Self-Reported and observed teaching styles of Swedish physical education teachers

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Abstract

Physical education scholars have identified a number of factors that affect how teachers translate policy into practice. It is becoming clear that to create learning experiences that reflect the intention of guiding documents, teachers need to employ appropriate teaching styles. The aim of this paper was to determine whether the teaching styles used by a group of PE teachers provide opportunities for students to meet objectives relating to creativity, problem solving, personal responsibility and independence. The first part of the investigation involved the use of a questionnaire based on Mosston and Ashworth’s *Spectrum of Teaching Styles* (2002). The second part involved observations of six primary and middle school teachers’ physical education lessons. The results suggest that PE teachers may not use different pedagogies for different reasons. The paper is concluded with a consideration of how a teaching styles framework can help teachers to meet diverse curriculum objectives.

Keywords: Spectrum of teaching styles, Swedish curriculum, curriculum alignment, pedagogy
Introduction

In the last 15 years a number of physical education (PE) syllabus documents have used terms such as ‘critical thinkers’, ‘creative thinking’, ‘self-directed’, ‘problem solvers’, ‘independent learners’, ‘self-monitor’ and ‘self-directed learners’ (The Australian Curriculum–Health and Physical Education, 2016; Scottish National 3 Physical Education, 2012; SHAPE America – Society of Health and Physical Educators, 2014; Skolverket, 2011). Many of these terms belong to a constructivist vocabulary of learning (Barker, Barker-Ruchti, & Pühse, 2013) and necessitate particular kinds of pupil-centered teaching. The relation between learning objectives and teaching strategies is however, not always made explicit in curricula. For example, the Swedish Curriculum for Compulsory School (2011) has constructivist aims but includes limited information on how these aims should be achieved in the classroom. There is an underlying assumption that teachers will use appropriate pedagogies to meet prescribed aims. Research has suggested however, that teachers do not always match pedagogies with aims, and that teacher education, teachers’ previous experiences, and pragmatic concerns markedly affect teachers’ pedagogies (SueSee, 2012; Syrmpas & Digelidis, 2014; Syrmpas, Digelidis, Watt, & Vicars, 2017; Thorburn & Collins, 2003). Specifically in Sweden, some scholars claim that whilst constructivist ideas and pedagogies dominate curriculum documents, they may not be entirely compatible with traditional sport discourses and direct teaching methods which tend to dominate practice (Larsson & Karlefor, 2015). With possible tensions between curricular objectives and teacher pedagogies forming the scientific backdrop, the aim of this paper is to determine whether the teaching styles used by Swedish PE teachers provide opportunities for students to meet educational objectives relating to creativity, problem solving, personal responsibility and independence as described in the Swedish curriculum document. The specific questions addressed in the paper are: (a) Which teaching styles do teachers of Swedish PE (Years 0-9)
report using when teaching PE? (b) Do the Swedish PE teachers implement teaching styles that promote the goals (i.e. creativity, problem solving, personal responsibility and independence) of Swedish curricula? (c) Does the reported use of Spectrum teaching styles differ among PE teachers? The investigation is informed by spectrum thinking, outlined later in the paper.

**Official and enacted curricula: Translating prescribed PE into practice**

In many countries, PE is prescribed in national, state, or district curricula. While such documents vary in scope and detail, they typically contain a broad description of the subject’s general aims and content along with grade-specific learning objectives. These documents are intended to (a) guide teachers as they structure learning experiences for students; and (b) ensure educational consistency and equity across schools. Nonetheless, a number of scholars have pointed out that significant gaps between official curricula and enacted curricula often exist (Chambers & Armour, 2011; Thorburn & Collins, 2006).

Scholars have suggested that a variety of contextual factors influence teaching content and students’ learning (Alfrey, O'Connor, & Jeanes, 2017; Oliver & Lalik, 2004). Kulinna, McCaughtry, Cothran, and Martin (2006) provide an extensive list of influences, dividing contextual factors into: personal factors such as the demographics of teachers, students and parents; instructional factors such as the size of the class or availability of equipment; institutional factors such as school culture; and societal factors including broader educational trends and patterns. In an examination of inner-city PE lessons, Kulinna et al. (2006) emphasized that all types of factors affect how curricula are enacted.

Other research supports Kulinna and colleagues’ (2006) categorization. Focusing on factors that Kulinna et al. (2006) refer to as societal, McEvilly, Atencio, Verheul and Jess (2013) examined discourses surrounding pre-school PE using academic literature as a source
of data. They proposed that three main discourses relating to motor skill development, play, and physical activity are prominent and that these discourses lead to quite different – and possibly contradictory – classroom practices. They also noted that government policy initiatives on issues such as obesity shaped enacted curricula. Taking a finer grained approach, Peiró-Velert and her colleagues (2015) drew attention to the importance of instructional materials such as textbooks and equipment in mediating teachers’ and students’ curricula enactment. In line with other scholars (Williams & Macdonald, 2015) however, they pointed out that societal trends relating to commercialization and technologization are having considerable impact on such materials and consequently on how national and state prescriptions are addressed in schools.

