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

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14   **Abstract**

15   Physical education scholars have identified a number of factors that affect how teachers

16   translate policy into practice. It is becoming clear that to create learning experiences that

17   reflect the intention of guiding documents, teachers need to employ appropriate teaching

18   styles. The aim of this paper was to determine whether the teaching styles used by a group of

19   PE teachers provide opportunities for students to meet objectives relating to creativity,

20   problem solving, personal responsibility and independence. The first part of the investigation

21   involved the use of a questionnaire based on Mosston and Ashworth's *Spectrum of Teaching*

22   *Styles* (2002). The second part involved observations of six primary and middle school

23   teachers' physical education lessons. The results suggest that PE teachers may not use

24   different pedagogies for different reasons. The paper is concluded with a consideration of

25   how a teaching styles framework can help teachers to meet diverse curriculum objectives.

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Introduction

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37   In the last 15 years a number of physical education (PE) syllabus documents have used

38 terms such as 'critical thinkers', 'creative thinking', 'self-directed', 'problem solvers',

39 'independent learners', 'self-monitor' and 'self-directed learners' (The Australian

40 Curriculum-Health and Physical Education, 2016; Scottish National 3 Physical Education,

41 2012; SHAPE America – Society of Health and Physical Educators, 2014; Skolverket, 2011).

42 Many of these terms belong to a constructivist vocabulary of learning (Barker, Barker-Ruchti,

43 & Pühse, 2013) and necessitate particular kinds of pupil-centered teaching. The relation

44 between learning objectives and teaching strategies is however, not always made explicit in

45 curricula. For example, the Swedish Curriculum for Compulsory School (2011) has

46 constructivist aims but includes limited information on how these aims should be achieved in

47 the classroom. There is an underlying assumption that teachers will use appropriate

48 pedagogies to meet prescribed aims. Research has suggested however, that teachers do not

49 always match pedagogies with aims, and that teacher education, teachers' previous

50 experiences, and pragmatic concerns markedly affect teachers' pedagogies (SueSee, 2012;

51 Syrmpas & Digelidis, 2014; Syrmpas, Digelidis, Watt, & Vicars, 2017; Thorburn & Collins,

52 2003). Specifically in Sweden, some scholars claim that whilst constructivist ideas and

53 pedagogies dominate curriculum documents, they may not be entirely compatible with

54 traditional sport discourses and direct teaching methods which tend to dominate practice

55 (Larsson & Karlefors, 2015). With possible tensions between curricular objectives and

56 teacher pedagogies forming the scientific backdrop, the aim of this paper is to determine

57 whether the teaching styles used by Swedish PE teachers provide opportunities for students to

58 meet educational objectives relating to creativity, problem solving, personal responsibility

59 and independence as described in the Swedish curriculum document. The specific questions

60 addressed in the paper are: (a) Which teaching styles do teachers of Swedish PE (Years 0-9)

61   report using when teaching PE? (b) Do the Swedish PE teachers implement teaching styles

62   that promote the goals (i.e. creativity, problem solving, personal responsibility and

63   independence) of Swedish curricula? (c) Does the reported use of Spectrum teaching styles

64   differ among PE teachers? The investigation is informed by spectrum thinking, outlined later

65   in the paper.

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

67   In many countries, PE is prescribed in national, state, or district curricula. While such

68   documents vary in scope and detail, they typically contain a broad description of the subject's

69   general aims and content along with grade-specific learning objectives. These documents are

70   intended to (a) guide teachers as they structure learning experiences for students; and (b)

71   ensure educational consistency and equity across schools. Nonetheless, a number of scholars

72   have pointed out that significant gaps between official curricula and *enacted* curricula often

73   exist (Chambers & Armour, 2011; Thorburn & Collins, 2006).

74   Scholars have suggested that a variety of contextual factors influence teaching content

75   and students' learning (Alfrey, O'Connor, & Jeanes, 2017; Oliver & Lalik, 2004). Kulinna,

76   McCaughtry, Cothran, and Martin (2006) provide an extensive list of influences, dividing

77   contextual factors into: *personal* factors such as the demographics of teachers, students and

78   parents; *instructional* factors such as the size of the class or availability of equipment;

79   *institutional* factors such as school culture; and *societal* factors including broader educational

80   trends and patterns. In an examination of inner-city PE lessons, Kulinna et al. (2006)

81   emphasized that all types of factors affect how curricula are enacted.

