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## Relationships between physical education (PE) teaching and student self-efficacy, aptitude to participate in PE and functional skills: with a special focus on students with disabilities

Karin Bertills <sup>a</sup>, Mats Granlund <sup>b</sup>, Örjan Dahlström <sup>c</sup> and Lilly Augustine <sup>d</sup>

<sup>a</sup>School of Education and Communication, Jönköping University, Jönköping, Sweden; <sup>b</sup>School of Health and Welfare, Jönköping University, Jönköping, Sweden; <sup>c</sup>Department of Behavioural Sciences and Learning, Disability Research Division, Linköping University, Linköping, Sweden; <sup>d</sup>School of Education and Environment, Kristianstad University, Kristianstad, Sweden

### ABSTRACT

**Background:** Students with disability show an increasing incidence of school failure. Quality teaching and appropriate support may foster high self-efficacy, a predictive factor for successful school outcomes. Physical Education (PE) can provide students with a context in which self-efficacy and participation are promoted leading to improved academic achievement. The transition into secondary school can be challenging for many students with increased educational demands, developmental changes and individual social identification coinciding. A disability may add to the challenge of success.

**Methods:** Three groups of students, aged 13 years and enrolled in Swedish mainstream schools were targeted ( $n = 439$ ). Groups included students with 1. A diagnosed disability, 2. Low grades in PE (D–F) and 3. High grades (A–C) in PE. Questionnaires were collected and analyzed from 30/439 students with a diagnosed disability (physical, neuro-developmental and intellectual) from 26 classes, their classmates and their PE-teachers ( $n = 25$ ). Relationships between student self-reports and PE-teachers' self-ratings were investigated. Also examined was the potential to which students' functional skills could predict elevated general school self-efficacy, PE specific self-efficacy and aptitude to participate in PE. Results were compared with the total sample and between the three target groups ( $n = 121$ ).

**Results:** For students with disabilities, better self-rated teaching skills were related to lower student perceived general school self-efficacy, PE specific self-efficacy and aptitude to participate in PE. The impact of classroom climate in PE was more obvious among students with disabilities. Perceived functional skills were associated with elevated general school self-efficacy, PE specific self-efficacy and aptitude to participate in PE. Better socio-cognitive functional skills had an overall positive effect on all outcomes. Students with disabilities reported results similar to the total sample, the D–F group scored lower and the A–C group higher than the total sample and the disability group. Elevated self-efficacy in PE is six times less probable in students with disabilities, compared to the A–C group.



**Conclusions:** Our findings that better teacher planning and grading skills, are detrimental to students disadvantaged by disability is contradictory. Improving the establishment and communication of adapted learning

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**CONTACT** Karin Bertills  [karin.bertills@ju.se](mailto:karin.bertills@ju.se)  School of Education and Communication, Jönköping University, Box 1026, 55111 Jönköping, Sweden

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standards at the transition to secondary school is a crucial and a predictive factor for promoting positive school experiences for students with disability. Students with disabilities need to be assured that the intended learning outcomes can be reached by doing activities differently than their typically functioning peers. Consideration of class composition is suggested as a means of promoting a positive learning climate, which would particularly benefit students with disabilities. Allocation of resources to support student socio-cognitive skills would improve experiences for the D–F group and likely promote a positive learning environment.

## Introduction

Teaching style and the interaction between a teacher and student may have both a positive and negative impact on student health and academic achievement (Gustafsson et al. 2010). Physical activities are well documented to promote physical, mental and psychosocial health in typically functioning students (Bouchard, Blair, and Haskell 2006). Less is known about the experiences of students with disabilities (UNESCO 2015a). Perceived competence is higher in physically active students with physical disabilities than in those who are inactive (Barg et al. 2010). Reduced physical activity is associated with lower emotional self-efficacy in students, who do less physical activity than recommended (Valois et al. 2008). Due to functional limitations, students with disabilities experience restricted opportunities for participation in extracurricular physical activities compared to their typically developing peers (King et al. 2009). For these students school-based Physical Education (PE) may serve as an important context to gain the benefits of physical activities (Block and Oubrusnikova 2007), but students with disabilities are over-represented in groups at risk of failing PE (Bråkenhielm 2008).

Self-efficacy refers to belief in one's capabilities to carry out the courses of action needed for desired goals (Klassen 2010). Self-efficacy beliefs are vital to all students, but may be critical determinants of the aptitude to participate in PE for students with disabilities, who need to work past their limitations. Despite this, school-based physical education research has largely overlooked issues related to disability (Haeghele and Hodge 2016). A teacher who promotes high student self-efficacy can have a positive impact on student motivation and behavior (Usher and Pajares 2008), student persistence in demanding physical challenges (Gao, Lee, and Harrison 2008), future health behavior (Feltz and Magyar 2006), and participation and higher self-efficacy for future success (Chase 2001).

