability of the sample being representative of the general population, thus potentially limiting the generalizability of the results. However, the sampling procedure included several measures designed to increase generalizability. These measures appear to have been successful, as certain key characteristics of the sample mirrored the designated population (e.g. age, gender composition, ethnicity, and urban settlement). Self-reporting presents certain obstacles which can skew the results, such as social desirability and response bias. However, steps were taken during the data collection to minimize the impact of those phenomena. There is also an unknown discrepancy between the actual and the perceived prevalence of the measured behavior. We rely on the students perceptions when measuring support, which only gives us an indication of the actual received support. However, students respond and react in accordance with their perceptions, which underlines the importance of documenting and understanding those perceptions. Despite these limitations, the results of the study are interesting and have important practical implications. Additionally, we would like to point out that sampling participants from two countries represents a strength to the study, and that the similarities in results across borders bolster the argument for these findings to be generalized even further.

Our recommendations for future research are threefold; 1) the replicability of the results across grade levels should be investigated, 2) longitudinal study design should be used to determine whether the perceptions of the sample remain constant over time, or whether they change in accordance with the Matthew effect, and 3) the discrepancy between perceived and received support in the PE context should be explored using observation.

Conclusion and recommendations for practice

Our findings indicate discrepant perceptions of support, on all measured support variables, depending on the students' competence levels. Irrespective of the discrepancy that may exist between the actual and the reported support, the student's perceptions are of concern and indicate biased teacher behavior. To reverse the current trend, we have provided three measures that we believe can reduce the aforementioned discrepancy. Firstly, PE teachers must become more aware of their own biases, recognizing their tendency to treat the competent more favorably. Secondly, challenges related to the students who

show less appreciation for the subject should become more prominent in the PE teacher education. The current system has a tendency to affirm the predetermined views of an already homogenous group of individuals instead of challenging their preconceptions, thus broadening their horizons. Finally, non-traditional sports and activities should become more prominent on the agenda, at the expense of more traditional sports, in an effort to reduce the advantage those who participate in leisure time sporting activities have over those who do not. When traditional sports are on the agenda, the rules of the game can be modified to even the playing field.

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Appendices

Aron Gauti Laxdal
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4036 STAVANGER

Vår dato: 13.10.2016 Vår ref: 49932 / 3 / ASF Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 12.09.2016. Meldingen gjelder prosjektet:

49932	*The Learning environment in upper secondary School physical education*
Behandlingsansvarlig	*Universitetet i Stavanger, ved institusjonens øverste leder*
Daglig ansvarlig	*Aron Gauti Laxdal*

Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 01.06.2019, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Katrine Utaaker Segadal

Amalie Statland Fantoft

Kontaktperson: Amalie Statland Fantoft tlf: 55 58 36 41
Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

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NSD – Norwegian Centre for Research Data NO-5007 Bergen, NORWAY Faks: +47-55 58 96 50 www.nsd.no

Universitetet
i Stavanger

HÁSKÓLI ÍSLANDS

31.08.2017

Deres institusjon har blitt valgt ut som potensiell kandidat for deltakelse i et forskningsprosjekt. Forskingsprosjektet er et samarbeidsprosjekt mellom Universitetet i Stavanger og Islands Universitetet. Målet med prosjektet er å øke kunnskapsnivået knyttet til læringsmiljøet i kroppsøvingsfaget og finne ut hvilken organiseringsform som er mest hensiktsmessig. På sikt er håpet at kunnskapen som etableres gjennom dette prosjektet vil gjøre kroppsøving til et triveligere og mer interessant fag for elevene, spesielt de kvinnelige elevene.

Totalt antall deltakere i prosjektet vil være på ca. 1200 studiespesialiserende elever på videregående skole, 600 fra Norge og 600 fra Island. Det ønskelige antallet elever fra hver enkelt skole er to klasser fra hvert trinn (ca. 150 elever). Elevene vil bli bedt om å gjennomføre en enkel spørreundersøkelse i papirform. Gjennomføring av selve spørreundersøkelsen tar ca. 25 minutter og kan utføres i løpet av en kroppsøvingstime. Representanter fra Universitetet i Stavanger vil utføre datainnsamlingen, noe som vil minimere påkjenningen for deres institusjon og ansatte. Innsamlingen vil bli gjennomført i løpet av **november 2017**.

Deltakelse i studien er frivillig og elevene har rett til å trekke seg, uten begrunnelse eller negative konsekvenser, når som helst i prosessen. Samtlige opplysninger som samles inn vil bli håndtert i tråd med personopplysningsloven og blir kun publisert i anonymisert form. Ingen utenfor forskningsgruppen kommer til å ha tilgang til det komplette datasettet. Prosjektet er meldt inn til, og godkjent av NSD, personvernombud for forskning.