Attempts to change teaching and learning practices have provided important insights into factors affecting curricula enactment. Thorburn and Collins (2003) for example, suggested that short-term assessment pressures, teaching traditions that exist within schools, levels of teacher expertise, and student motivation or ability influence how – and even if – curricula innovation occurs. In developing and implementing a curriculum strand focusing on girls’ bodies, Oliver and Lalik (2004) for example, found that some students’ levels of print-literacy were below what they expected. This impacted on the students’ ability to engage in critical-thinking tasks. The authors also faced resistance from the students as the authors attempted to introduce change. Hastie, Martin and Buchanan (2006) encountered challenges when introducing a new curriculum too, although these were of a different kind. They found that employing new pedagogies involved significant challenges to their own professional identities and certain levels of ontological insecurity. Finally, O’Connor, Jeanes and Alfrey (2016) investigated how teachers worked with a new socially-critical curriculum. They concluded that teachers tended to oscillate between familiar, teacher-centered approaches and loose, student-centered approaches without really wholly adopting the inquiry based
approaches that were prescribed (see also, Alfrey et al., 2017). According to O’Connor and her colleagues, this tendency was partially related to teacher expertise but also partly related to the messiness of inquiry based learning and its tendency to accept multiple ways of knowing.

Not captured so effectively by Kulinna and colleagues’ framework but still important to our discussion of tensions between curricular objectives and implementation are the contradictions and incongruities in curricula themselves (see Janemalm, Quennerstedt & Barker, 2018). After conducting a critical discourse analysis of an Australian state prescription for PE, Rossi and colleagues (2009) questioned whether, “given the complexity and multilevel pathways of message systems/ideologies in the document, teachers can deliver the curricula’s [social justice] agenda” (p. 75). Rossi et al. added that because teachers will necessarily read the official curriculum in different ways, “it should come as no great shock that alignment between intended and constructed meaning is not as smooth as the authors of the text might expect” (2009, p. 78), a conclusion reached by other Australian scholars (Leahy, O’Flynn, & Wright, 2013; Penney, 2013). Similarly, Oliver and Lalik (2004) suggested that enacting curricula “is never free from “moral and ethical vulnerabilities” (p. 163) and that there are always elements of interpretation.

Given the potential for obstacles and ambiguities, along with misinterpretation in the enactment of curricula, it is almost surprising that so much time and effort is spent on developing educational policy. Yet as Penney (2010) – argues, enacted curriculum possibilities are shaped by official curriculum documentation. Rather than consider practice as a matter of ‘implementation’ or even ‘translation’, it may be more useful to consider the curricular potential. With this in mind, the next section outlines the Swedish curriculum and how it encourages creativity, exploration and independence in PE practice.
Overview of Swedish curriculum policy context The Swedish PE curriculum includes three parts: fundamental values and tasks of the school; overall goals and guidelines for education, and; syllabi for each subject (Skolverket, 2011 – English translated version) which prescribe educational content for approximately 4900 primary and lower secondary (compulsory) schools in Sweden (Statista, 2018). Each of these parts are supplemented with knowledge requirements, which specify knowledge to be taught and clearly defines through the use of criteria descriptors the different grades that can be awarded to students.

The curriculum document contains syllabi for 20 subjects taught across the compulsory years, pre-school-grade 9 (0-9). In the Fundamental values section and the Overall goals and guidelines section a number of explicit references to creativity can be found. The Curriculum states for example, “creative activities and games are essential components of active learning” (Skolverket, 2011, p. 11). It also states, “the school should stimulate pupils’ creativity, curiosity and self-confidence, as well as their desire to explore their own ideas and solve problems. Pupils should have the opportunity to take initiatives and responsibility” (p. 11), and that “creative ability is a part of what the pupils should acquire” (p. 12). The document also proposes that through participation in PE, students will learn to “solve problems and transform ideas into action in a creative way” (p. 15).

Along with creativity, the document refers to independence and responsibility. It states for example, that “teachers should organise and carry out the work so that pupils: gradually receive more and increasingly independent tasks to perform, and take greater personal responsibility” (Skolverket, 2011, p. 16). Further, teachers should:

take as their starting point that the pupils are able and willing to take personal responsibility for their learning and work in school; be responsible for ensuring that all pupils can exercise real influence over working methods, forms and contents of
education, and ensure that this influence grows with increasing age and maturity. 

(Skolverket, 2011, p. 17)

The themes of creativity, problem solving, independence and responsibility are intertwined as valuable attributes and outcomes which learners should develop. This investigation is based on the idea that in order to develop such attributes, certain kinds of pedagogies are required. To frame different kinds of pedagogies, we use Mosston and Ashworth’s (2008) work in teaching styles.