Including students with disabilities into mainstream school serves as a means of implementing human rights (UNESCO 1994; UNICEF 2011). However, simply being included does not guarantee high participation in structured activities (Eriksson, Welander, and Granlund 2007). In order to succeed in school activities, students need to be able to regulate their behavior, exercise control over their learning, and manage their learning environment. The factor with the highest predictive power in relation to school outcomes is self-efficacy (Zimmerman 2000). Positive effects of high self-efficacy on academic achievement, both direct and indirect, are well established (Pajares 2003; Schunk 2003; Klassen 2007; Gustafsson et al. 2010; Kitsantas, Cheema, and Ware 2011). In PE, perceived self-efficacy has primarily been examined in the relation to motor skills (Zimmerman and Kitsantas 1997) and pro-sociality (Caprara, Alessandri, and Eisenberg 2012). These studies have concluded that high self-efficacy beliefs contribute to successful outcomes. Another factor related to achieving learning outcomes is quality of teaching (Reyes et al. 2012). Quality of teaching is related to students' opportunities to take control over their learning, and to gain high self-efficacy (Skinner and Belmont 1993). Research on quality PE teaching has focused on the amount of time students are physically active, reinforcement of student motivation and the role of content and how it is delivered (Rink 2013). In inclusive practices it is suggested that the most effective teachers clearly communicate high and adapted expectations, establish routines enabling small group activities and engage in

individualized interactions designed to foster all students' active participation in their own learning and understanding (Jordan, Glenn, and McGhie-Richmond 2010).

In Nordic countries, PE curriculum is currently less focused on physical achievement and more focused on how to promote patterns of physical activity in adulthood. This is done by providing role models, knowledge and skills in PE (Telama et al. 2005; Engström 2008; Koivusilta, Nupponen, and Rimpelä 2012). A mission for PE-teachers is to provide students with structured learning opportunities to gain knowledge about the body and the relationship between body movement and its effect on health and well-being (Chen and Ennis 2009). However, school-based physical education has been criticized for focusing too much on team sports and competitive games and conveying a traditional view of PE as affirming norms and values of a fit body with high levels of motoric competence (Fitzgerald 2005). Studies addressing student grading show that observable and measurable physical achievements are required to achieve higher grades in PE (Lopez-Pastor et al. 2013). The aptitude to participate in PE decreases over time for students in general, but students involved in extracurricular competitive sports are more apt to participate (Säfvenbom, Haugen, and Bulie 2015). Over time, the gap between students with typical and atypical functional skills may increase, suggesting a need for research to identify factors that promote positive outcomes.

Previous studies regarding the perceptions of students in need of special support in PE have primarily used qualitative methods, investigated students younger than 13 and focused on physical disabilities (Haegele and Sutherland 2015). Barriers increase at the transition to secondary school, partly due to the traditional view of PE influencing both teachers and students, and partly to increasing demands on expected learning outcome (Smith and Green 2004). As such, the present study investigated students, who were 13 years of age and focused on relations between self-ratings of PE-teachers' teaching skills, environmental prerequisites and classroom climate, and student perceived general school self-efficacy, PE specific self-efficacy, aptitude to participate in PE and physical and socio-cognitive functional skills. Three groups of students were included in the study, students with disabilities, students with low grades in PE at the transition into secondary school, and with high grades in PE.

### **Self-efficacy**

Self-efficacy is defined as 'perceived personal capability to organize and execute actions to attain goals' (Bandura 1986). A general sense of capability can be measured across domains as general self-efficacy. Specific self-efficacy refers to a personal sense of competence to successfully finish a specified task (Schunk and Pajares 2010). Measuring self-efficacy adds considerable information to general cognitive ability, academic aspirations, mental state and prosocial versus problem behavior (Pajares and Urdan 2006). The generality of self-efficacy may spread across various subjects or fields with the level and strength of self-efficacy depending on the difficulty of a task and certainty of success (Zimmerman 1995). High self-efficacious students are characterized by choosing more difficult and challenging tasks, investing more effort and being more persistent in accomplishing a specific task (Zimmerman 2000). This, in turn influences learning (Bandura 1986). Successful outcomes result in feeling competent and expecting future success in similar tasks. Regarding oneself as skillful boosts self-efficacy. One source of self-efficacy is prior accomplishment, which has the strongest effect on future performance. Other sources of self-efficacy are vicarious experiences, that is, observing peers and role models, verbal persuasion, that is, encouragement from teacher and peers, and physiological states such as anxiety and stress (Bandura 1997). Students with intellectual disabilities have less access to all four sources of self-efficacy. Comparing results from national tests, students with learning difficulties reported lower levels of self-efficacy, than peers without such difficulties (Jungert and Andersson 2013). Possessing all sources of self-efficacy is probably related to higher self-efficacy beliefs and higher academic achievement (Hampton and Mason 2003).

