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RESEARCH ARTICLE

Observed teaching styles of senior physical education teachers in Australia

Brendan SueSee[1] · Ken Edwards[2] · Shane Pill[3] · Thomas Cuddihy[4]

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Abstract

Prior to 2005, it was not known what teaching styles were used for physical education (PE) in the state of Queensland, Australia. In order to explore the effect that teachers' beliefs about teaching styles influenced their self-reported use, Cothran et al. (*Research Quarterly for Exercise and Sport, 76*(2), 193–201, 2005) conducted a study in which teachers were asked to complete a questionnaire that presented various teaching style scenarios based on the 11 styles identified by Mosston and Ashworth (2008). This research included Queensland teachers of both primary and secondary PE, but did not confirm through observation the accuracy of the self-reporting. To address this gap, this paper presents the findings of observations of teaching styles used by nine teachers of Queensland senior PE across three 1-h lessons of a 9-week unit, to determine whether syllabus outcomes were being met. The teachers had all completed 4-year training, with three having 0–4 years of teaching experience, three with 5–10 years, and three with 11 years or more. The nine participants' lessons ($n = 27$ lessons) were coded by two coders using Ashworth's (2004) *Identification of Classroom Teaching-learning Styles* and descriptors of teaching styles from (Cothran et al. 2005) *Teaching Physical Education* (Mosston and Ashworth 2002). Inter-observer reliability over the 27 lessons was 99%. The data were analysed via an SPSS version 21 command to determine the means and frequency distribution of the styles indicated within the Mosston and Ashworth (2008) Spectrum. The senior PE teachers participating in this study failed to demonstrate the use of a range of styles in their lessons, in spite of the Queensland Senior Physical Education Syllabus (2004) detailing a specific range of styles to be used. This suggests that the aims, objectives and outcomes (including higher-order thinking skills) as described in the syllabus were not being met.

Keywords Spectrum of teaching styles · Physical education curriculum · Syllabus implementation · Pedagogy

Introduction

At the time of the study, Queensland schools were using the Queensland Senior Physical Education Syllabus (QSPES; QSA 2004). The QSPES is a fundamental document relevant to the teaching of senior physical education (PE) in the Australian state of Queensland. It is mandated throughout the state, and all schools teaching senior PE must follow the guidelines from this document. The challenge for teachers in selecting appropriate teaching styles to meet the *general objectives* of the QSPES (acquiring, applying, evaluating and the non-assessed appreciation) is not a recent problem or specific to this research (Curtner-Smith et al. 2001a; Hasty 1997). At the completion of an evaluation of the trial-pilot QSPES, the Board of Senior Secondary School Studies (BSSSS 1998) recommended that guidance and professional development be required for "teaching, including guidance in pedagogies designed to develop the independent learner, addressing educational equity in regards to Senior Physical

✉ Brendan SueSee
Brendan.SueSee@usq.edu.au

Ken Edwards
Kenneth.Edwards@usq.edu.au

Shane Pill
shane.pill@flinders.edu.au

Thomas Cuddihy
t.cuddihy@qut.edu.au

[1] University of Southern Queensland, Springfield Campus, PO BOX 4393, Springfield Central, Australia

[2] University of Southern Queensland, Ipswich Campus, 11 Salisbury Road, Ipswich, QLD 4305, Australia

[3] Flinders University, GPO Box 2100, Adelaide 5001, Australia

[4] Queensland University of Technology, Brisbane, Australia

education" (p. 42). Specifically with regard to pedagogy, the report noted that teachers "still used familiar directive approaches, particularly in the early stages of implementation or when working on unfamiliar units" (BSSSS 1998, p. 128).

The purpose of the current study was to observe and code (on three separate occasions) the teaching styles of a sample ($n = 9$) of teachers of senior PE across a 9-week unit of work. Years 11 and 12 of schooling in Queensland are considered senior school, and grades awarded during this time in senior PE contribute to a university entrance score. The research reported in this paper and related discussion addresses the following questions: 1) What teaching styles were teachers of Queensland senior secondary PE (years 11 and 12) observed using in practical lessons? 2) Are the teaching styles observed in Queensland senior secondary PE classes providing opportunities for students to use relevant higher-order thinking skills (HOTs)? [For this article, HOTs is based on the taxonomy described by Bloom (1956), and refers to levels of thinking above comprehension. In particular, when referring to HOTs, the article will be focusing on evaluating, synthesising, solving problems, producing new knowledge and creativity in unknown environments.] 3. Do the teaching styles used by teachers of Queensland senior secondary PE allow students to produce new knowledge as described in the QSPES?