Jeg håper at deres skole har lyst til å delta på dette spennende prosjektet. Dere vil bli kontaktet i løpet av kort tid hvor jeg kommer til å svare på eventuelle uklarheter, og forhåpentligvis innhente et positivt svar.

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Aron Laxdal

Læringsmiljø i kroppsøving

Kjære deltaker

Formålet med denne undersøkelsen er å få mer kunnskap om læringsmiljøet i kroppsøving med et håp om å forbedre deres opplevelse av faget.

Først og fremst håper vi at du vil delta i denne undersøkelsen og tar deg tid til å svare på alle spørsmålene. Din deltakelse er frivillig, og den kan avsluttes når som helst i løpet av prosessen. Intervjuguiden er noe omfattende og tar omtrent 25 minutter å gjennomføre. Vi håper at du tar arbeidet seriøst og svarer så ærlig du kan.

Alle svarene vil bli behandlet konfidensielt og det vil ikke være mulig å identifisere deg under rapportering av resultatene i dette arbeidet.

De fleste spørsmålene er basert på at du skal vurdere ulike beskrivelser, påstander og utsagn på en skala (for eksempel fra helt uenig til helt enig). Legg merke til at skalaene kan variere noe fra spørsmål til spørsmål, så det er viktig at du er oppmerksom på det. Det finnes ingen rette eller gale svar, det er din oppfatning som er av interesse. Ved å svare på undersøkelsen gir du oss ditt samtykke for å bruke de opplysningene du gir i vårt arbeid. Det er kun medlemmene av den aktuelle forskningsgruppen som har tilgang til opplysningene. Den avlagte informasjonen makuleres ved prosjektets ende i 2019.

Aron Gauti Laxdal, stipendiat ved Universitetet i Stavanger, er ansvarlig for undersøkelsen og er det noe du lurer på angående den er det bare å ta kontakt med ham.

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Universitetet
i Stavanger

1. Fødeår _____

2. Kjønn:

- Gutt
- Jente

3. Føler du at dine religiøse meninger påvirker din evne til å delta i kroppsøving på skolen?

- Ja
- Nei

4. Ser du på deg selv som etnisk norsk?

- Ja
- Nei

5. Kroppsøvingstimene gjennomføres …

- Alltid felles for begge kjønn
- Som regel felles for begge kjønn, men av og til i kjønnsdelte grupper
- Som regel i kjønnsdelte gruppe, men av og til felles
- Alltid i kjønnsdelte grupper

6. Hvor lang tid har dere til å dusje og skifte klær fra kroppsøvingstimen er ferdig til neste time begynner?

- Ca. 5-10 min
- Ca. 15-20 min
- Mer enn 25 min
- Kroppsøving er som regel dagens siste time

7. Dusjer du etter kroppsøvingstimene?

- Aldri
- Sjelden
- Oftest
- Alltid

8. Er du glad i kroppsøving som fag

- Ja
- Nei

9. Er du medlem i et idrettslag

- Ja
- Nei

10. Hvor mange timer i uken bruker du på organisert trening med et idrettslag? _____

11. Hvor mange timer i uken bruker du på uorganisert trening på eget initiativ (egentrening)? _____

Her skal du gi uttrykk for hvordan du opplever forholdet til kroppsøvingslæreren din.

I kroppsøvingstimene…	Helt uenig			Nøytral			Helt enig
12. Får vi hjelp av læreren til å forbedre oss.	1	2	3	4	5	6	7
13. Gir læreren oss følelsen av at vi er flinke.	1	2	3	4	5	6	7
14. Føler vi at læreren liker når vi lykkes.	1	2	3	4	5	6	7
15. Gir læreren oss følelsen av at vi mestrer aktivitetene i timene.	1	2	3	4	5	6	7
16. Støtter læreren oss.	1	2	3	4	5	6	7
17. Oppmuntrer læreren oss til å jobbe sammen i kroppsøvingstimene.	1	2	3	4	5	6	7
18. Respekterer læreren oss.	1	2	3	4	5	6	7
19. Bryr læreren seg om oss.	1	2	3	4	5	6	7
20. Føler vi at læreren er vennlig mot oss.	1	2	3	4	5	6	7
21. Føler vi at læreren gir oss valgmuligheter og alternativer.	1	2	3	4	5	6	7
22. Føler vi at læreren forstår oss.	1	2	3	4	5	6	7
23. Har læreren tro på våre evner til å gjøre det bra i timene.	1	2	3	4	5	6	7
24. Oppfordrer læreren oss til å stille spørsmål.	1	2	3	4	5	6	7
25. Prøver læreren å forstå våre synspunkt før han/hun foreslår alternative løsninger.	1	2	3	4	5	6	7
26. Lytter læreren til hvordan vi ønsker å gjøre ting.	1	2	3	4	5	6	7