82   Other research supports Kulinna and colleagues' (2006) categorization. Focusing on

83   factors that Kulinna et al. (2006) refer to as *societal*, McEvilly, Atencio, Verheul and Jess

84   (2013) examined discourses surrounding pre-school PE using academic literature as a source

85   of data. They proposed that three main discourses relating to motor skill development, play,

86   and physical activity are prominent and that these discourses lead to quite different – and

87   possibly contradictory – classroom practices. They also noted that government policy

88   initiatives on issues such as obesity shaped enacted curricula. Taking a finer grained

89   approach, Peiró-Velert and her colleagues (2015) drew attention to the importance of

90   instructional materials such as textbooks and equipment in mediating teachers' and students'

91   curricula enactment. In line with other scholars (Williams & Macdonald, 2015) however,

92   they pointed out that societal trends relating to commercialization and technologization are

93   having considerable impact on such materials and consequently on how national and state

94   prescriptions are addressed in schools.

95   Attempts to change teaching and learning practices have provided important insights

96   into factors affecting curricula enactment. Thorburn and Collins (2003) for example,

97   suggested that short-term assessment pressures, teaching traditions that exist within schools,

98   levels of teacher expertise, and student motivation or ability influence how – and even *if* –

99   curricula innovation occurs. In developing and implementing a curriculum strand focusing on

100   girls' bodies, Oliver and Lalik (2004) for example, found that some students' levels of print-

101   literacy were below what they expected. This impacted on the students' ability to engage in

102   critical-thinking tasks. The authors also faced resistance from the students as the authors

103   attempted to introduce change. Hastie, Martin and Buchanan (2006) encountered challenges

104   when introducing a new curriculum too, although these were of a different kind. They found

105   that employing new pedagogies involved significant challenges to their own professional

106   identities and certain levels of ontological insecurity. Finally, O'Connor, Jeanes and Alfrey

107   (2016) investigated how teachers worked with a new socially-critical curriculum. They

108   concluded that teachers tended to oscillate between familiar, teacher-centered approaches and

109   loose, student-centered approaches without really wholly adopting the inquiry based

110   approaches that were prescribed (see also, Alfrey et al., 2017). According to O'Connor and

111   her colleagues, this tendency was partially related to teacher expertise but also partly related

112   to the messiness of inquiry based learning and its tendency to accept multiple ways of

113   knowing.

114   Not captured so effectively by Kulinna and colleagues' framework but still important to

115   our discussion of tensions between curricular objectives and implementation are the

116   contradictions and incongruities in curricula themselves (see Janemalm, Quennerstedt &

117   Barker, 2018). After conducting a critical discourse analysis of an Australian state

118   prescription for PE, Rossi and colleagues (2009) questioned whether, "given the complexity

119   and multilevel pathways of message systems/ideologies in the document, teachers can deliver

120   the curricula's [social justice] agenda" (p. 75). Rossi et al. added that because teachers will

121   necessarily read the official curriculum in different ways, "it should come as no great shock

122   that alignment between intended and constructed meaning is not as smooth as the authors of

123   the text might expect" (2009, p. 78), a conclusion reached by other Australian scholars

124   (Leahy, O'Flynn, & Wright, 2013; Penney, 2013). Similarly, Oliver and Lalik (2004)

125   suggested that enacting curricula "is never free from "moral and ethical vulnerabilities" (p.

126   163) and that there are always elements of interpretation.

127   Given the potential for obstacles and ambiguities, along with misinterpretation in the

128   enactment of curricula, it is almost surprising that so much time and effort is spent on

129   developing educational policy. Yet as Penney (2010) – argues, enacted curriculum

130   possibilities are shaped by official curriculum documentation. Rather than consider practice

131   as a matter of 'implementation' or even 'translation', it may be more useful to consider the

132   curricular potential. With this in mind, the next section outlines the Swedish curriculum and

133   how it encourages creativity, exploration and independence in PE practice.

134   ***Overview of Swedish curriculum policy context*** The Swedish PE curriculum includes

135   three parts: *fundamental values and tasks of the school*; *overall goals and guidelines for*

136   *education*, and; *syllabi for each subject* (Skolverket, 2011 – English translated version) which

137   prescribe educational content for approximately 4900 primary and lower secondary

138   (compulsory) schools in Sweden (Statista, 2018). Each of these parts are supplemented with

139   knowledge requirements, which specify knowledge to be taught and clearly defines through

140   the use of criteria descriptors the different grades that can be awarded to students.

141   The curriculum document contains syllabi for 20 subjects taught across the compulsory

142   years, pre-school-grade 9 (0-9). In the *Fundamental values* section and the *Overall goals and*

143   *guidelines section* a number of explicit references to creativity can be found. The Curriculum

144   states for example, "creative activities and games are essential components of active

145   learning" (Skolverket, 2011, p. 11). It also states, "the school should stimulate pupils'

146   creativity, curiosity and self-confidence, as well as their desire to explore their own ideas and

147   solve problems. Pupils should have the opportunity to take initiatives and responsibility" (p.

148   11), and that "creative ability is a part of what the pupils should acquire" (p. 12). The

149   document also proposes that through participation in PE, students will learn to "solve

150   problems and transform ideas into action in a creative way" (p. 15).