Curriculum context

An evaluation of the pilot Queensland Physical Education Syllabus concluded that, in the English-speaking world, the syllabus was nearly without peer (Penney and Kirk 1998). Reasons for this conclusion could include the notion of *intelligent performance* as movement that will "involve rational and creative thought at a high level of cognitive functioning" (QSA 2004, p. 1), and engaging students not just as performers, but also as analysts, planners and critics "in, about and through physical activity" (p. 1). Further, the QSPES (QSA 2004) requires the use of a wide variety of pedagogical approaches, including "guided discovery, inquiry, cooperative learning, individualised instruction, games for understanding and sport education" (p. 28). Additionally, the QSPES states that learning experiences "should develop students as self-directed, interdependent and independent learners" (p. 29), and provides criteria for *evaluating* (when awarding an "A" or "B" standard) physical performance, where a student must a) implement physical responses through reflection and decision-making, and b) solve problems independently by demonstrating solutions in new or unrehearsed contexts. This concept of a new or unrehearsed context (and stipulating that an "A" or "B" standard for evaluating can only be given when solving problems in new or unrehearsed contexts) emphasises the value of creativity as an example of a higher-order thinking skill. Given that the QSPES identifies six teaching styles to be used, and that no one teaching style can encompass all learning objectives (Mosston and Ashworth 2008), teachers of senior PE in Queensland would need to use a range of teaching styles to achieve syllabus goals.

The Spectrum of teaching styles

The Spectrum of teaching styles (Mosston and Ashworth 2008), hereafter referred to as the "Spectrum", is based on the premise that teaching is governed by a single unifying process: decision-making. More specifically, teaching styles can be defined by looking at who is making the decisions, when the decisions are being made and what the decisions are being made about. When these decisions are identified, 11 teaching styles can be defined. Different teaching styles allow teachers and students to achieve different educational objectives. The Spectrum comprises 11 teaching styles, *Command Style-A* through *Self-Teaching Style-K*. At *Command Style-A*, the teacher is making the maximum number of decisions and the student the minimum. At *Self-Teaching Style-K*, the teacher is making the minimum number of decisions and the student is making the maximum. Put another way, there is less teacher direction at the *Self-Teaching Style-K* than at the *Command Style-A*. The Spectrum is divided into two clusters: the *reproduction cluster* of teaching styles, where new knowledge is not generated, and the *production* cluster of teaching styles (styles F–K), or those "dependent upon the learner producing new knowledge to self or teacher" (Byra 2000, p. 233). In terms of the most commonly used styles, Byra (2007) found that "based on direct teacher observation, styles A–E are used more frequently than styles F through H. *Practice Style-B* was used more frequently than any other Spectrum teaching style" (p. 4). Similarly, Cothran et al. (2005) found that a group of 1400 teachers self-reported using teaching styles from the reproduction cluster more frequently than those from the production cluster. The Spectrum is represented as "a continuum with equal spaces and dotted lines representing the incremental, yet cumulative shift of decisions and the design variations that exist between landmark styles" (Mosston and Ashworth 2008, xx). It demonstrates a non-"versus" approach, in which all teaching styles are valued equally.

Although they all have equal value, however, each teaching style on the Spectrum achieves different objectives. From styles C through H, there is a progressive increase in student intellectual involvement in the lesson, requiring the student to have ever greater control over their work (Haslam 2002). To be more specific, rather than just one type of thinking, at a higher level of intellectual involvement, a greater range of thinking will be required, including analysing movement options, organising movement solutions and evaluating the movement itself (Haslam 2002). While the term "higher

level" potentially goes against the non-"versus" approach of the Spectrum, the concept that the greater the intellectual involvement or variety of cognitive processes required by the learner, the greater the intellectual rigor, is not a "versus" concept insofar as it is not a suggestion to rank intellectual activity, but an explanation of how these activities are used. To represent this concept graphically, Haslam (2002) designed a table to show how *movement processes* and *core thinking skills* match up. This is shown here in Table 1.

To give an example of this match-up, let us consider the movement process of *patterning*. If the learner is required to *remember* an example or pattern of movement, it is more than likely that this pattern is displayed to the learner by their teacher. With respect to *Practice Style-B*, an environment or episode is then created that requires the learner to practice this movement pattern. *Practice Style-B* is the most appropriate style to use for the *movement process* of *patterning*, and *remembering* will be the *core thinking skill* (or cognitive operation) that will enable the learner to perform this movement process successfully (Haslam 2002). When these concepts are positioned in the context of the QSPES), the *general objectives* of the senior PE syllabus (QSA 2004) can be incorporated into the table alongside the appropriate *movement processes*, *core thinking skills* and *teaching styles.* This is shown in Table 2.