### **Disability and perceived participation in PE**

Participation can be seen as an expression of inclusion (Maxwell, Alves, and Granlund 2012) and a prerequisite to gain access to all four sources of self-efficacy (Bandura 1997). ‘Involvement in a life situation’ is the definition of participation expressed in the International Classification of Functioning, Disability and Health for Children and Youth, ICF-CY (World Health Organization 2007). In conceptualizing participation, there are two key elements, attendance and involvement. ‘Being there’ is a prerequisite for participation, but does not guarantee that the individual perceives ‘being involved’ (Imms et al. 2016). Another crucial aspect of participation is therefore whether involvement in the context is perceived as meaningful (King 2013). Thus, student voices are needed to involve them in the planning and organization of PE activities (Fitzgerald, Jobling, and Kirk 2003; Fitzgerald 2005, 2012).

The structure of PE lessons, both in terms of physical and social adaptations, is important for the participation of students with disabilities in school-based PE. Different adaptations and modifications are required, depending on the type of disability. Meaningful learning experiences for students with disabilities in PE are extensively dependent on teachers’ skills to and attitudes toward communicating and structuring their teaching in an inclusive direction (Jordan, Glenn, and McGhie-Richmond 2010). Participation restriction may be experienced if the activity is not adapted to students in need of special support (Smith 2004; Coates and Vickerman 2010; Healy, Msetfi, and Gallagher 2013). Students with physical disabilities describe *good days* in PE as lessons in which they experience a sense of belonging, their participation as skillful and where you share benefits (Goodwin and Watkinson 2000). Encouragement, reinforcement, help and guidance facilitate positive peer interaction (Seymour, Reid, and Bloom 2009). Patience and social encouragement are examples of caring support (Goodwin and Watkinson 2000).

### **Quality teaching to enhance participation in PE**

How teachers work, that is, relate to students, interact with students and structure the school environment is important. Students are diverse learners and by emphasizing teaching strategies, informed by what to teach and to whom, teaching can be effective and inclusive (Florian 2008). In inclusive practices, the teacher ‘owns the problem’ to encourage diverse learning and make adjustments that relieve the student from the sole responsibility of adapting his/her learning style (Coates 2012). To make modifications adequate students need to have their voices heard (Fitzgerald 2012).

Students with disabilities enjoy PE lessons, but have questioned the appropriateness of activities (Coates and Vickerman 2010). Modifications and mutual communication of alternative activities (inclusive or segregated) enhance participation (Bredahl 2013; Haegele and Sutherland 2015). Long-term planning by teachers is needed to provide adaptations that ensure meaningful participation and learning experiences in PE for students in need of special support. Inclusion in PE is significantly different from other subject areas, since the implementation of the PE syllabus include activity specific facilities and equipment, seasonal activities and safety issues (Morley et al. 2005). Teachers’ inadequate training and skills to adapt their teaching may account for reasons why students in need of special support are not fully included in mainstream PE (Coates and Vickerman 2008).

Research on the grading of students with disabilities is scarce (Mong 2014), but suggests a need to establish adapted standards, implement adaptations and modification of activities, and to formulate grading criteria according to these standards (if grade level standards are altered). Feed-back on product, process and progress must be based on these grading criteria and clearly communicated (Guskey and Jung 2009).

In the present study, teaching skills are used as a term to describe teachers’ systematic work with grading according to a criterion-referenced syllabus. According to assessment support for Swedish PE-teachers, teachers who work systematically with grading are characterized by planning

assessments and consciously incorporating them into their teaching. Strategies are needed to plan, long-term, what knowledge and skills to assess and how and when to assess. Lessons are planned with intended learning outcomes targeted, rather than specific content areas or activities. In short, students know what is expected from them, and are offered the opportunity to be actively involved in their learning. Teaching skills are defined by aspects the teacher can influence (The Swedish National Agency for Education 2012). The physical teaching environment may also restrict opportunities for teachers to adapt their lessons and modify the use of equipment (Jenkinson and Benson 2010). Lack of support in terms of resourcing and assistants has been reported (Morley et al. 2005). In the present study, teaching prerequisites refer to the physical teaching environment. Teachers' ratings of the classroom climate refer to social indicators of the learning climate.

Given that students in general experience a positive learning environment, research suggests that the physical, social, affective and cognitive benefits of PE can be claimed. A positive PE context is characterized by enjoyment, diversity and engagement, with trained teachers and supportive parents (Bailey et al. 2009). Equality, safeguarding and meaningful participation are fundamental principles in the guidelines for policy-makers to enhance quality physical education. A major conclusion from research to date is that PE-teachers need further training on how to implement inclusive practices and differentiate their teaching to accommodate students in need of special support (UNESCO 2015b).