151   Along with creativity, the document refers to independence and responsibility. It states

152   for example, that "teachers should organise and carry out the work so that pupils: gradually

153   receive more and increasingly independent tasks to perform, and take greater personal

154   responsibility" (Skolverket, 2011, p. 16). Further, teachers should:

155   take as their starting point that the pupils are able and willing to take personal

156   responsibility for their learning and work in school; be responsible for ensuring that all

157   pupils can exercise real influence over working methods, forms and contents of

158   education, and ensure that this influence grows with increasing age and maturity.

159   (Skolverket, 2011, p. 17)

160   The themes of creativity, problem solving, independence and responsibility are

161 intertwined as valuable attributes and outcomes which learners should develop. This

162 investigation is based on the idea that in order to develop such attributes, certain kinds of

163 pedagogies are required. To frame different kinds of pedagogies, we use Mosston and

164 Ashworth's (2008) work in teaching styles.

165 **The Spectrum of Teaching Styles**

166   The Spectrum of Teaching Styles (from this point referred to as 'the Spectrum') was

167 developed in the 1960s by Mosston and has undergone development in the last 50 years

168 (Mosston & Ashworth, 2008). Mosston and Ashworth (2008) suggest that teaching behaviour

169 can be defined as a chain of decision making where decisions are made by either the teacher

170 or student(s). Teaching styles are characterised by who is making the decisions, when the

171 decisions are being made, what the decisions are being made about and the intent of the

172 decision makers. When teaching is looked at as a series of decisions, different teaching styles

173 can be distinguished. Based on this premise, the Spectrum consists of at least 11 teaching

174 styles. These range from the Command Style-A through to the Self Teaching Style-K.

175 Importantly, the Spectrum assumes a non-versus (or 'all equal') approach and places equal

176 value on all teaching styles.

177   At the Command Style-A, the teacher makes all decisions and the student role is to

178 follow these decisions on cue. At the other end of the Spectrum in the Self-Teaching Style-K,

179 students make all of the decisions. The styles on the Spectrum can be divided into two

180 clusters: the reproduction cluster (Styles A-E), where knowledge is reproduced from

181 memory. Practice Style-B is an example of a style from the reproduction cluster and the

182   defining characteristic of this style "is individual and private practice of a

183   memory/reproductive task with feedback" (Mosston & Ashworth 2008, p. 94). An example

184   of Practice Style-B would involve the teacher giving a demonstration (including the teaching

185   cues) and then the learner would go and practice the task and the teacher would give feedback

186   to the learner during or after the practice. The production cluster of teaching styles (Styles F-

187   K), require learners to be responsible for "producing new knowledge to self or teacher"

188   (Byra, 2000, p. 233). Production styles require learners to either discover or create knowledge

189   (often answers to problems posed by teachers) which is new or previously unknown to the

190   learners (Mosston & Ashworth, 2008). In other words, they involve elements of either

191   discovery or creativity. Convergent Discovery Style-G is an example of a production cluster

192   style and it requires the learner to discover a 'correct' response – in other words a response

193   predetermined by the teacher – using the convergent process (Mosston & Ashworth 2008).

194   The role of the teacher is "to design the single question delivered to the learner" (Mosston &

195   Ashworth 2008, p. 237) and "the role of the learner is to engage in reasoning, questioning and

196   logic to sequentially make connections about the content to discover the answers" (Mosston

197   & Ashworth 2008, p. 237).

198   Practice Style-B has been identified as the most commonly used style of all teaching

199   styles (Byra, 2007; Curtner-Smith, Todorovich, McCaughtry, & Lacon, 2001; Curtner-Smith,

200   Hasty, & Kerr, 2001). Cothran et al. (2005) found that 1400 teachers self-reported using

201   teaching styles from the reproduction cluster more frequently than teaching styles from the

202   production cluster. Scholars in other contexts have also reported that reproduction cluster

203   styles are more frequently used by teachers of PE (Jaakkolla & Watt, 2011; Kulinna &

204   Cothran, 2003; SueSee & Edwards, 2011; Syrmpas et al., 2017).

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206   **Methods**

207   In line with the research questions, this investigation used a mixed methods approach

208   to collect data. A questionnaire was used to generate data about how often a group of

209   Swedish PE teachers reported using teaching styles to teach their classes. Coding of

210   videotaped practical PE lessons was used for the second part of the investigation.

211   *Questionnaire*

212   A Swedish language version of SueSee, Ashworth, and Edwards' (2006) questionnaire

213   was developed by the first author and two native speaking Swedes. The questionnaire was a

214   modified version of the questionnaire used by Kulinna, Cothran and Regualos (2003) and

215   Cothran and colleagues (2005). Discussions between the first author and Ashworth were used

216   to develop the revised questionnaire, and then the draft version of the instrument was again

217   subject to scrutiny from Ashworth as a final development step. For this research, the

218   *Instrument for collecting teachers' beliefs about their teaching styles used in physical*

219   *education: Adaptation of description inventory of landmark teaching styles: A spectrum*

220   *approach* (Author's work, 2006) was translated to Swedish by a Swedish PE teacher with 14

221   years teaching experience. It was then back translated by a native Swede and assessed with

222   one of the co-authors who speaks Swedish. The questionnaire was posted on a Swedish PE

223   Facebook page (Idrottslarare) that has approximately 8000 members twice per week for four

224   months along with an invitation to complete the survey.