Salter and Graham (1985) and Cleland and Pearse (1995) suggested that *production* styles would create learning experiences that require students to produce knowledge new to them. If that is accepted, it is imperative that teachers utilising the QSPES (use *production* teaching styles to allow students to meet the general objective of *evaluating* in a new or unrehearsed complex environment, if the student is to be awarded a grade of "A" or "B" (QSA 2004). If teachers do not know how to use these styles, or choose not to use them, it would seem plausible that student learning could be compromised, and it would be more difficult for students to demonstrate the general objectives of the QSPES). Furthermore, failure to use a range of teaching styles (*reproduction* and *production* styles) would mean that syllabus outcomes and aims would be compromised.

Method

In this study, observations were made of the actual (as opposed to perceived) teaching styles used by Queensland teachers of senior secondary PE (years 11 and 12) in practical lessons. From the observational data collected about the type and frequency of teaching styles used in lessons, along with information contained in the QSPES), an analysis was also performed to identify the opportunities for students to develop HOTs and to produce new knowledge.

The research methods used herein were non-experimental, which is "typified by observations or descriptions of the status of a condition or situation" (Berg and Latin 2004, p. 197). The study sought to record events that would have occurred regardless of whether the researcher was present. The researcher did not attempt to manipulate variables or make "something" happen. The study employed observational research, which is characterised by the researcher obtaining "data by examining or observing a behavior or trait and recording it rather than having the subject report it" (Berg and Latin 2004, p. 209). The chief investigator was a non-participant observer, but may have had what Singleton and Straits (2005) refer to as peripheral membership, that is, the observer may be "marginally part of the settings they observe" (p. 330). The researcher did not attempt to hide their presence from the participants while video-recording the lessons and did not participate in the lesson.

Study sample

Nine participants were selected from a list of potential participants ($n = 27$) identified in response to a previous survey of PE teachers' perceived use of teaching styles. The nine-participant sample size can be readily justified. Firstly, this type of purposive sampling (or theoretical sampling) is "designed to encapsulate a relevant range in relation to the wider universe, but not represent it directly. This may mean a range of experiences, characteristics, processes, types, categories, cases or examples, and so on" (Mason 1996, p. 92). The sample selection meets these criteria by considering

Table 1 Movement processes and their related core thinking skills and teaching styles

Movement process categories	Core thinking skills	Teaching styles
Perceiving	Information Gathering	Command
Patterning	Remembering	Practice
Adapting	Organising	Reciprocal
Refining	Analysing	Self-Check
	Discovery Threshold	
Varying	Focusing	Guided Discovery
Improvising	Integrating	Convergent Discovery
Composing	Generating	Divergent Discovery

Table 2 Movement processes, teaching styles, thinking skills and the QSPES (QSA 2004) general objectives

Movement process	Teaching styles	Core thinking skills	QLD senior PE general objectives
Perceiving	Command	Information Gathering	Acquiring
Patterning	Practice	Remembering	Acquiring
Adapting	Reciprocal	Organising	Applying
Refining	Self-Check	Analysing	Applying
Varying	Guided Discovery	Focusing	Applying/Evaluating
Improvising	Convergent Discovery	Integrating	Evaluating
Composing	Divergent Discovery	Generating	Evaluating

QLD Queensland

factors such as sex, teaching experience, private or public schools, physical activities being taught, cohort (single-sex or co-educational), religious or non-denominational, and rural or urban. Specifically, the sample covers a range of teaching experience, gender, locations, clientele, socioeconomic groups, activities and times when observed. With regard to the variety of school settings, six of the schools were state/government (sometimes known as public) co-educational schools, with one being in a rural area. Three of the schools were private/independent schools (one single-sex male, one single-sex female and one co-educational). All categories from the physical activities section of the QSPES (QSA 2004) were represented (aesthetic, direct interceptive, indirect interceptive and performance) in the sample observed. Physical activities being taught included touch football (a non-tackle version of rugby league; 6 lessons), netball (6), Gaelic football (3), softball (3), competitive aerobics (3), archery (3) and orienteering (3). The gender breakdown of the group was six male and three female teachers. Within the sample of nine teachers, three had 0–4 years of teaching experience, three had 5–9 years, and three had 10 years or more. Most of the sample worked in outside school activities which would have contributed to their expertise. For example, three of the participants were part-time university-level tutors, and three were members of review panels or panel chairs (an Education Queensland course-monitoring service for all subjects in the various regions around Queensland to ensure consistency of standards). Three of the participants were also heads of departments (HODs). This HOD role means that they were involved in middle-management or managerial tasks (such as curriculum aspects including work programs) for the subject area of PE within their school. Therefore, the sample represents many of the characteristics of Queensland senior secondary PE teachers. However, it is acknowledged that the sample is not all-encompassing.