I kroppsøvingstimene...	Aldri	Sjelden	Av og til	Ofte	Nesten alltid	Alltid
27. Informerer læreren oss om hva vi skal lære	1	2	3	4	5	6
28. Presenterer læreren klare mål for timen, og hva som blir forventet av oss	1	2	3	4	5	6
29. Gir læreren tilbakemeldinger som forteller om kvaliteten på vårt arbeid	1	2	3	4	5	6
30. Gir læreren tydelige råd om hvordan vi kan forbedre våre prestasjoner	1	2	3	4	5	6
31. Er læreren opptatt av at vi lærer nye aktiviteter	1	2	3	4	5	6
32. Gir læreren åpne oppgaver hvor vi kan prøve ut ulike løsninger	1	2	3	4	5	6
33. Er læreren lydhør for våre tilbakemeldinger, og tar hensyn til denne i senere undervisning	1	2	3	4	5	6
34. Gir læreren oss mulighet til å vurdere eget arbeid og egen faglig utvikling	1	2	3	4	5	6
35. Avslutter læreren timene med en kort samtale om hva vi har lært i dagens økt	1	2	3	4	5	6
36. Sørger læreren for at vi kommer raskt i gang med det vi skal gjøre	1	2	3	4	5	6
37. Virker timene godt planlagt	1	2	3	4	5	6
38. Kommer læreren presist til timen	1	2	3	4	5	6
39. Er læreren flink til å organisere undervisningen	1	2	3	4	5	6
40. Har læreren kontroll i timene	1	2	3	4	5	6
41. Vet vi hva vi skal gjøre	1	2	3	4	5	6

Her skal du gi uttrykk for hvordan du opplever <u>kroppsøvingstimene.</u>

I kroppsøvingstimene…

	Helt uenig		Nøytral		Helt enig
42. Har elevene en god følelse når de gjør det bedre enn sine medelever.	1	2	3	4	5
43. Blir elevene straffet når de gjør en feil.	1	2	3	4	5
44. Er det viktig å være bedre enn de andre.	1	2	3	4	5
45. Gir læreren mest oppmerksomhet til de beste.	1	2	3	4	5
46. Er det viktig å gjøre det bedre enn andre.	1	2	3	4	5
47. Favoriserer læreren enkelte elever.	1	2	3	4	5
48. Blir elevene oppmuntret til å gjøre det bedre enn medelevene.	1	2	3	4	5
49. Ønsker alle elevene å være best.	1	2	3	4	5
50. Blir bare de beste elevene lagt merke til.	1	2	3	4	5
51. Er elevene redd for å gjøre feil.	1	2	3	4	5
52. Oppnår bare noen få elever stjernestatus.	1	2	3	4	5
53. Blir innsats belønnet.	1	2	3	4	5
54. Er læreren opptatt av å utvikle/forbedre ferdigheter blant elevene.	1	2	3	4	5
55. Er fremgang hos hver enkelt elev viktig.	1	2	3	4	5
56. Prøver elevene å lære seg nye ferdigheter.	1	2	3	4	5
57. Blir elevene oppmuntret til å trene på det de ikke er så flinke til.	1	2	3	4	5
58. Vil læreren at vi skal prøve ut nye ferdigheter.	1	2	3	4	5
59. Liker elevene å konkurrere mot noen som er bedre enn dem.	1	2	3	4	5
60. Har alle elevene en viktig oppgave når vi setter sammen lag som skal konkurrere mot andre utenom klassen.	1	2	3	4	5
61. Får de aller fleste elevene delta når det gjennomføres lagkonkurranser mot andre.	1	2	3	4	5