225   The *Instrument for collecting teachers' beliefs about their teaching styles in physical*

226   *education* (SueSee et al., 2006) consisted of 11 scenarios that "provide a mutually exclusive

227   image with the essential factors of the different teaching styles" (Ashworth, 2008, p. 2). Using

228   a 5-point Likert scale (1-Not at all to 5-Most of the time – see example in Table 1) the

229   questionnaire asked "How frequently do I use this description to teach my PE lessons

230   throughout the year"?

231   **Insert Table 1 Here**

232

233   A number of Swedish PE teachers (n = 42) who visited the Idrottslarare Facebook page chose

234   to fill in the survey, thus choosing to participate in the first part of the investigation. The

235   sample of 42 respondents (from 41 schools) was comprised of 19 males and 23 females. 12 of

236   the respondents taught at lower primary, 21 at middle primary and nine at senior high school.

237   Respondents were asked to indicate their teaching experience resulting in a sample of 14

238   teaching for 0-4 years, 13 teaching for 5-10 years and 15 teaching for more than 11 years.

239   *Participants*

240   The participants chosen for the second part of the investigation had completed the

241   questionnaire and had indicated their willingness to take part in lesson observations. The

242   participants also needed to be teaching compulsory school PE (in years 0-9) in Sweden to be

243   included. Six individuals volunteered for the second part of the research. Five were teaching

244   in or near to Gothenburg, Sweden's second largest city. One teacher was working on

245   Sweden's west coast. A summary of the participants, gender, year level, lesson content and

246   length, and number of students is provided in **Table 2**. All of the lessons observed were co-

247   educational classes and ranged in size from 14 to 25 students. Lesson length ranged from 41

248   minutes to 54 minutes. All lessons took place indoors.

249   **Insert Table 2 Here**

250   *Data collection procedures*

251   All lessons were video recorded using a hand-held digital video camera and four of

252   the six lessons with a GoPro digital video camera. Two participants declined to wear the

253   GoPro camera due to personal reasons. In these cases, we relied on the observer hand-held

254   camera to record the action between teacher and students. In the analysis, this form of

255   recording proved sufficient for the coding process. The handheld camera was focused

256   predominantly on the teacher during the lessons while the GoPro worn by the teacher showed

257   his or her view. The filming researcher was positioned approximately five metres from the

258   teacher. This proximity allowed all verbal commands to be recorded. All video recording

259   began with the first instruction by the class teacher about the lessons activities.

260   ***Coding instruments and procedures***

261   As we were not interested in patterns of behavior or effects of interventions, and in

262   line with previous studies (Cothran et. al., 2004; Hewitt & Edwards, 2015; SueSee, Edwards,

263   Pill & Cuddihy, 2018) the questionnaire data were collated into a set that represented how

264   often participants believed they had used a teaching style. The video recordings of lessons

265   were reviewed and coded using four tools: (1) Ashworth's (2002) *Identification of Classroom*

266   *Teaching Learning Styles* (see also Hewitt & Edwards, 2011; SueSee, 2012); (2) the

267   *Identification of Classroom Teaching Learning Style* (Ashworth, 2002; Byra, Sanchez &

268   Wallhead, 2014; Hewitt, Edwards, Ashworth & Pill, 2016; SueSee & Edwards, 2011); (3)

269   Sherman's (1982) *Style analysis checklist for Mosston and Ashworth's spectrum of teaching*

270   *styles* and has also been used by others (Byra, Sanchez & Wallhead, 2014); and (4) the

271   *Physical Education Teacher Assessment Instrument* (Phillips, Carlisle, Steffen, & Stroout,

272   1986).

273   The procedure for coding involved using the Instrument for Identifying Coding Sheet

274   (IFITS), which involved a ten second observation followed by a ten second recording of this

275   observation (i.e., a decision every 20 seconds). The decisions the coders were making

276   involved determining which teaching style was being used in the previous ten second period.

277   The coders used the three tools to make the decision (based on the teachers' and students'

278   behavior) about which teaching style was being used. If an interval of time was observed

279   where two or more teaching styles were employed, the style would be coded as the style

280   closest to the production end of the Spectrum.