**The Spectrum of Teaching Styles**

The Spectrum of Teaching Styles (from this point referred to as ‘the Spectrum’) was developed in the 1960s by Mosston and has undergone development in the last 50 years (Mosston & Ashworth, 2008). Mosston and Ashworth (2008) suggest that teaching behaviour can be defined as a chain of decision making where decisions are made by either the teacher or student(s). Teaching styles are characterised by who is making the decisions, when the decisions are being made, what the decisions are being made about and the intent of the decision makers. When teaching is looked at as a series of decisions, different teaching styles can be distinguished. Based on this premise, the Spectrum consists of at least 11 teaching styles. These range from the Command Style-A through to the Self Teaching Style-K. Importantly, the Spectrum assumes a non-versus (or ‘all equal’) approach and places equal value on all teaching styles.

At the Command Style-A, the teacher makes all decisions and the student role is to follow these decisions on cue. At the other end of the Spectrum in the Self-Teaching Style-K, students make all of the decisions. The styles on the Spectrum can be divided into two clusters: the reproduction cluster (Styles A-E), where knowledge is reproduced from memory. Practice Style-B is an example of a style from the reproduction cluster and the
defining characteristic of this style “is individual and private practice of a
memory/reproductive task with feedback” (Mosston & Ashworth 2008, p. 94). An example
of Practice Style-B would involve the teacher giving a demonstration (including the teaching
cues) and then the learner would go and practice the task and the teacher would give feedback
to the learner during or after the practice. The production cluster of teaching styles (Styles F-
K), require learners to be responsible for “producing new knowledge to self or teacher”
(Byra, 2000, p. 233). Production styles require learners to either discover or create knowledge
(often answers to problems posed by teachers) which is new or previously unknown to the
learners (Mosston & Ashworth, 2008). In other words, they involve elements of either
discovery or creativity. Convergent Discovery Style-G is an example of a production cluster
style and it requires the learner to discover a ‘correct’ response – in other words a response
predetermined by the teacher – using the convergent process (Mosston & Ashworth 2008).
The role of the teacher is “to design the single question delivered to the learner” (Mosston &
Ashworth 2008, p. 237) and “the role of the learner is to engage in reasoning, questioning and
logic to sequentially make connections about the content to discover the answers” (Mosston

Practice Style-B has been identified as the most commonly used style of all teaching
styles (Byra, 2007; Curtner-Smith, Todorovich, McCaughtry, & Lacon, 2001; Curtner-Smith,
Hasty, & Kerr, 2001). Cothran et al. (2005) found that 1400 teachers self-reported using
teaching styles from the reproduction cluster more frequently than teaching styles from the
production cluster. Scholars in other contexts have also reported that reproduction cluster
styles are more frequently used by teachers of PE (Jaakkolla & Watt, 2011; Kulinna &
Cothran, 2003; SueSee & Edwards, 2011; Syrmpas et al., 2017).

Methods
In line with the research questions, this investigation used a mixed methods approach to collect data. A questionnaire was used to generate data about how often a group of Swedish PE teachers reported using teaching styles to teach their classes. Coding of videotaped practical PE lessons was used for the second part of the investigation.

**Questionnaire**

A Swedish language version of SueSee, Ashworth, and Edwards’ (2006) questionnaire was developed by the first author and two native speaking Swedes. The questionnaire was a modified version of the questionnaire used by Kulinna, Cothran and Regualos (2003) and Cothran and colleagues (2005). Discussions between the first author and Ashworth were used to develop the revised questionnaire, and then the draft version of the instrument was again subject to scrutiny from Ashworth as a final development step. For this research, the Instrument for collecting teachers’ beliefs about their teaching styles used in physical education: Adaptation of description inventory of landmark teaching styles: A spectrum approach (Author’s work, 2006) was translated to Swedish by a Swedish PE teacher with 14 years teaching experience. It was then back translated by a native Swede and assessed with one of the co-authors who speaks Swedish. The questionnaire was posted on a Swedish PE Facebook page (Idrottslarare) that has approximately 8000 members twice per week for four months along with an invitation to complete the survey.

The Instrument for collecting teachers’ beliefs about their teaching styles in physical education (SueSee et al., 2006) consisted of 11 scenarios that “provide a mutually exclusive image with the essential factors of the different teaching styles” (Ashworth, 2008, p. 2). Using a 5-point Likert scale (1-Not at all to 5-Most of the time – see example in Table 1) the questionnaire asked “How frequently do I use this description to teach my PE lessons throughout the year”?

**Insert Table 1 Here**
A number of Swedish PE teachers (n = 42) who visited the Idrottslarare Facebook page chose to fill in the survey, thus choosing to participate in the first part of the investigation. The sample of 42 respondents (from 41 schools) was comprised of 19 males and 23 females. 12 of the respondents taught at lower primary, 21 at middle primary and nine at senior high school. Respondents were asked to indicate their teaching experience resulting in a sample of 14 teaching for 0-4 years, 13 teaching for 5-10 years and 15 teaching for more than 11 years.