Other research identified during the literature review that was non-experimental or descriptive reveals that samples of similar size were common. For example, a study of PE teacher curriculum decision-making by Reddan (2000) included six teachers, and O'Connor (1999) investigated five teachers in a study of teachers' identities. The nine-teacher sample size reflects the logistics of time and the availability of the observer, and the three lessons observed (per participant) over the 9-week unit equated to nearly 22% of all physical activity lessons undertaken within that time. The lessons observed were practically based lessons (i.e., physical activity was required as part of the lesson). Practical, as opposed to theoretical, lessons were selected because PE is essentially a practically based subject. Secondly, PE is normally taught in a practical or performance-based setting where there is an integration of some theoretical aspects. Therefore, the observations mirrored this setting.

Video-recording of lessons

The process of collecting observational data involved the video-recording of all lessons using a Panasonic NV-GS300 digital video camera. The camera was hand-held for the lessons and was focused predominantly on the teacher. If students were filmed, it was when they came into shot with the teacher and not as the focus of the study. To limit the intrusiveness of the presence of the researcher, the students were told by their teachers that they (the teacher) were the focus of the research, not the students. The chief investigator, as the observer and recorder, was introduced at the beginning of the lesson, but no communication was entered into with the teacher or students throughout the recording. The chief investigator was positioned between 15 and 50 m from the teacher. All teachers wore wireless lapel microphones which transmitted to the video camera. This allowed all verbal commands to be heard and recorded in their entirety. All video-recording began with the first instruction by the class teacher about the lesson activities.

Systematic observation instrument

The video recordings of lessons were reviewed and coded using Ashworth's (2004) *Identification of Classroom Teaching-learning Styles*. This instrument has been used by others (Hewitt 2015; Hewitt and Edwards 2013), and was selected to ensure that the descriptions of the teaching styles that were coded were an accurate reflection of Mosston and

Ashworth's (2008) definitions. The instrument allowed the researchers to observe the teaching behaviour and then classify that behaviour as a style on the Spectrum based on the description of the style. The *Identification of Classroom Teaching-learning Style* (Ashworth 2004) provided descriptors of nine possible teaching styles (out of 11). The instrument describes the subject matter expectations for the observed teaching styles and the behaviour expectations for the students when they are participating in a learning experience or episode.

In conjunction with Ashworth's (2004) *Identification of Classroom Teaching-learning Styles*, the observation and coding process also involved an adaptation of the *Instrument for Identifying Teaching Styles* (IFITS) coding sheet. The IFITS was used in a study by Hasty (1997) to ascertain the amount of time teachers spent using different teaching styles. It functioned as a basic coding sheet; Fig. 1 provides a 3-min example of a coded observation.

The *coding protocol* employed when using the IFITS involved a 10-s observation followed by 10 s during which a code was recorded for the observation. This meant that when observing a lesson, the coder made a decision every 20 s. These decisions involved determining which teaching style was being utilised during the previous 10-s period. If two or more teaching styles were evident during an interval, the style closest to the production end of the Spectrum was coded. For example, if *Practice Style-B* and *Reciprocal Style-C* were both seen during a 10-s period, the trained coder would record the style as *Reciprocal Style-C*. This decision was based on Hasty's (1997) work, where "the least didactic (i.e., more student centred) teaching style is given preference and recorded" (p. 45). This is because the literature suggests that production styles are the least used, or are "likely to be used sparingly" (p. 46). Therefore, this process would ensure that any coding bias that did occur would be to the *production* cluster end of the Spectrum. Again, this decision was based on Hasty's research, "so that the time teachers spent using productive teaching styles was overestimated" (p. 46). While Hasty's adaptation of Ashworth's (2004) *Identification of Classroom Teaching-learning Styles* included only eight categories of teaching styles (A–H), the current study involved all 11 teaching styles (A–K).

A category identification decision that was employed during the coding process was for "management" during lesson time. Management decisions recognised were based on the same categories that Hasty (1997) employed. Hasty used a grouping of all management activities that were defined by the *Physical Education Teacher Assessment Instrument* (Phillips et al. 1986). Consequently, the five management sub-categories employed were *beginning/ending class*, *organisation*, *behaviour management*, *equipment management* and *other tasks.*

If the teacher used a teaching style and performed a management task within the same 10-s observation (such as moving markers), the teaching style was coded, not the management style. Physical activities such as archery require high levels of management due to the safety issues associated with the sport. Eight physical activities were observed being taught by the participant teachers: touch football (a non-contact version of rugby league), netball, Gaelic football, archery, softball, athletics, orienteering and aerobics.

After coding had been completed for all 27 observed lessons, there were 4465 10-s observations, reflecting a total of 24 h 48 min 20 s of video recordings, with three observations per minute.