281   Reliability of coding is important when decisions are being made based on

282   observations. Inter-observer reliability was calculated using the formula:

283

284   Inter-observer agreement = Agreements / (Agreements + Disagreements) x 100

285

286   By using this formula, inter-observer agreement was calculated across the six observed

287   lessons using the three tools and coding sheet. 100% agreement was the highest agreement

288   recorded; the lowest was 95.3%. Researchers have suggested that 85% or higher needs to be

289   achieved to be considered an appropriate level of reliability (Rushall, 1977; van der Mars,

290   1989).

291   *Ethics*

292   The research project followed the ethical guidelines outlined by Swedish law as well

293   as the Swedish Research Council. Consent for both parts of the research was obtained from

294   the participants. For the questionnaire, the researchers explained the purpose of the research

295   on the Idrottslarare Facebook page on which the questionnaire was posted. Confidentiality

296   was assured to all participants. Approval was obtained from all participants to be involved in

297   observations of this research. Any student who did not wish to be filmed was not filmed.

298   Anonymity was guaranteed with all videos stored on password-protected computers and

299   deleted after the codings were completed for the second time.

300   **Results**

301   *Teachers' reported teaching styles*

302   The results in this section focus on the reported usage of teaching styles by the

303   questionnaire respondents. The responses have been grouped and presented as a percentage

304   of respondents who believed that they used that teaching style "Sometimes to Always" (see

305   also Cothran et al., 2005; SueSee, 2012).

306 **Insert Table 3 Here**

307

308 **Table 3** show three styles are reportedly used more frequently than other styles: Practice

309 Style-B, the Divergent Discovery Style-H and the Learner Designed Individual Program

310 Style-I. The Practice Style-B is from the reproduction cluster of the Spectrum (Mosston &

311 Ashworth, 2008) while the Divergent Discovery Style-H and Learner Designed Individual

312 program Style-I are from the production cluster of the Spectrum (Mosston & Ashworth,

313 2008). All the other reproduction cluster styles were reportedly used over 50% of the time

314 "Sometimes to Always" with the Reciprocal Style-C and the Self-Check Style-D the

315 exceptions. The remaining styles (the Guided Discovery Style-F, the Convergent Discovery

316 Style-G, the Learner Initiated Program Style-J and the Self-Teaching Style-K) are all from

317 the production cluster which, again require the production of new knowledge through either

318 discovery or creativity (Mosston & Ashworth, 2008). These remaining styles were reportedly

319 used by participants less than 50% of the time ("Sometimes to Always").

320 A comparison of self-reported teaching styles by gender reveals some differences –

321 see **Table 4** below. For male teachers, the most reportedly used style was the Practice Style-B

322 (89.4%) followed by the Divergent Discovery Style-H (78.9%) and the Learner Designed

323 Individual Program Style-*I* and the Inclusion Style-E being used by 66.6% of respondents

324 "Sometimes to Always". For female teachers, the Learner Designed Individual Program

325 Style-I is the most reportedly used (80%) while the Divergent Discovery Style-H and the

326 Practice Style-B are both equally reported on 75% of the time Sometimes to Always.

327 **Insert Table 4 Here**

328 Comparing teachers according to years of teaching experience shows differences

329 (**Table 5**). Almost all of the respondents (92.8%) who had been teaching 0-4 years self-

330 reported using the Practice Style-B "sometimes to always", while the second most reportedly

331   used style for this group was the Divergent Discovery Style-H (78.5%). The group of

332   participants with 5-10 years' experience reportedly used the Practice Style-B and Learner

333   Designed Individual Program Style-I the most with 76.9% of respondents indicating that they

334   use these styles "sometimes to always". Finally, 86.6% of the third group (those with 11

335   years or more teaching experience) reportedly used the Learner Designed Individual Program

336   Style-I "sometimes to always" with the Practice Style-B and the Divergent Discovery Style-H

337   used by 80% of respondents "sometimes to always". The first two groups (0-4 years'

338   experience and 5-10 years' experience) most reportedly used styles include one reproduction

339   cluster style and one production cluster style. The '11 years or more experience' group is

340   different in that the two most reportedly used styles are production cluster styles. This

341   difference between the '11 years or more experience' group and the other groups is more

342   pronounced when the response grouping is changed to "often to always". When this grouping

343   is used, production cluster styles dominate.

344   **Insert Table 5 Here**

345   *Teaching styles observed during lessons*

346   The second part of this research involved observing, videotaping and then coding six

347   lessons taught by six different teachers. **Table 6** shows the results as percentage of time all

348   (n=6) teachers were coded using each style, the number of raw score codings and the total

349   time each style was used. The most commonly observed style was the Practice Style-B (just

350   over 73%). The Divergent Discovery Style-H was the next most observed teaching style

351   (2.7%). The Self-Check Style-D was also observed 0.8% of the time. Management was just

352   over 23.1% of all observed lesson time.