**Participants**

The participants chosen for the second part of the investigation had completed the questionnaire and had indicated their willingness to take part in lesson observations. The participants also needed to be teaching compulsory school PE (in years 0-9) in Sweden to be included. Six individuals volunteered for the second part of the research. Five were teaching in or near to Gothenburg, Sweden’s second largest city. One teacher was working on Sweden’s west coast. A summary of the participants, gender, year level, lesson content and length, and number of students is provided in Table 2. All of the lessons observed were co-educational classes and ranged in size from 14 to 25 students. Lesson length ranged from 41 minutes to 54 minutes. All lessons took place indoors.

**Insert Table 2 Here**

**Data collection procedures**

All lessons were video recorded using a hand-held digital video camera and four of the six lessons with a GoPro digital video camera. Two participants declined to wear the GoPro camera due to personal reasons. In these cases, we relied on the observer hand-held camera to record the action between teacher and students. In the analysis, this form of recording proved sufficient for the coding process. The handheld camera was focused predominantly on the teacher during the lessons while the GoPro worn by the teacher showed
his or her view. The filming researcher was positioned approximately five metres from the
teacher. This proximity allowed all verbal commands to be recorded. All video recording
began with the first instruction by the class teacher about the lessons activities.

Coding instruments and procedures

As we were not interested in patterns of behavior or effects of interventions, and in
line with previous studies (Cothran et. al., 2004; Hewitt & Edwards, 2015; SueSee, Edwards,
Pill & Cuddihy, 2018) the questionnaire data were collated into a set that represented how
often participants believed they had used a teaching style. The video recordings of lessons
were reviewed and coded using four tools: (1) Ashworth’s (2002) Identification of Classroom
Teaching Learning Styles (see also Hewitt & Edwards, 2011; SueSee, 2012); (2) the
Identification of Classroom Teaching Learning Style (Ashworth, 2002; Byra, Sanchez &
Wallhead, 2014; Hewitt, Edwards, Ashworth & Pill, 2016; SueSee & Edwards, 2011); (3)
Sherman’s (1982) Style analysis checklist for Mosston and Ashworth’s spectrum of teaching
styles and has also been used by others (Byra, Sanchez & Wallhead, 2014); and (4) the
Physical Education Teacher Assessment Instrument (Phillips, Carlisle, Steffen, & Stroout,
1986).

The procedure for coding involved using the Instrument for Identifying Coding Sheet
(IFITS), which involved a ten second observation followed by a ten second recording of this
observation (i.e., a decision every 20 seconds). The decisions the coders were making
involved determining which teaching style was being used in the previous ten second period.
The coders used the three tools to make the decision (based on the teachers’ and students’
behavior) about which teaching style was being used. If an interval of time was observed
where two or more teaching styles were employed, the style would be coded as the style
closest to the production end of the Spectrum.
Reliability of coding is important when decisions are being made based on observations. Inter-observer reliability was calculated using the formula:

$$\text{Inter-observer agreement} = \frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100$$

By using this formula, inter-observer agreement was calculated across the six observed lessons using the three tools and coding sheet. 100% agreement was the highest agreement recorded; the lowest was 95.3%. Researchers have suggested that 85% or higher needs to be achieved to be considered an appropriate level of reliability (Rushall, 1977; van der Mars, 1989).

**Ethics**

The research project followed the ethical guidelines outlined by Swedish law as well as the Swedish Research Council. Consent for both parts of the research was obtained from the participants. For the questionnaire, the researchers explained the purpose of the research on the Idrottslarare Facebook page on which the questionnaire was posted. Confidentiality was assured to all participants. Approval was obtained from all participants to be involved in observations of this research. Any student who did not wish to be filmed was not filmed. Anonymity was guaranteed with all videos stored on password-protected computers and deleted after the codings were completed for the second time.

**Results**

**Teachers’ reported teaching styles**

The results in this section focus on the reported usage of teaching styles by the questionnaire respondents. The responses have been grouped and presented as a percentage of respondents who believed that they used that teaching style “Sometimes to Always” (see also Cothran et al., 2005; SueSee, 2012).
Table 3 show three styles are reportedly used more frequently than other styles: Practice Style-B, the Divergent Discovery Style-H and the Learner Designed Individual Program Style-I. The Practice Style-B is from the reproduction cluster of the Spectrum (Mosston & Ashworth, 2008) while the Divergent Discovery Style-H and Learner Designed Individual program Style-I are from the production cluster of the Spectrum (Mosston & Ashworth, 2008). All the other reproduction cluster styles were reportedly used over 50% of the time “Sometimes to Always” with the Reciprocal Style-C and the Self-Check Style-D the exceptions. The remaining styles (the Guided Discovery Style-F, the Convergent Discovery Style-G, the Learner Initiated Program Style-J and the Self-Teaching Style-K) are all from the production cluster which, again require the production of new knowledge through either discovery or creativity (Mosston & Ashworth, 2008). These remaining styles were reportedly used by participants less than 50% of the time (“Sometimes to Always”).