	Helt uenig			Nøytral			Helt enig
62. Jeg kan bestemme hvilke aktiviteter jeg vil øve på i kroppsøving	1	2	3	4	5	6	7
63. Jeg har noe å si om hvilke ferdigheter jeg ønsker å øve på i kroppsøving.	1	2	3	4	5	6	7
64. Jeg føler at jeg er aktiv i kroppsøving fordi jeg ønsker det selv.	1	2	3	4	5	6	7
65. Jeg må tvinge meg selv for å delta i kroppsøvingstimene	1	2	3	4	5	6	7
66. Jeg føler en viss handlingsfrihet i kroppsøvingstimene.	1	2	3	4	5	6	7
67. Jeg kan påvirke hva jeg gjør i kroppsøvingstimene.	1	2	3	4	5	6	7
68. Jeg tror jeg er ganske god i kroppsøving.	1	2	3	4	5	6	7
69. Jeg er fornøyd med mine prestasjoner i kroppsøvingsfaget.	1	2	3	4	5	6	7
70. Jeg klarer aktivitetene i kroppsøving godt etter å ha holdt på med dem en liten stund	1	2	3	4	5	6	7
71. Jeg har gode ferdigheter i kroppsøving	1	2	3	4	5	6	7
72. Kroppsøving er et fag jeg ikke får til.	1	2	3	4	5	6	7
73. Når kroppsøvingstimen er ferdig tenker jeg over hva jeg har lært	1	2	3	4	5	6	7
74. Når aktiviteten er tung eller vanskelig gir jeg opp eller deltar minst mulig	1	2	3	4	5	6	7
75. Jeg øver på noen av de ferdighetene vi har lært i kroppsøving, selv om jeg ikke trenger å gjøre det	1	2	3	4	5	6	7
76. Selv om aktivitetene er kjedelige og uinteressante, holder jeg på til timen er ferdig	1	2	3	4	5	6	7
77. Før kroppsøvingstimen begynner, tenker jeg på hva jeg må gjøre for å lære noe	1	2	3	4	5	6	7
78. Når kroppsøvingstimen er ferdig, tenker jeg ofte tilbake og lurer på hva vi skulle lære i timen	1	2	3	4	5	6	7
79. Når læreren snakker tenker jeg på andre ting og hører ikke etter	1	2	3	4	5	6	7
80. Underveis i timen vurderer jeg aktiviteten for å se om jeg lærer noe	1	2	3	4	5	6	7
81. Jeg jobber hardt for å få en god karakter i gym, til og med de gangene jeg ikke liker aktiviteten	1	2	3	4	5	6	7

Her skal svare på noen spørsmål knyttet til ballundervisningen i kroppsøvingstimene

	Helt uenig		Nøytral		Helt enig
82. Jeg er flink i de fleste ballaktiviteter (Fotball, Håndball, Basketball, Volleyball osv.)	1	2	3	4	5
83. Ballaktiviteter i kroppsøving er kjedelig	1	2	3	4	5
84. Jeg syns for mange kroppsøvingstimer brukes på ballaktiviteter	1	2	3	4	5
	Aldri	**Sjelden**	**Noen ganger**	**Ofte**	**Alltid**
85. De som er flinke i ballspill hjelper til at de andre blir gode?	1	2	3	4	5
86. Kroppsøvingslæreren bruker tid på å lære oss reglene i ballspillene	1	2	3	4	5
87. Når vi spiller er det kroppsøvingslæreren som dømmer	1	2	3	4	5
	Svært lite				**Svært mye**
88. Hvor stor andel av kroppsøvingstimer brukes på ballaktiviteter?	1	2	3	4	5
89. Hvor mye av timen brukes på spill?	1	2	3	4	5
90. Hvor mye av tiden brukes til å lære ballteknikk (for eksempel skudd, pasninger, finter eller fingerslag)	1	2	3	4	5

Hvor ofte brukes de forskjellige ballaktivitetene i kroppsøvingsundervisningen?	Aldri	Sjelden	Av og til	Ofte	Svært Ofte
91. Fotball	1	2	3	4	5
92. Håndball	1	2	3	4	5
93. Basketball	1	2	3	4	5
94. Volleyball	1	2	3	4	5
95. Innebandy	1	2	3	4	5
96. Annet	1	2	3	4	5

	Ikke i det hele tatt					I veldig stor grad
97. Påvirker situasjoner knyttet opp mot garderoben (skiftning av klær, dusjing o.l.) din deltakelse i kroppsøvingstimene?	1	2	3	4	5	6
98. Påvirker situasjoner knyttet opp mot garderoben (skiftning av klær, dusjing o.l.) din innsats i kroppsøvingstimene?	1	2	3	4	5	6
99. Påvirker tiden du har til å skifte klær og dusje etter kroppsøvingstimen din innsats?	1	2	3	4	5	6
100. Hva var den siste karakteren du fikk i kroppsøving?	1	2	3	4	5	6

Her skal du gi uttrykk for hvordan du opplever forholdet til klassekameratene dine i kroppsøvingstimene.

Jeg føler meg…	Helt uenig	Uenig	Delvis uenig	Nøytral	Delvis enig	Enig	Helt enig
101. støttet	1	2	3	4	5	6	7
102. forstått	1	2	3	4	5	6	7
103. lyttet til	1	2	3	4	5	6	7
104. verdsatt	1	2	3	4	5	6	7
105. trygg	1	2	3	4	5	6	7

106. Skole: _____

107. Klasse: _____