353   **Insert Table 6 Here**

354   Of the six teachers who participated in the observations, four of the six used one style

355   for their lesson. Two teachers were observed using more than one style-Participant 2 (the

356   Practice Style-B and the Divergent Discovery Style-H) and Participant 4 (the Practice Style-B

357   and the Self-Check Style-D). Participant 2 was the only teacher observed using a style from

358   the production cluster of teaching styles. Every participant was observed using the Practice

359   Style-B at some point during their lesson.

360   **Discussion**

361   The discussion section of this paper is structured in two parts. The first part relates to

362   the questionnaire and the second part concerns factors contributing to the data produced from

363   the observations of the six participants.

364   *Discussion of questionnaire results*

365   Results from the questionnaire suggest that at least some Swedish PE teachers are

366   providing opportunities for students to meet educational objectives relating to creativity,

367   problem solving, personal responsibility and independence as described in the Swedish

368   compulsory curriculum document. The teachers in this investigation reported using

369   production cluster styles the Learner Designed Individual Program Style-I (73.8%) and the

370   Divergent Discovery Style-H (76.1%). These styles require the production of knowledge new

371   to the learner through the conscious thought processes of creativity and discovery (Mosston

372   & Ashworth, 2008).

373   In contrast to other spectrum investigations (Cothran et al., 2005; Hewitt, 2015;

374   SueSee, 2012), production cluster styles dominate the top three most frequently reported

375   styles. A factor that may contribute to teachers reportedly enacting creativity and discovery

376   aspects of the curriculum is that Sweden only has national testing in years six and nine. Some

377   scholars have suggested that high stakes assessment where test scores either contribute to

378 university entrance or are made public may contribute to a narrowing of teaching styles

379 and/or the domination of reproduction cluster styles (Cothran et al., 2005; Kirk & O'Flaherty,

380 2003; Thorburn & Collins, 2003).

381   The teaching styles reported in this study are significant in that they can be seen to

382 reflect Swedish (physical) educational values mentioned earlier in the Swedish curricular

383 material document relating to curiosity, creativity, independence and so forth (see Skolverket,

384 2011). As Alfrey and colleagues (2017) note, teachers' philosophies are affected by ideology

385 and history – teachers cannot but be influenced by the cultural environment in which they

386 find themselves. The results here suggest that constructivist assumptions – assumptions that

387 underpin curricula in many countries (The Australian Curriculum-Health and Physical

388 Education, 2016; Scottish National 3 Physical Education, 2012; SHAPE America, 2014) –

389 have a relatively comfortable fit with Swedish 'societal factors' (Kulinna et al., 2006). As a

390 result, discovery-oriented or problem based pedagogies appear to challenge neither the

391 teachers' typical practices, not their professional identities (see Hastie, et al., 2006).

392   Gender differences were evident in that the 19 male respondents reportedly used the

393 Practice Style-B, the Divergent Discovery Style-H, and the Inclusion Style-E the most

394 frequently. The 23 female respondents reportedly used the production cluster styles more

395 with the Learner Designed Individual Program Style-I, the Divergent Discovery Style-H and

396 the Practice Style-B dominating. These results indicate a preference for use of production

397 clusters over reproduction cluster styles with females and consequently a greater likelihood

398 that female teachers will at least address, if not meet, policy objectives than their male

399 counterparts.[1] None of the reviewed literature examined this aspect of curriculum

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[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).

400　implementation and while we might expect societal trends such as commercialization and

401　technologization (see Williams & Macdonald, 2015) to affect male and female teachers

402　differently, there is a need for further research in the area of gender and curriculum

403　implementation.

404　　　Teachers who had 0-4 years' experience (n=14) self-reported using the Practice Style-B

405　(92.8%) and the Divergent Discovery Style-H and the Inclusion Style-E equally the most.

406　Teachers with 5-10 years' experience (n=13) reported using the Practice Style-B and the

407　Learner Designed Individual Program-I equally the most (76.9%) whilst the most

408　experienced participants (n=15) (those with 11 years and over experience) self-reported using

409　the Learner Designed Individual program (86.6%) and equally, the Divergent Discovery

410　Style-H and the Practice Style-B on 80%. In short, the more experience the teachers had, the

411　more they reported using production cluster styles. This result suggests that experienced PE

412　teachers are more likely to employ pedagogies that are consistent with curricular objectives.

413　This result is similar to the investigation of Zeng (2016), who found that teachers who had

414　graduated reportedly used production style clusters (Styles F-I) more frequently than

415　undergraduates and believed that these styles would help students learn skills and activities

416　and motivate others. It also supports O'Connor et al.'s (2016) and Thorburn and Collins'

417　(2003) conclusion that experience is a key factor influencing the implementation of curricula.

418　Considering the self-reported use of styles here, it is worth noting that others (Cothran et al.,

419　2005; SueSee, Edwards, Pill & Cuddihy, 2018) have found that teachers either overestimate

420　their use of styles or may not be able to identify specific styles.