A comparison of self-reported teaching styles by gender reveals some differences – see Table 4 below. For male teachers, the most reportedly used style was the Practice Style-B (89.4%) followed by the Divergent Discovery Style-H (78.9%) and the Learner Designed Individual Program Style-I and the Inclusion Style-E being used by 66.6% of respondents “Sometimes to Always”. For female teachers, the Learner Designed Individual Program Style-I is the most reportedly used (80%) while the Divergent Discovery Style-H and the Practice Style-B are both equally reported on 75% of the time Sometimes to Always.

Insert Table 4 Here

Comparing teachers according to years of teaching experience shows differences (Table 5). Almost all of the respondents (92.8%) who had been teaching 0-4 years self-reported using the Practice Style-B “sometimes to always”, while the second most reportedly
used style for this group was the Divergent Discovery Style-H (78.5%). The group of participants with 5-10 years’ experience reportedly used the Practice Style-B and Learner Designed Individual Program Style-I the most with 76.9% of respondents indicating that they use these styles “sometimes to always”. Finally, 86.6% of the third group (those with 11 years or more teaching experience) reportedly used the Learner Designed Individual Program Style-I “sometimes to always” with the Practice Style-B and the Divergent Discovery Style-H used by 80% of respondents “sometimes to always”. The first two groups (0-4 years’ experience and 5-10 years’ experience) most reportedly used styles include one reproduction cluster style and one production cluster style. The ‘11 years or more experience’ group is different in that the two most reportedly used styles are production cluster styles. This difference between the ‘11 years or more experience’ group and the other groups is more pronounced when the response grouping is changed to “often to always”. When this grouping is used, production cluster styles dominate.

**Insert Table 5 Here**

**Teaching styles observed during lessons**

The second part of this research involved observing, videotaping and then coding six lessons taught by six different teachers. **Table 6** shows the results as percentage of time all (n=6) teachers were coded using each style, the number of raw score codings and the total time each style was used. The most commonly observed style was the Practice Style-B (just over 73%). The Divergent Discovery Style-H was the next most observed teaching style (2.7%). The Self-Check Style-D was also observed 0.8% of the time. Management was just over 23.1% of all observed lesson time.

**Insert Table 6 Here**
Of the six teachers who participated in the observations, four of the six used one style for their lesson. Two teachers were observed using more than one style—Participant 2 (the Practice Style-B and the Divergent Discovery Style-H) and Participant 4 (the Practice Style-B and the Self-Check Style-D). Participant 2 was the only teacher observed using a style from the production cluster of teaching styles. Every participant was observed using the Practice Style-B at some point during their lesson.

Discussion

The discussion section of this paper is structured in two parts. The first part relates to the questionnaire and the second part concerns factors contributing to the data produced from the observations of the six participants.

Discussion of questionnaire results

Results from the questionnaire suggest that at least some Swedish PE teachers are providing opportunities for students to meet educational objectives relating to creativity, problem solving, personal responsibility and independence as described in the Swedish compulsory curriculum document. The teachers in this investigation reported using production cluster styles the Learner Designed Individual Program Style-I (73.8%) and the Divergent Discovery Style-H (76.1%). These styles require the production of knowledge new to the learner through the conscious thought processes of creativity and discovery (Mosston & Ashworth, 2008).

In contrast to other spectrum investigations (Cothran et al., 2005; Hewitt, 2015; SueSee, 2012), production cluster styles dominate the top three most frequently reported styles. A factor that may contribute to teachers reportedly enacting creativity and discovery aspects of the curriculum is that Sweden only has national testing in years six and nine. Some scholars have suggested that high stakes assessment where test scores either contribute to
university entrance or are made public may contribute to a narrowing of teaching styles and/or the domination of reproduction cluster styles (Cothran et al., 2005; Kirk & O’Flaherty, 2003; Thorburn & Collins, 2003).

The teaching styles reported in this study are significant in that they can be seen to reflect Swedish (physical) educational values mentioned earlier in the Swedish curricular material document relating to curiosity, creativity, independence and so forth (see Skolverket, 2011). As Alfrey and colleagues (2017) note, teachers’ philosophies are affected by ideology and history – teachers cannot but be influenced by the cultural environment in which they find themselves. The results here suggest that constructivist assumptions – assumptions that underpin curricula in many countries (The Australian Curriculum-Health and Physical Education, 2016; Scottish National 3 Physical Education, 2012; SHAPE America, 2014) – have a relatively comfortable fit with Swedish ‘societal factors’ (Kulinna et al., 2006). As a result, discovery-oriented or problem based pedagogies appear to challenge neither the teachers’ typical practices, not their professional identities (see Hastie, et al., 2006).

Gender differences were evident in that the 19 male respondents reportedly used the Practice Style-B, the Divergent Discovery Style-H, and the Inclusion Style-E the most frequently. The 23 female respondents reportedly used the production cluster styles more with the Learner Designed Individual Program Style-I, the Divergent Discovery Style-H and the Practice Style-B dominating. These results indicate a preference for use of production clusters over reproduction cluster styles with females and consequently a greater likelihood that female teachers will at least address, if not meet, policy objectives than their male counterparts.¹ None of the reviewed literature examined this aspect of curriculum

¹ Some research suggests that teachers of both genders prefer reproduction cluster styles (Abdurrahman & Nilüfer, 2012; Jaakkola & Watt, 2011; Kulinna & Cothran, 2003; Zeng, 2016) while other investigations suggest that female teachers use production teaching styles more often than males (Al-Mulla, 1998; Macfadyen & Campbell, 2005).
implementation and while we might expect societal trends such as commercialization and technologization (see Williams & Macdonald, 2015) to affect male and female teachers differently, there is a need for further research in the area of gender and curriculum implementation.