### **Research questions**

In this study, we investigated relationships between PE teaching and student self-efficacy, aptitude to participate in PE and functional skills. It was hypothesized that the outcomes of PE are conditioned by teaching skills, prerequisites and climate, and are affected by student perceived self-efficacy and aptitude to participate. Relations were studied in a sample of Swedish students, aged 13, and compared among three target groups, students with disabilities, students with low grades in PE, and students with high grades in PE. Relations between the three target groups were studied in all three research questions.

- (1) What are the relations between (a) teaching skills, prerequisite and climate and (b) students' general school and PE specific self-efficacy, and aptitude to participate in PE?
- (2) What are the relations between students' perceived (a) socio-cognitive and physical functional skills and (b) general school self-efficacy, PE specific self-efficacy and aptitude to participate in PE?
- (3) Can elevated self-efficacy be predicted by socio-cognitive and physical functional skills?

## **Method**

### **Participants**

Twenty-three schools and PE-teachers from 26 classes agreed to be included in the study. Data were collected and analyzed from 439 students of year 7, aged 13. Nonrandom purposive sampling was used to recruit students with diagnosed disabilities. All classmates were offered the opportunity to participate. Those who actively consented were allocated to either a group with high grades (A–C) or a group with low grades (D–F) before transition into secondary school. The remaining students were included as a reference group (Table 1).

The group of students with disabilities were diagnosed with physical, neuro-developmental, intellectual, or a combination of one or more disabilities (Table 2).

### **Data collection instruments**

#### **Student questionnaires**

The General Self-efficacy (GeneralSE) instrument was translated into Swedish. GeneralSE includes three scales consisting of eight items, each measuring academic (AcademicSE), social (SocialSE)

**Table 1.** Student participants.

Groups	<i>n</i>	Male	Female	Classes/teachers
Disability	30	22	8	
Low grades	36	23	13	
High grades	55	22	33	
Others	318	161	157	
Number of classes				26
Total	439	224	215	22 <sup>a</sup>

<sup>a</sup>One teacher teaches two classes included in the study. Three schools denied participation.

**Table 2.** Type of disability.

Type of disability	<i>N</i>	Male	Female
Neuro-developmental disorder	12	9	3
Mobility	6	3	3
Neuro-developmental and one/multiple other disabilities	5	3	2 <sup>a</sup>
Vision	4	3	1
Hearing	2	2	
Intellectual disability	2	2	
Total	30	22	8

<sup>a</sup>One student withdrew at data collection.

and emotional self-efficacy (EmotionalSE) (Muris 2001). An additional instrument, the Self-efficacy in Physical Education and Health (SEinPE) was created, based on the Swedish PE syllabus and its three components: movement (MovementSE), health and life-style (HealthSE) and outdoor life and activities (OutdoorSE). Aptitude to participate in PE (Participate) was developed and consisted of items reported to be vital components for participation (Maxwell, Alves, and Granlund 2012) and adapted to a PE context. The Abilities Index (Bailey et al. 1995) was adapted and indexed to measure self-reported physical and socio-cognitive skills (PHYS, SOC\_COG), (Table 3). Following a checklist manual with quality standards (Mokkink et al. 2010), psychometric properties of the instruments were evaluated in a pilot-study. The scales were found to be accessible, valid and reliable (Bertills, Granlund, and Augustine 2017). Moderate correlations between the self-efficacy and functioning scales indicated that they measured different aspects of ability and competence. The strong correlation between SEinPE and Participate showed that the aptitude to participate is closely related to SEinPE.

**Table 3.** Examples of items measuring general school self-efficacy, PE specific self-efficacy, aptitude to participate in PE and functioning.

Index	<i>N</i>	Items
<b>GeneralSE</b>	24	<b>How</b> well can you/do you succeed in ...
AcademicSE	8	Get help from teacher, study, finish homework, pay attention, understand subjects, satisfy parents, study for and pass tests
SocialSE	8	Express opinions, become friends, chat, work in harmony, tell friends off, tell funny event, stay friends, prevent quarrels
EmotionalSE	8	Cheer up, calm down, prevent nervousness, control feelings, pep-talk, tell you don't feel well, suppress unpleasant thoughts, not worry
<b>SEinPE</b>	20	<b>Report</b> how you perceive your skills and abilities to participate and succeed in ...
MovementSE	8	Dance, fitness programs, games, athletics, obstacle courses, gymnastics, team sports, swimming
HealthSE	7	Set goals, plan, carry out and evaluate training, talk about physical experiences and effects, prevent injuries, describe risks, handle emergencies, reason about unhealthy behaviors
OutdoorSE	5	Plan, organize, carry out outdoor life, act according to public access to land, adapt clothing, handle water emergencies, orienteering
<b>Participate</b>	7	<b>Can</b> participate, do my best, safe in changing room, join competitive games, know what is expected from me, active in sports club, support from teacher
<b>PHYS</b>	3	<b>Functional skills</b> in hands, arms, legs
<b>SOC_COG</b>	7	<b>General</b> health, social skills, behavior, understand others, communicate, problem-solving

Note: Text is bolded for total scales.