Coding and reliability

The coding of the video-recorded lessons was performed by two specialist PE teachers. The first coder was also the chief investigator, and had a four year undergraduate degree, two master's degrees, and 12 years of teaching experience. The second coder had a four year undergraduate specialist PE

Fig. 1 A section from the IFITS coding sheet representing 3 min of observation. The researcher observes for 10 s, and is then allowed 10 s to record the appropriate style code for that observation (i.e., three observations and three codes recorded per minute)

INTERVAL	TEACHING STYLE											
1	A	(B)	C	D	E	F	G	H	I	J	K	M
2	A	(B)	C	D	E	F	G	H	I	J	K	M
3	A	B	(C)	D	E	F	G	H	I	J	K	M
4	A	B	(C)	D	E	F	G	H	I	J	K	M
5	A	B	(C)	D	E	F	G	H	I	J	K	M
6	A	(B)	C	D	E	F	G	H	I	J	K	M
7	A	(B)	C	D	E	F	G	H	I	J	K	M
8	A	B	(C)	D	E	F	G	H	I	J	K	M
9	A	B	C	D	(E)	F	G	H	I	J	K	M

degree and had been teaching for three years. The second coder had studied Spectrum of teaching styles literature and theory during their degree program, and had received 9 h of training by the first coder on the use of the coding instrument.

To increase inter-observer reliability, both coders practised coding live and recorded PE lessons in order to become familiar with the teaching styles and to become competent with the coding sheet. The fact that all lessons were video-recorded meant that the coders were able to stop the lessons at any time to consult notes or texts to clear up any confusion.

The first coder was also able to consult extensively with Professor Sara Ashworth during the coding process to clarify some scenarios. Descriptions of any episode in question, and the exact words used by the teacher during the episode, were forwarded to Professor Ashworth, who would then describe the decision the teacher was making or the decisions the teacher was asking the learner/s to make. The ability to consult with a person with exceptional knowledge of the Spectrum was invaluable to the coders and contributed to the accuracy of the coding.

Inter-observer reliability is a "common way of estimating reliability among coders by using a formula that divides the number of agreements in behavior coding by the sum of the agreements and disagreements" (Thomas and Nelson 2001, p. 190). The lowest recorded level for inter-observer reliability for the 27 lessons was 96.4%, and the highest was 100%. Of the 4465 total observations, 4421 were in agreement, and 44 conflicted. When the inter-observer agreement (IOA) formula is applied, this represents approximately 99% inter-observer reliability.

Timing of observations

The observations for the study were conducted in term 3 of the school year so that all participants had been teaching their students for at least 20 weeks. Term 4 was ruled out because school assessments needed to be finalised by about week 5 of term 4 for students in year 12, and by around week 7 for students in year 11.

Data analysis

The observational data were analysed via SPSS version 21 software using the "Explore" and "Descriptives" commands (IBM Corp., Armonk, NY, USA) to determine the means and frequency distribution of the styles indicated within Mosston and Ashworth's (2008) Spectrum. A range of information presented in Tables 3 and 4 examines aspects of the observational data collected.

Results

From the 27 lessons observed, only five of the 11 teaching styles on the Spectrum were observed. Interestingly, only four of the nine observed participants used two or more teaching styles. This means that five participants used only one style for the three lessons in which they were observed. The dominant style was *Practice Style-B*. Table 3 shows the styles employed by the participants during the video-recorded lessons.

The mean lesson time for the 27 lessons observed was 55.1 min (1488.3 min observed/27 lessons), with school timetabled teaching time ranging from 50 to 70 min. Table 4 outlines aspects of time spent on the teaching styles observed and total coding for each style. Management during lessons was coded 1008 times within a total time of 5 h and 36 min, for a mean of 12.4 min (22.6%) of lesson teaching time. When taken together, management and *Practice Style-B* take up 50.2 min of the average 55.1-min lesson observed. Using data from a previous study (SueSee and Edwards 2011), Table 4 also shows the number of participants who had indicated in a questionnaire what styles they believed they used.

Of the five styles observed (A, B, C, D and H), all lessons ($n = 27$) included *Practice Style-B* (100%) (Table 5). Management was also observed in all lessons, but usage was relatively low when compared with the findings of other studies (Siedentop 1983; Emmanouilidou et al. 2007). *Command Style-A* was observed in three lessons (11.1% of all lessons), *Reciprocal Style-C* in two lessons (7.4%), and *Self-Check Style-D* and *Divergent Discovery Style-H* in only one lesson each (3.7%). Overall, it can be shown that all teachers use *Practice Style-B* either exclusively or most of the time, with some teachers using other styles at times as well (usually one or two styles and invariably from the production cluster).

As noted previously, the teaching style predominantly used by participants during the video-recorded lessons was *Practice Style-B*, which was coded 3120 times (17 h 20 min) and occupied a mean of 37.8 min (68.6%) of lesson teaching time. At some point, all participants used this style to teach their PE classes in every lesson. The *Command Style-A* was the second most frequently observed, with 163 codings and a total of 54.3 min, for a mean of 2 min (3.65%) of individual lesson teaching time (Table 5). However, only one individual (participant 7) was observed using this style, and is therefore wholly responsible for this result. The third most commonly recorded teaching style was *Reciprocal Style-C*. When the entire video-recording time is considered, *Reciprocal Style-C* was used for 38 min and coded 114 times, for a mean of 1.4 min (2.5%) of lesson time. The only style observed from the production cluster, *Divergent Discovery Style-H*, was observed 0.78% of the time, or 11 min and 40 s. This equates to 35 of the 4465 coded observations, making it the fourth most commonly observed teaching style used by participants in this research. Again, it was used by only one participant—participant 7.