Teachers who had 0-4 years’ experience (n=14) self-reported using the Practice Style-B (92.8%) and the Divergent Discovery Style-H and the Inclusion Style-E equally the most. Teachers with 5-10 years’ experience (n=13) reported using the Practice Style-B and the Learner Designed Individual Program-I equally the most (76.9%) whilst the most experienced participants (n=15) (those with 11 years and over experience) self-reported using the Learner Designed Individual program (86.6%) and equally, the Divergent Discovery Style-H and the Practice Style-B on 80%. In short, the more experience the teachers had, the more they reported using production cluster styles. This result suggests that experienced PE teachers are more likely to employ pedagogies that are consistent with curricular objectives. This result is similar to the investigation of Zeng (2016), who found that teachers who had graduated reportedly used production style clusters (Styles F-I) more frequently than undergraduates and believed that these styles would help students learn skills and activities and motivate others. It also supports O’Connor et al.’s (2016) and Thorburn and Collins’ (2003) conclusion that experience is a key factor influencing the implementation of curricula. Considering the self-reported use of styles here, it is worth noting that others (Cothran et al., 2005; SueSee, Edwards, Pill & Cuddihy, 2018) have found that teachers either overestimate their use of styles or may not be able to identify specific styles.

**Observed lessons**

The observation part of this research suggests that production style pedagogies may not be used as often as reported. This finding would reflect research in other contexts (see
SueSee, 2012) in which the demands of high stakes assessment appeared to counter-act the teaching styles specified in the curriculum. There are several potential reasons for the trend observed here. It may be that the participating teachers value reproduction styles more than production styles (see Cothran et al., 2005, for a discussion of how teachers value teaching styles). One reason that reproduction styles have been found to be more highly valued is the perception that they are better at promoting motor skills and physical development (Byra, 2000; Garn & Byra, 2002; Syrmpas et al., 2017). Styles from the production cluster have in contrast, been seen as more related to cognitive development (Syrmpas et. al., 2017; Garn & Byra, 2002). Participants here may have similar beliefs about the clusters or at least were more interested in physical development in the lessons observed.

Another reason reproduction cluster teaching styles were more common could be because of differences in definitions of creativity, problem solving, curiosity, independence, and responsibility. Teachers may still use reproduction cluster styles and ask students to solve problems but without instructing students to use new solutions. Alternatively, teachers may ask students to solve problems to which students already know the answer. In such cases, they cannot said to be producing new knowledge. There was however no evidence to suggest that either of these phenomena were occurring in the observed lessons.

Importantly but perhaps not surprisingly, the Swedish curriculum (Skolverket, 2011) does not state how independent or how responsible a student should be (i.e., responsible for 50% of the decisions made in a lesson or independent 60% of the time). It is possible that students may work independently of the teacher at times but not of their classmates. Furthermore, responsibility may be required with the management of self or equipment, but that does not always necessitate the use of creativity or discovery and production cluster styles. Further, as a great deal of research has indicated, we cannot assume that policy will be interpreted in the same way, regardless of teaching or context. Rossi et al., (2009) for
example, suggest that texts are usually “read” in different ways and teachers’ interpretations differ from those of government syllabus writers, who “might harbour expectations that a particular syllabus document will convey a particular message to teachers as they implement the curriculum” (p. 78). Similarly, Larsson and Karlefors (2015), when speaking of the Swedish PE curriculum for upper secondary school (2011) and PE teachers’ knowledge base, questioned whether the “objectives do not make sense when teachers make pedagogical considerations” (p. 585). What was suggested by the sample of observed lessons is that some Swedish teachers are not inviting students to be creative and discover solutions because they are using production cluster styles when teaching PE in the compulsory years. As we have suggested, it is possible that these teachers and Swedish teachers in general do use other styles besides the ones observed and more research is warranted.

**Conclusion**

The aim of this paper was to determine whether the teaching styles used by Swedish PE teachers provide opportunities for students to meet educational objectives relating to creativity, problem solving, personal responsibility and independence as described in the Swedish compulsory curriculum document. Our data provide some evidence to suggest that while Swedish PE teachers report using production pedagogies, these pedagogies are not always reflected in practice. Reproduction cluster styles were more common across the observed lessons, despite a range of reproduction and production styles being reportedly used. Although further investigation is necessary, we would suggest that discussions of frameworks such as the Spectrum may assist practitioners in developing strategies for achieving curricular goals.