**Table 4.** PE-teachers' ratings of their teaching skills, prerequisites and climate.

Index	N	Items
Teaching skills	14	Lesson planning, long-term plan and systematic grading
Lesson planning	4	Activity choices, varied instructions, students prepared and actively involved in planning PE activities
Long-term plan	4	Systematic plan in accordance with curriculum and syllabus
Grading	6	Plan what to assess and when, students know what is assessed and when, regard all available information about student
Prerequisites	3	Facilities, equipment and support for inclusion
Climate	4	Overall climate, students helpful, PE-appropriate clothing and engagement

Note: Teaching skills consist of lesson planning, long-term plan and systematic grading.

### Teacher questionnaires

The questionnaire with self-ratings of PE teaching was developed and concern environmental, inclusion, participation and grading aspects. The scale was indexed into instruments with dichotomized items. Lesson planning, long-term planning and grading were summed into teaching skills. The physical environment (prerequisites for teaching), and the social environment (ratings of the classroom climate) were treated separately (Table 4).

### Procedures

A cross-sectional comparative design with questionnaires was used. Data from teacher questionnaires were collected by mail. Questionnaires were distributed to students in their home classrooms and collected by the researchers about one term after transition into secondary school. Reading assistance was offered when needed.

### Statistical analysis

To examine the correlation between teaching skills, prerequisites and climate, and students' general school self-efficacy, PE specific self-efficacy, and aptitude to participate in PE, Spearman's rho (Field 2013) was examined for the total sample, and for each group of students separately, students with disabilities, D-F group, and A-C group. The correlations were calculated based on teachers' estimation of their teaching skills, prerequisites and climate, and the corresponding classes' average scores on self-efficacy. The correlations between the three student-groups were then compared using Fisher's  $r$  to  $z$  transformation (Siegel 1988).

The relations between student functional skills – socio-cognitive and physical – and students' general school self-efficacy, PE specific self-efficacy and aptitude to participate in PE, were examined with Spearman's rho based on students' individual scores. The correlations between the three student-groups were then compared using Fisher's  $r$  to  $z$  transformations.

The potential of socio-cognitive and physical functions to predict elevated general school self-efficacy, PE specific self-efficacy and aptitude to participate in PE was examined. A series of logistic regression analyses were performed, using socio-cognitive function, physical function and group (disability, low grades, high grades) as predictors.

Mean scores were calculated for all total scales and subscales. Cases with more than 25% missing values were excluded.

### Ethics

Informed consent to participate was collected from 121 (of 439) students, and their parents. The study was approved by the Ethical Review Board, Linköping, Sweden (2013/508-31).



## Results

### *Teaching skills, prerequisites and climate, and student perceived general school self-efficacy, PE specific self-efficacy, and aptitude to participate in PE*

Among students in the total sample ( $n = 434$ ) teachers' ratings of the classroom climate correlated significantly with student general school self-efficacy, aptitude to participate in PE, and PE specific self-efficacy (Table 5). Teaching skills were also related to student aptitude to participate in PE and MovementSE. Concerning aspects of teaching skills, higher MovementSE was experienced if the teachers plan long-term. Students of teachers who work systematically with grading experienced a higher aptitude to participate in PE and higher HealthSE.

Students with disabilities diverged from other groups in displaying predominantly negative correlations. As teachers scored higher on teaching skills and prerequisites, students with disabilities reported lower general school self-efficacy, aptitude to participate in PE, and PE specific self-efficacy. In the D-F group, higher ratings of teaching skills were significantly and most strongly positively associated with aptitude to participate and MovementSE.

Correlations between grading and MovementSE and between teaching prerequisites and aptitude to participate were significantly more negative among students with disabilities compared to students in the D-F group. For the D-F group the correlation between teaching prerequisites and aptitude to participate was significant, but not in the other groups. This correlation was significantly stronger compared to students with disabilities ( $Z = 2.53$ ,  $p = .01$ ) and the A-C group ( $Z = 2.20$ ,  $p = .03$ ). Correlations between teachers' systematic grading and MovementSE were non-significant, but significantly stronger in the D-F group compared to the disability group ( $Z = 2.35$ ,  $p = .02$ ).

**Table 5.** Correlations (Spearman's rho) between teachers' self-ratings and student self-reports in the total study sample, and in each group separately.