Table 3 Teaching styles identified and lesson focus/foci employed in the study ($n = 27$ lessons)

Participant	Lesson focus	Styles used	Number of styles used
Participant 1	Athletics	Practice Style-B	1
Participant 2	Gaelic	Practice Style-B	1
Participant 3	Netball	Practice Style-B,	2
Participant 4	Softball	Reciprocal Style-C Practice Style-B,	2
Participant 5	Archery	Self-Check Style-D Practice Style-B,	2
Participant 6	Netball	Reciprocal Style-C Practice Style-B	1
Participant 7	Aerobics	Command Style-A, Practice Style-B,	3
Participant 8	Touch football	Divergent Discovery Style-H Practice Style-B	1
Participant 9	Orienteering	Practice Style-B	1

Finally, the fifth most commonly recorded teaching style was the *Self-Check Style-D*. This style was also used by only one teacher, participant 4, who was observed using the style 0.56% of total lesson teaching time observed, or for 8.3 min (25 of the 4465 coded observations). The physical activity that this participant was teaching was softball (classified by the QSPES as *Indirect Interceptive*) (QSA 2004).

Discussion

The finding that Queensland senior secondary PE teachers were predominantly using one teaching style makes it difficult to ignore the incongruence that emerges between the actions observed here and the beliefs expressed on a questionnaire in a related study (SueSee and Edwards 2011). That study included 110 Queensland secondary PE teachers and explored teachers' beliefs about their use of teaching styles. Teachers' responses to the questionnaire indicated that they used a variety of teaching styles "sometimes" or "often" in lessons. which directly contradicts the current observational data revealing a very limited range of teaching styles. This phenomenon was addressed earlier by Mosston and Ashworth (2008), who noted that "research on classroom teaching-learning behaviors indicates that, although teachers believe they use a wide variety of alternative behaviors in the classroom, they are, in fact, significantly uniform in their teaching behavior" (p. 293). This observation is supported by the results of the present study, along with others (Cothran et al. 2005; Curtner-Smith et al.

Table 4 Time participants were observed using styles (part B) and reported usage by participants

Teaching style	*% of time teaching styles were observed from total lessons*	*No. of codings N = 4465*	*Time recorded using this style N = 24 h:48 min:20 s*	*Observed participants who claimed to use this style "here & there– most of the time" (n = 9)*
Command Style-A	3.65%	163	54 min 20 s	7
Practice Style-B	69.87%	3120	17 h 20 min	8
Reciprocal Style-C	2.55%	114	38 min	5
Self-Check Style-D	0.55%	25	8 min 20 s	6
Inclusion Style-E	0%	0	0	6
Guided Discovery Style-F	0%	0	0	3
Convergent Discovery Style-G	0%	0	0	6
Divergent Discovery Style-H	0.78%	35	11 min 40s	7
Learner-Designed Individual Program Style-I	0%	0	0	5
Learner-Initiated Program Style-J	0%	0	0	2
Self-Teaching Style-K	0%	0	0	2
Management	22.57%	1008	5 h 36 min	N/A

Table 5 Teaching styles used in the lessons observed and style as a percentage of lessons observed ($n = 27$)

Teaching Style	Command (A)	Practice (B)	Reciprocal (C)	Self-Check (D)	Divergent Discovery (H)	Management
No. of lessons that included the style	3	27	2	1	1	27
Style as a percentage of all 27 lessons (%)	11	100	7	4	4	100

2001a, b; Jaakkola and Watt 2011; Kulinna and Cothran 2003; SueSee and Edwards 2011; Syrmpas et al. 2016).

This result is similar to the results of an observation of 20 teachers reported by Hasty (1997), who found that the teachers "spent the vast majority of their time using the reproductive style termed 'practice' in Mosston's Spectrum" (p. 69). Kulinna et al. (2000) also found similar results when they examined teachers' experiences using the Spectrum, noting that *Practice Style-B* was reported as the most preferred teaching style.

The second most frequently observed style in the current study was *Command Style-A*, which was used by only one teacher—participant 7. The fact that this participant was teaching aerobics may have been a factor, given the nature of this activity—relying on or valuing synchronicity. Perhaps it adds another perspective when this percentage is presented as only 54 min out of close to 25 h of video-recorded teaching.