421　***Observed lessons***

422　　　The observation part of this research suggests that production style pedagogies may

423　not be used as often as reported. This finding would reflect research in other contexts (see

424   SueSee, 2012) in which the demands of high stakes assessment appeared to counter-act the

425   teaching styles specified in the curriculum. There are several potential reasons for the trend

426   observed here. It may be that the participating teachers value reproduction styles more than

427   production styles (see Cothran et al., 2005, for a discussion of how teachers value teaching

428   styles). One reason that reproduction styles have been found to be more highly valued is the

429   perception that they are better at promoting motor skills and physical development (Byra,

430   2000; Garn & Byra, 2002; Syrmpas et al., 2017). Styles from the production cluster have in

431   contrast, been seen as more related to cognitive development (Syrmpas et. al., 2017; Garn &

432   Byra, 2002). Participants here may have similar beliefs about the clusters or at least were

433   more interested in physical development in the lessons observed.

434   Another reason reproduction cluster teaching styles were more common could be

435   because of differences in definitions of creativity, problem solving, curiosity, independence,

436   and responsibility. Teachers may still use reproduction cluster styles and ask students to solve

437   problems but without instructing students to use new solutions. Alternatively, teachers may

438   ask students to solve problems to which students already know the answer. In such cases,

439   they cannot said to be producing new knowledge. There was however no evidence to suggest

440   that either of these phenomena were occurring in the observed lessons.

441   Importantly but perhaps not surprisingly, the Swedish curriculum (Skolverket, 2011)

442   does not state how independent or how responsible a student should be (i.e., responsible for

443   50% of the decisions made in a lesson or independent 60% of the time). It is possible that

444   students may work independently of the teacher at times but not of their classmates.

445   Furthermore, responsibility may be required with the management of self or equipment, but

446   that does not always necessitate the use of creativity or discovery and production cluster

447   styles. Further, as a great deal of research has indicated, we cannot assume that policy will be

448   interpreted in the same way, regardless of teaching or context. Rossi et al., (2009) for

449   example, suggest that texts are usually "read" in different ways and teachers' interpretations

450   differ from those of government syllabus writers, who "might harbour expectations that a

451   particular syllabus document will convey a particular message to teachers as they implement

452   the curriculum" (p. 78). Similarly, Larsson and Karlefors (2015), when speaking of the

453   Swedish PE curriculum for upper secondary school (2011) and PE teachers' knowledge base,

454   questioned whether the "objectives do not make sense when teachers make pedagogical

455   considerations" (p. 585). What was suggested by the sample of observed lessons is that some

456   Swedish teachers are not inviting students to be creative and discover solutions because they

457   are using production cluster styles when teaching PE in the compulsory years. As we have

458   suggested, it is possible that these teachers and Swedish teachers in general do use other

459   styles besides the ones observed and more research is warranted.

460   **Conclusion**

461   The aim of this paper was to determine whether the teaching styles used by Swedish

462   PE teachers provide opportunities for students to meet educational objectives relating to

463   creativity, problem solving, personal responsibility and independence as described in the

464   Swedish compulsory curriculum document. Our data provide some evidence to suggest that

465   while Swedish PE teachers report using production pedagogies, these pedagogies are not

466   always reflected in practice. Reproduction cluster styles were more common across the

467   observed lessons, despite a range of reproduction and production styles being reportedly

468   used. Although further investigation is necessary, we would suggest that discussions of

469   frameworks such as the Spectrum may assist practitioners in developing strategies for

470   achieving curricular goals.

471   We would like to finish with a couple of reflections. A number of scholars have

472   highlighted the multidimensional goals of curriculum, suggesting – rightly in our view – that

473   diverse goals cannot be achieved alone through only one cluster style (Digelidis,

474   Theodorakis, Zetou, & Dimas, 2006; Kulinna & Cothran, 2003; Syrmpas et al., 2017). Yet if

475   policy documents such as the Swedish compulsory curriculum (2011) are to contain

476   multidimensional goals, relating to creativity, curiosity, problem solving as well as movement

477   capability for example, it would make sense to provide explicit commentary on how these

478   goals might be achieved. We are not suggesting that curricula need provide concrete

479   explanations or detailed examples of what to do in the classroom. Rather, we are suggesting

480   that indications of the range of pedagogies that might prove useful in transforming policy into

481   practice might prove useful for teachers and teacher educators working with such documents.

482   Finally and related, to increase the likelihood of teachers using different pedagogies to

483   achieve different objectives, teachers would benefit from professional support. A first step

484   might involve acknowledging that while different pedagogies or styles might all 'have their

485   place', some will be better for achieving certain outcomes than others. Support during the

486   trial and implementation of new pedagogies is also likely to be necessary. Assistance from

487   experienced teachers or teacher educators along with practical opportunities to collaborate in

488   the creation of successful, efficient and innovative lessons with new teaching style(s) has

489   been suggested as a way of changing in teachers' perception and employment of new

490   teaching styles (Gusky, 2002; Syrmpas et al., 2017). We believe that such strategies would be

491   useful in generally considering how to meet diverse curriculum objectives.