	GSE Total	Part Total	SEinPE Total	MSE	HSE	OSE
<i>Total (n = 434)</i>						
Teaching skills	.037	.136**	.080	.118*	.058	.052
Lesson planning	-.049	.014	.001	.071	-.048	.008
Long-term plan	.062	.095*	.060	.105*	.023	.043
Grading	.051	.141**	.066	.043	.101*	.037
Prerequisites	-.062	-.023	-.033	-.004	-.055	-.003
Climate	.132**	.176**	.110*	.134**	.095*	.048
<i>Disabilities (n = 25)</i>						
Teaching skills	-.230	-.100	-.071	-.104	-.092	.071
Lesson planning	-.265	-.341	-.217	-.159	-.273	-.180
Long-term plan	-.294	.055	.041	.101	-.016	.224
Grading	-.092	-.122	-.175	-.328	-.105	-.083
Prerequisites	-.309	-.239	-.146	-.213	-.088	-.046
Climate	-.106	.266	.333	.357	.306	.296
<i>A-C (n = 55)</i>						
Teaching skills	.095	.063	.191	.172	.254	.017
Lesson planning	-.021	-.107	.061	.065	.118	-.081
Long-term plan	.128	.045	.118	.207	.123	-.039
Grading	.063	.203	.242	.133	.322*	.121
Prerequisites	.081	-.035	.089	-.024	.098	.154
Climate	.199	.182	.127	.103	.185	.043
<i>D-F (n = 36)</i>						
Teaching skills	.053	.367*	.259	.363*	.189	.111
Lesson planning	-.277	.064	.028	.075	.060	-.115
Long-term plan	.035	.312	.159	.192	.141	.049
Grading	.266	.149	.230	.299	.127	.232
Prerequisites	.013	.425**	.249	.291	.163	.172
Climate	.060	.270	.129	.191	.092	-.003

Notes: Teaching skills: lesson plan, long-term plan and systematic grading; GSE: GeneralSE; Part: Participation; SEinPE: Self-efficacy in PE; MSE: MovementSE; HSE: HHealthSE; OSE: OutdoorSE.

\*\* $p < .01$ .

\* $p < .05$ .

**Table 6.** Correlations between students’ functional skills – socio-cognitive and physical – and students’ perceived self-efficacy in the total sample and in each group separately.

	GSE Total	Part Total	SEinPE Total
<i>Socio-cognitive skills</i>			
Total (n = 434)	.587**	.407**	.467**
Study sample (n = 119)	.628**	.431**	.496**
Disabilities (n = 29)	.530**	.453*	.296
A–C (n = 54)	.454**	.225	.413**
D–F (n = 36)	.807**	.537**	.605**
<i>Physical skills</i>			
Total (n = 437)	.217**	.122*	.179**
Study sample (n = 121)	.101	.116	.096
Disabilities (n = 30)	–.008	.059	.015
A–C (n = 55)	–.104	–.084	.061
D–F (n = 36)	.266	.264	.078

Notes: GSE: GeneralSE; Part: Participation; SEinPE: Self-efficacy in PE.

\*\*p < .01.

\*p < .05.

Students with disabilities have highest non-significant correlations between classroom climate and PE-related self-efficacy. No significant differences were found between the groups.

**Student perceived functional skills in relation to self-efficacy and aptitude to participate in PE**

For the total sample of students, socio-cognitive skills showed moderate to strong correlations with general school self-efficacy, aptitude to participate in PE and PE specific self-efficacy (Table 6).

Correlations were similar over the different groups, although the correlation with self-efficacy in PE in the disability group, and the correlation with aptitude to participate in the A–C group were non-significant. The correlation of socio-cognitive skills with general school self-efficacy was significantly different between the D–F group (r = .81) and the A–C group (r = .45), (Z = 2.82, p = .005).

Physical skills showed low to moderate correlations with GeneralSE, Participate and SEinPE among students in the total sample. Comparisons of correlations between the groups did show some differences. While correlations in the disability group all were close to zero, correlations in the A–C and D–F groups were opposite in their direction for several measures. The major difference was shown in EmotionalSE (a subscale of GeneralSE) where there was a positive significant correlation in the D–F group and a negative (non-significant) correlation in the A–C group (Z = 2.31, p = .01).

**Associations between student perceived functional skills and general self-efficacy, PE specific self-efficacy and aptitude to participate in PE**

Examination of the main scales showed that elevated socio-cognitive skills were significantly associated with eight times higher odds of having elevated GeneralSE and with four times higher

**Table 7.** Binary logistic regression models with elevated GSE, SEinPE and Part as outcome variables, and with socio-cognitive, physical and group (A–C and D–F, with disability as reference category) as independent variables in univariate models.