Reciprocal Style-C was the third most commonly observed teaching style, and was used by two of the participants during the observations—participants 3 and 5. The physical activities taught by these two participants were netball (classified by the QSPES as *direct interceptive*) and archery (classified by the QSPES as *performance*) (QSA 2004).

The only teaching style from the production cluster that was observed was the *Divergent Discovery Style-H*. Mosston and Ashworth (2008) describe the defining characteristics of the *Divergent Discovery Style-H* as discovering "divergent (multiple) responses to a single question/situation, within a specific cognitive operation" (p. 247). It is important to highlight here that if the students know the answer to the question or have had the opportunity to practice the skill or response before, then it is not *discovery*—it is *memory*. If this is the case, the teaching style used will be from the reproduction cluster (i.e., a style from A–E), as the student cannot discover something that they already know.

No other teaching styles were observed during the 27 recorded lessons, which is in line with earlier claims (Cothran et al. 2005) that teachers are generally uniform in their personal teaching style. Overall, four styles were used from the *reproduction* cluster and one style from the *production* cluster. This is consistent with previously reported findings in other studies (Curtner-Smith et al. 2001a, b; Jaakkola and Watt 2011; Kulinna and Cothran 2003; SueSee and Edwards 2011; Syrmpas et al. 2016), which showed that styles from the reproduction cluster were more commonly used by teachers. From a historical perspective, the results align with the reported use of a dominant "PE Method" (Metzler 2011). Daniel and Bergman-Drewe (1998) described this method as a focus "on basic technical skills or on the accumulation of actions or facts, without taking into consideration the causes, consequences, or relationships involved in these facts or actions" (p. 38). The finding from an earlier study (Cothran et al. 2005) that *Practice Style-B* was reported as either the first or second most frequently used style across seven countries also supports the universal popularity of this style as the "PE Method".

Although the QSPES (2004) requires a range of pedagogical approaches, it seems that even when a mandated curriculum calls for certain "styles" to be used, it has little effect on the styles adopted. The observed use of teaching styles in this study mirrors the findings in studies by Hasty (1997) and Pill (2016), the latter suggesting that "history has shown that a new curriculum document of itself is not sufficient to bring about change as the PE Method still dominates" (Pill 2016, p. 10). It may also be appropriate to consider the effect that assessment has on teaching styles. For example, Thorburn (2007) states that "formal assessment requirements can lead to the prominence of direct teaching approaches and a narrowing of the domain of learning" (p. 172). Others (Hay 2008; Thorburn and Collins 2003) have proposed that pressure from within schools for higher grades has an influence on pedagogical styles. While the role of assessment was not the focus of this research, it is possible that the styles observed were influenced by it, as PE may contribute to a university entrance score for some students.

Students using HOTs and producing new knowledge

A second area of focus of this paper—and which is related to questions 2 and 3 in the introduction—is concerned with whether teachers are using Spectrum styles from the production cluster, which will require students to produce new knowledge and use HOTs as described in the QSPES (QSA 2004). To examine these aspects, one must refer not only to the observational data previously discussed and to information known about the various teaching styles and research findings, but also to the QSPES syllabus general objectives of *acquiring*, *applying*, *evaluating* and *appreciating* (the last

not assessed). The QSPES states that when students undertake learning experiences, these must "comprise a complete process of learning, simultaneously covering all the general objectives … rather than focusing on each objective in isolation" (QSA 2004, p. 5). The QSPES further reinforces this requirement by noting that "learning experiences should not be related to a specific objective but, where possible, should encompass all objectives, extending understanding through an increasing depth of study" (QSA 2004, p. 28). These points suggest that an observer would rarely expect to see lessons where only one general objective is being taught, and that, more commonly, they would see all general objectives being covered. Therefore, it can be reasonably assumed that learning experiences covering all the general objectives will require learners to use HOTs which are commonly associated with teaching styles from the production cluster. However, based on recorded observations of teaching styles, coverage of all the general objectives was not achieved. Participant teachers used a limited range of teaching styles, which would not allow students to achieve this syllabus requirement of covering all general objectives.

As discussed previously, the nine participants employed five teaching styles over 27 lessons. Styles A, B, C and D are all from the group or cluster of teaching styles referred to as the reproduction cluster. In the case of *Command Style-A* and *Practice Style-B*, Mosston and Ashworth (2008) assert that the dominant cognitive operation required for success as a student taught with either of these styles is *memory*. Therefore, *Command Style-A* and *Practice Style-B* do not cover the objective *evaluating* as required by the syllabus. In these styles, the teacher asks the student to either completely *copy or replicate a movement in unison*, starting and stopping when the teacher directs or decides. The only decision the student needs to make is whether to comply or not comply with the request. In the context of *Practice Style-B*, the student is practising a movement over and over, but is also deciding pace, beginning and ending, number and speed.