We would like to finish with a couple of reflections. A number of scholars have highlighted the multidimensional goals of curriculum, suggesting – rightly in our view – that diverse goals cannot be achieved alone through only one cluster style (Digelidis, 2015).
Theodorakis, Zetou, & Dimas, 2006; Kulinna & Cothran, 2003; Syrmpas et al., 2017). Yet if policy documents such as the Swedish compulsory curriculum (2011) are to contain multidimensional goals, relating to creativity, curiosity, problem solving as well as movement capability for example, it would make sense to provide explicit commentary on how these goals might be achieved. We are not suggesting that curricula need provide concrete explanations or detailed examples of what to do in the classroom. Rather, we are suggesting that indications of the range of pedagogies that might prove useful in transforming policy into practice might prove useful for teachers and teacher educators working with such documents.

Finally and related, to increase the likelihood of teachers using different pedagogies to achieve different objectives, teachers would benefit from professional support. A first step might involve acknowledging that while different pedagogies or styles might all ‘have their place’, some will be better for achieving certain outcomes than others. Support during the trial and implementation of new pedagogies is also likely to be necessary. Assistance from experienced teachers or teacher educators along with practical opportunities to collaborate in the creation of successful, efficient and innovative lessons with new teaching style(s) has been suggested as a way of changing in teachers’ perception and employment of new teaching styles (Gusky, 2002; Syrmpas et al., 2017). We believe that such strategies would be useful in generally considering how to meet diverse curriculum objectives.

The findings presented in this paper should be thought-provoking and helpful in informing policy makers and higher education facilities in what may need to occur to ensure PE teachers are well supported in their implementation of curricula. If teachers are not supported, the value of curricula must be questioned and the prescribed outcomes are unlikely to be achieved.
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Table 1  An Example of One Scenario from the *Spectrum Inventory* (2006) Which Shows Different Likert Scale Descriptors and Focusing on Measuring How Often a Teaching Style Was Used.

<table>
<thead>
<tr>
<th>Scenario Style</th>
<th>Scenario Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The students perform the task, selected by the teacher, in a unison, choreographed, or precision performance image following the exact pacing (cues) set by the teacher.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How frequently do I use this description to teach my physical education lessons throughout the year?</th>
<th>Not at all</th>
<th>Minimally</th>
<th>Here &amp; there</th>
<th>Often</th>
<th>Most of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 2  Summary of Participants and Lessons Observed.

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Gender</th>
<th>Year level</th>
<th>Lesson content</th>
<th>Lesson length (minutes)</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>1</td>
<td>Physical fitness games/course</td>
<td>53.6</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>2</td>
<td>Physical fitness course</td>
<td>40.6</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>7</td>
<td>Physical fitness and Handball</td>
<td>53</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>9</td>
<td>Dance</td>
<td>51.3</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>9</td>
<td>Volleyball and physical fitness</td>
<td>54</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>1</td>
<td>Structured play/Games</td>
<td>42.2</td>
<td>21</td>
</tr>
</tbody>
</table>
Table 3  Percentage of Teachers Self-Identified Use of Each Teaching Style “Sometimes to Always”.

<table>
<thead>
<tr>
<th>Teaching Style</th>
<th>Percentage of Swedish PE teachers self-identified use of teaching styles “Sometimes to Always”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Style-A</td>
<td>50%</td>
</tr>
<tr>
<td>Practice Style-B</td>
<td>80.9%</td>
</tr>
<tr>
<td>Reciprocal Style-C</td>
<td>26.1%</td>
</tr>
<tr>
<td>Self-Check-Style D</td>
<td>47.6%</td>
</tr>
<tr>
<td>Inclusion Style-E</td>
<td>59.5%</td>
</tr>
<tr>
<td>Guided Discovery Style-F</td>
<td>30.9%</td>
</tr>
<tr>
<td>Convergent Discovery Style-G</td>
<td>40.4%</td>
</tr>
<tr>
<td>Divergent Discovery Style-H</td>
<td>76.1%</td>
</tr>
<tr>
<td>Learner Designed Individual Program Style- I</td>
<td>73.8%</td>
</tr>
<tr>
<td>Learner Initiated Program-Style-J</td>
<td>35.7%</td>
</tr>
<tr>
<td>Self-Teaching Style-K</td>
<td>16.6%</td>
</tr>
</tbody>
</table>
Table 4  Percentage of Male, Female and All Participants Self-Identified Use of Teaching Styles “Sometimes to Always”.