	Elevated GSE		Elevated SEinPE		Elevated part	
	OR (95% CI)	R <sup>2</sup> <sub>N</sub>	OR (95% CI)	R <sup>2</sup> <sub>N</sub>	OR (95% CI)	R <sup>2</sup> <sub>N</sub>
Elevated socio-cognitive skills	8.315 (2.913–23.737)	.217***	2.316 (0.993–5.403)	.044	4.062 (1.772–9.308)	.124***
Elevated physical skills	1.246 (0.941–1.651)	.030	1.230 (0.951–1.591)	.029	1.457 (1.089–1.950)	.083*
A–C	2.277 (0.901–5.751)	.040	6.000 (2.060–17.479)	.143**	2.555 (1.021–6.393)	.045
D–F	1.295 (0.477–3.521)		1.750 (0.646–4.744)		1.796 (0.673–4.793)	

Notes: GSE: GeneralSE; Part: Participation, SEinPE: Self-efficacy in PE; R<sup>2</sup><sub>N</sub>: Nagelkerke’s pseudo R<sup>2</sup>.

\*\*\*p < .001.

\*\*p < .01.

\*p < .05.

odds of having elevated aptitude to participate in PE (Table 7). Being in group A–C was significantly associated with six times higher odds of having elevated SE in PE, compared to the disability group. Elevated physical function was associated with an elevation in aptitude to participate in PE. Although models were significant, the corresponding 95% CI were wide and the effect sizes small (Nagelkerke's pseudo- $R^2$ ). Additional independent variables did not significantly add to any of the models.

## Discussion

### *Self-efficacy and teaching skills*

For students with disabilities there are negative correlations between teaching skills, and self-efficacy. This finding may seem contradictory. Teaching skills are based on self-ratings of the teachers' own teaching. The questionnaire includes items of how they accommodate students with disabilities, but also how they interpret and assess core content of the subject. In accordance with a criterion-referenced grading system, teachers are to be transparent in the structure of their teaching. The rationale for lesson content and grounds upon which students are graded should be clearly stated. Our results indicate that students in the A–C group and D–F group responded positively to teachers who work systematically with grading. Florian (2008) suggests that effective and inclusive teaching recognizes students as diverse learners. A recent dissertation about criterion-referenced grading of PE concludes that in a system where all students are to reach the same goal at the same time, background factors such as diversity are crucial for the outcome (Svennberg 2017). One explanation as to why better teaching skills affect students with disabilities negatively could be that the intended learning outcomes stated in the syllabus are not compatible with inclusive teaching. Another explanation might be that school-based PE is affirming traditional norms of a sport culture for 'fit bodies' (Fitzgerald 2005), at the expense of students with disabilities, who experience a loss of self-efficacy when assessment processes are communicated.

### *Participation and teaching prerequisites*

Being there and being engaged in the activity means that students are likely to experience participation (Imms et al. 2016). When comparing groups of students included in the present study, good prerequisites for teaching, that is, facilities, material and support, were shown to have a positive effect on the aptitude to participate for the D–F group. This group of students may associate good prerequisites with having fun, exercising and team work (Goodwin and Watkinson 2000). Lower aptitude to participate in students with disabilities can be due to students' views and expectations of traditional sports and games with the pressure of high physical performance (Fitzgerald 2005).

### *Learning environment*

Significant correlations were found between PE-teachers' ratings of classroom climate and students' ratings in the total sample of how they perceive their general school self-efficacy, PE specific self-efficacy and their aptitude to participate in PE. It indicates that PE-teachers' ratings of a social environmental factor such as the classroom climate, may serve as an indicator of how students experience their learning environment. For students with disabilities the impact of classroom climate is more obvious in PE-related self-efficacy. According to Haegele and Sutherland (2015), by providing a positive learning environment for students with disabilities, meaningful learning experiences can occur. One way would be to consciously consider the composition of classmates at transitions to ensure a supportive PE environment.

### **Functional skills**

Individual factors were identified to have effects on student general school self-efficacy, PE specific self-efficacy and in aptitude to participate in PE. Socio-cognitive skills (general health, social skills, behavior, ability to understand others, make yourself understood and problem-solving skills) have more impact than physical skills.

In this study, students with disabilities demonstrated socio-cognitive results similar to the total sample, which implies that the support they receive is adequate to reinforce self-efficacy and aptitude to participate in PE. The highest impact of socio-cognitive skills on self-efficacy and participation is seen in the D–F group, and lower physical skills were associated with lower general school self-efficacy. Our findings are similar to Valois et al. (2008) who found that reduced physical activity may result in lower emotional self-efficacy in students, who are less physically active than generally recommended. Thus, stressing the importance of learning how to regulate behaviors, thoughts and emotions (Zimmerman 2000), for achieving intended learning outcomes in PE. Providing socio-cognitive support, not only academic, to the D–F group would probably work to their benefit and add positively to the classroom climate and a self-efficacy enhancing learning environment.