492   The findings presented in this paper should be thought-provoking and helpful in

493   informing policy makers and higher education facilities in what may need to occur to ensure

494   PE teachers are well supported in their implementation of curricula. If teachers are not

495   supported, the value of curricula must be questioned and the prescribed outcomes are unlikely

496   to be achieved.

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661 **Table 1   An Example of One Scenario from the *Spectrum Inventory* (2006) Which**
662 **Shows Different Likert Scale Descriptors and Focusing on Measuring How Often a**
663 **Teaching Style Was Used.**
664

Scenario Style	Scenario Descriptor				
A	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.				
How frequently do I use this description to teach my physical education lessons throughout the **year**?	**Not at all**	**Minimally**	**Here & there**	**Often**	**Most of the time**
	1	2	3	(4)	5

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667   **Table 2   Summary of Participants and Lessons Observed**.

Teacher	Gender	Year level	Lesson content	Lesson length (minutes)	Number of students
1	Male	1	Physical fitness games/ course	53.6	17
2	Male	2	Physical fitness course	40.6	16
3	Female	7	Physical fitness and Handball	53	18
4	Male	9	Dance	51.3	26
5	Female	9	Volleyball and physical fitness	54	18
6	Female	1	Structured play/Games	42.2	21

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670   **Table 3   Percentage of Teachers Self-Identified Use of Each Teaching Style "Sometimes**
671   **to Always".**

Teaching Style	Percentage of Swedish PE teachers self-identified use of teaching styles "Sometimes to Always"
Command Style-A	50%
Practice Style-B	80.9%
Reciprocal Style-C	26.1%
Self-Check-Style D	47.6%
Inclusion Style-E	59.5%
Guided Discovery Style-F	30.9%
Convergent Discovery Style-G	40.4%
Divergent Discovery Style-H	76.1%
Learner Designed Individual Program Style- I	73.8%
Learner Initiated Program-Style-J	35.7%
Self-Teaching Style-K	16.6%

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674 **Table 4 Percentage of Male, Female and All Participants Self-Identified Use of**
675 **Teaching Styles "Sometimes to Always".**

Teaching Style	Percentage of male Swedish PE teachers self-identified use of teaching styles "Sometimes to Always" *N=19*	Percentage of female Swedish PE teachers self-identified use of teaching styles "Sometimes to Always" N=23	Percentage of Swedish PE teachers self-identified use of teaching styles "Sometimes to Always" N=42
Command Style-A	42.1%	56.5%	50%
Practice Style-B	89.4%	73.9%	80.9%
Reciprocal Style-C	31.5%	21.7%	26.1%
Self-Check-Style D	52.6%	43.4%	47.6%
Inclusion Style-E	73.6%	47.8%	59.5%
Guided Discovery Style-F	31.5%	30.4%	30.9%
Convergent Discovery Style-G	26.3%	52.1%	40.4%
Divergent Discovery Style-H	78.9%	73.9%	76.1%
Learner Designed Individual Program Style- I	68.4%	78.2%	73.8%
Learner Initiated Program-Style-J	31.5%	39.1%	35.7%
Self-Teaching Style-K	15.7%	17.3%	16.6%

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678 **Table 5   Comparison of Self-Reported Use of Teaching Styles ("Sometimes to Always")**

679 **Based on Years of Teaching Experience.**

Teaching Style	Percentage of teachers with 0-4 years teaching experience self-reported use of teaching style ("Sometimes to Always") n=14	Percentage teachers with 5-10 years teaching experience self-reported use of teaching style ("Sometimes to Always") n=13	Percentage of teachers with 11 years or more teaching experience self-reported use of teaching style ("Sometimes to Always") n=15	11 Years or more teaching experience self-reported use of teaching style ("Often to Always")
Command Style-A	42.8%	53.8%	60.0%	6.6%
Practice Style-B	92.8%	76.9%	80%	26.6%
Reciprocal Style-C	28.5%	38.4%	20%	20%
Self-Check-Style D	35.7%	53.8%	60 %	26.6%
Inclusion Style-E	78.5%	46.1%	53.3%	26.6%
Guided Discovery Style-F	28.5%	15.3 %	53.3%	0%
Convergent Discovery Style-G	28.5%	53.8%	40%	0%
Divergent Discovery Style-H	78.5%	69.2%	80%	33.3%

Learner Designed Individual Program Style-I	35.7%	76.9%	86.6%	66.6%
Learner Initiated Program-Style-J	21.4%	46.1%	33.3%	33.3%
Self-Teaching Style-K	28.5%	15.3%	6.6%	0%

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682 **Table 6   Time Participants Were Observed Using Teachings Styles as a Percent, Raw**

683 **Scores and Time.**

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

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