<table>
<thead>
<tr>
<th>Teaching Style</th>
<th>Percentage of male Swedish PE teachers self-identified use of teaching styles “Sometimes to Always” N=19</th>
<th>Percentage of female Swedish PE teachers self-identified use of teaching styles “Sometimes to Always” N=23</th>
<th>Percentage of Swedish PE teachers self-identified use of teaching styles “Sometimes to Always” N=42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Style-A</td>
<td>42.1%</td>
<td>56.5%</td>
<td>50%</td>
</tr>
<tr>
<td>Practice Style-B</td>
<td>89.4%</td>
<td>73.9%</td>
<td>80.9%</td>
</tr>
<tr>
<td>Reciprocal Style-C</td>
<td>31.5%</td>
<td>21.7%</td>
<td>26.1%</td>
</tr>
<tr>
<td>Self-Check-Style D</td>
<td>52.6%</td>
<td>43.4%</td>
<td>47.6%</td>
</tr>
<tr>
<td>Inclusion Style-E</td>
<td>73.6%</td>
<td>47.8%</td>
<td>59.5%</td>
</tr>
<tr>
<td>Guided Discovery Style-F</td>
<td>31.5%</td>
<td>30.4%</td>
<td>30.9%</td>
</tr>
<tr>
<td>Convergent Discovery Style-G</td>
<td>26.3%</td>
<td>52.1%</td>
<td>40.4%</td>
</tr>
<tr>
<td>Divergent Discovery Style-H</td>
<td>78.9%</td>
<td>73.9%</td>
<td>76.1%</td>
</tr>
<tr>
<td>Learner Designed Individual Program Style-I</td>
<td>68.4%</td>
<td>78.2%</td>
<td>73.8%</td>
</tr>
<tr>
<td>Learner Initiated Program-Style-J</td>
<td>31.5%</td>
<td>39.1%</td>
<td>35.7%</td>
</tr>
<tr>
<td>Self-Teaching Style-K</td>
<td>15.7%</td>
<td>17.3%</td>
<td>16.6%</td>
</tr>
</tbody>
</table>
Table 5  Comparison of Self-Reported Use of Teaching Styles (“Sometimes to Always”) Based on Years of Teaching Experience.

<table>
<thead>
<tr>
<th>Teaching Style</th>
<th>Percentage of teachers with 0-4 years teaching experience self-reported use of teaching style (“Sometimes to Always”) n=14</th>
<th>Percentage of teachers with 5-10 years teaching experience self-reported use of teaching style (“Sometimes to Always”) n=13</th>
<th>Percentage of teachers with 11 years or more teaching experience self-reported use of teaching style (“Sometimes to Always”) n=15</th>
<th>11 Years or more teaching experience self-reported use of teaching style (“Often to Always”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command Style-A</td>
<td>42.8%</td>
<td>53.8%</td>
<td>60.0%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Practice Style-B</td>
<td>92.8%</td>
<td>76.9%</td>
<td>80%</td>
<td>26.6%</td>
</tr>
<tr>
<td>Reciprocal Style-C</td>
<td>28.5%</td>
<td>38.4%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Self-Check-Style D</td>
<td>35.7%</td>
<td>53.8%</td>
<td>60%</td>
<td>26.6%</td>
</tr>
<tr>
<td>Inclusion Style-E</td>
<td>78.5%</td>
<td>46.1%</td>
<td>53.3%</td>
<td>26.6%</td>
</tr>
<tr>
<td>Guided Discovery Style-F</td>
<td>28.5%</td>
<td>15.3%</td>
<td>53.3%</td>
<td>0%</td>
</tr>
<tr>
<td>Convergent Discovery Style-G</td>
<td>28.5%</td>
<td>53.8%</td>
<td>40%</td>
<td>0%</td>
</tr>
<tr>
<td>Divergent Discovery Style-H</td>
<td>78.5%</td>
<td>69.2%</td>
<td>80%</td>
<td>33.3%</td>
</tr>
<tr>
<td></td>
<td>35.7%</td>
<td>76.9%</td>
<td>86.6%</td>
<td>66.6%</td>
</tr>
<tr>
<td>------------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Learner Designed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Style-I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learner</td>
<td>21.4%</td>
<td>46.1%</td>
<td>33.3%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Initiated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program-Style-J</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Teaching</td>
<td>28.5%</td>
<td>15.3%</td>
<td>6.6%</td>
<td>0%</td>
</tr>
<tr>
<td>Style-K</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6  Time Participants Were Observed Using Teachings Styles as a Percent, Raw Scores and Time.

<table>
<thead>
<tr>
<th>Teaching Style</th>
<th>% of Time Teaching Styles Were Observed From Total Lessons</th>
<th>No of Coding’s N=1013</th>
<th>Time Recorded Using this Style (minutes) N=337</th>
<th>Observed participants who claimed to use this Style “Here &amp; There- Most of the Time”(n=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command- Style A</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Practice-Style B</td>
<td>73.4%</td>
<td>744</td>
<td>248</td>
<td>3</td>
</tr>
<tr>
<td>Reciprocal-Style C</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Self-Check-Style D</td>
<td>.8%</td>
<td>8</td>
<td>2.6</td>
<td>1</td>
</tr>
<tr>
<td>Inclusion-Style E</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Guided Discovery-Style F</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Convergent Discovery-Style G</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Divergent Discovery-Style H</td>
<td>2.7%</td>
<td>27</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Learner Designed Individual Program-Style I</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Learner Initiated Program-Style J</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Self-Teaching-Style K</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Management</td>
<td>23.1%</td>
<td>234</td>
<td>78</td>
<td>na</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>1013</td>
<td>337.6</td>
<td>na</td>
</tr>
</tbody>
</table>