### ***Can elevated self-efficacy be predicted by perceived functional skills?***

Students who rated elevated socio-cognitive skills were four times more likely to have elevated aptitude to participate in PE. Since participation is a prerequisite for engaging in any activity (King 2013; Imms et al. 2016), this finding implies that there is a mutual relationship between socio-cognitive skills, participation and self-efficacy (Pajares and Urdan 2006). Higher self-efficacy has been shown to improve participation and expectations of future self-efficacy beliefs, which are favorable to motivational intentions (Chase 2001).

Compared to students with disabilities, the A–C group are six times, and the D–F group two times (non-significant) more likely to perceive elevated self-efficacy in PE. Elevated perceived physical skills are associated with elevated aptitude to participate in PE. This impact is weak, but since PE is dominated by the core content movement, questions about what norms to foster in school-based PE ought to be regularly discussed when increased school-based PE currently is suggested as a solution to issues related to unhealthy and sedentary behaviors. For students limited by disability, adequate support is crucial. Students need to be in control of their learning in order to manage their learning environment (Zimmerman 2000).

### **Conclusion**

Results indicate that better teaching skills, in terms of teaching according to a criterion-referenced syllabus, benefit most students, but do not include students disadvantaged by disability. This finding violates the right of the child to acquire good quality education based on equal opportunities (UNESCO 2015a). Our study indicates that students with disabilities have lower self-efficacy than their peers at the age of 13. Having a disability may be a barrier for students to find ways to succeed. The loss of general school- and PE specific self-efficacy and the lower desire to participate in students with disabilities, due to better PE-teaching skills, seem to exacerbate disadvantages. This highlights the importance of establishing and clearly communicating adapted standards for students with disabilities (Guskey and Jung 2009) at the transition into secondary school when barriers increase due to traditional views of ‘a fit body’ (Fitzgerald 2005) and higher educational demands (Smith and Green 2004). Students with disabilities need to be involved in developing these standards (Fitzgerald 2012) and assured that the modified activities carry the same status and value as traditional sport games (Fitzgerald 2005). Considering the fact that participation for students with disabilities in extracurricular physical activities is limited, they would benefit most from high-quality PE teaching. Students in the A–C group were six times more likely to report elevated PE self-efficacy when

compared to students with disabilities. Given that the majority of time in PE-class is spent on the core content movement, where physical skills are required, high-quality PE teaching is needed to narrow the gap in self-efficacy that exists between groups of students. Teachers need not only to communicate what to do and how to perform according to intended learning outcome, but also to communicate a long-term plan with standards adapted to students in need of special support. We suggest that teachers need guidelines, training and support on how to transform syllabus intentions into meaningful learning experiences for students in need of special support.

## Limitations

The sample size is sometimes too small to indicate significance in statistical analysis. Studying vulnerable groups of students such as students in need of special support, often results in small sample sizes due to rigorous ethical procedures. Consequently this group of students are not studied as a separate group in mainstream school research. By studying patterns rather than significance, the present study focuses on inclinations of student self-rated experiences.

Teaching skills are rated by teachers themselves and it may be argued that teachers over-estimate their teaching skills (lesson planning, long-term planning, systematic grading). Differences between teaching skills were revealed in teachers' ratings of how they systematically work with grading, which require good knowledge about the criterion-referenced syllabus implemented in Sweden in 2011. Scales were dichotomized to differentiate two levels of self-rated teaching skills.

The instrument aptitude to participate contained items related to prerequisites for participation. With current knowledge about participation, a scale more accurately measuring participation would have provided useful knowledge about relationships between participation, self-efficacy and functional skills.

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## Notes on contributors

*Karin Bertills* is a doctoral student of disability research at the School of Education and Communication, CHILD, Jönköping University, Sweden. Her research focuses on participation issues in Physical Education for students with disabilities. *Mats Granlund* is a professor of psychology and disability research, and the manager of the CHILD research group, associated with the Swedish Institute for Disability Research (SIDR). His area of research concerns participation and everyday functioning in children with disabilities.

*Örjan Dahlström* is a senior lecturer at the Department of Behavioural Sciences and Learning, Linköping University. He is a member of the interdisciplinary hearing science team Linnécentrum HEAD, associated with SIDR. His research interests concern neurocognitive processing of auditory speech signals. *Lilly Augustine* is a PhD with expertise in developmental psychology and health psychology at the Department of Education and the Environment, Kristianstad University. Her research interests are children's participation in everyday life and their health behaviors.

## ORCID

*Karin Bertills*  <http://orcid.org/0000-0002-6971-9430>

*Mats Granlund*  <http://orcid.org/0000-0001-9597-039X>

*Örjan Dahlström*  <http://orcid.org/0000-0002-3955-0443>

*Lilly Augustine*  <http://orcid.org/0000-0003-4079-8902>

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