It could be suggested that *Reciprocal Style-C* requires *evaluating*. For example, one may ask, if one student (S1) is watching or observing another student (S2) and comparing S2's performance to a criterion that has been provided by the teacher (typically on a criteria sheet), and is than being asked to provide feedback to S2, is S1 evaluating? Mosston and Ashworth (2008) suggest that the cognitive operations necessary for this style are "to compare and contrast the doer's work with the criteria, draw conclusions and offer feedback to the doer" (p. 137).

An important point here is the notion that the learner will be drawing conclusions. The QSPES (QSA 2004) states that *evaluating* does involve reaching conclusions. And this is obviously a point of contention. This uncertainty can be attributed in part to the ambiguous nature of cognitive terms given or used in the QSPES). Merely reaching a conclusion by reference to a criteria sheet does not guarantee that the student is *evaluating*. The student may be *evaluating*, but if the teacher has not directed them to do so, then this was not a conscious decision by the teacher, and therefore cannot be claimed as an objective or learning decision that the teacher developed.

On a criteria sheet for practising the forehand in tennis, one criterion might be "makes contact with the ball level with hip". For the observer to reach a conclusion, they will observe the doer → read the criteria → recall the image of the doer from memory → compare the memory image to the criteria description → reach a conclusion → give feedback (e.g., "You hit the ball too far out in front"). There is no value attributed to whether or not it was done. The skill is performed, or it is not performed. The point of contact was level with the hip, or it was not. In this example, the student is not being asked to rate how good or how bad (*evaluating*) the performance was, but only whether the student is reproducing the movement according to the criteria. Mosston and Ashworth (2008) support this argument, suggesting that it is a "misconception that the role of the observer is to evaluate the doer" (p. 133). The same explanation can be applied to *Self-Check Style-D*. The learner will ask the question, "Am I performing the skill as described on the checklist or not?" The student will ask, "Am I doing this movement the way it is described on the criteria sheet?" The answer is a choice: "Yes" or "No". The student is not being asked to compare how well they are doing it or *evaluating* how well they are doing it. The learner is required to simply decide: are they doing it?

Based on the features of the teaching styles observed, it is plausible to suggest that the opportunities for students to use HOTs such as *evaluating* (as defined by the QSPES and thus required to produce new knowledge) are limited or highly improbable. With only one teacher using a style from the production cluster for one moment during the 27 h of video-recorded lessons, it appears that these opportunities were not being provided.

Conclusion

This study has investigated the number, type and level of use of teaching styles (based on the Spectrum) undertaken by teachers of Queensland senior secondary PE. The paper has also explored aspects related to whether the teaching styles used allow for certain syllabus requirements to be met.

The observations and coding of 27 lessons showed that the nine participant teachers were not using a wide range of styles. Although five out of a possible 11 teaching styles (based on the Spectrum) were observed, *Practice Style-B* was used predominantly, and all but one style (*Divergent Discovery Style-H*) came from the *reproduction* cluster. *Practice Style-B*, the dominant style, was observed in all the lessons that were

video-recorded and coded. It was also the only style whose use was reported by all 110 Queensland senior secondary PE teachers in response to a preliminary questionnaire (SueSee and Edwards 2011). This observational data demonstrates that there is a considerable gap between the pedagogical styles used by participants in this study and what the QSPES (2004) document has outlined (or expects).

On its own, without considering the context, it is difficult say whether the use of a particular teaching style is a positive or negative occurrence. It may be claimed that the frequent use of only one style is helpful to students who are competent at using *memory* as the dominant conscious thought process, but probably not very helpful where the use of *discovery* or *creativity*—as aspects of *evaluating*—is required. If the students were asked to recall skills or strategies later for assessment, then this is considered to be a task requiring *memory* (as the conscious thought process), and *Practice Style-B* is completely appropriate. This style, however, does not enable students to meet learning objectives such as "analyse and organise a wide range of physical responses of self and others" (QSA 2004, p. 54) to the same extent as other teaching styles from the Spectrum. Evidently, the process of *evaluating*, as the syllabus document defines it (new or unrehearsed), was not occurring in the physical activity/practical classes observed because of the teaching styles used.

The use of only a small number of teaching styles provides limited opportunities for students to use HOTs and to produce new knowledge (*evaluating*) as described in the QSPES (QSA 2004). Based on the participants observed, Queensland teachers of senior PE need to use a wider range of teaching styles more frequently, as appropriate, to meet syllabus requirements. In light of the observational data, information about teaching styles and related research, and syllabus requirements, the use of a limited number of teaching styles—some for only small amounts of time—raises concerns about whether all the requirements of the PE syllabus are being achieved. This is especially so with regard to the use of HOTs and whether students have the ability to successfully produce new knowledge, as required by the general objective of *evaluating*. Further education of PE teachers regarding teaching styles is necessary to address some of the findings as discussed in this paper. Increasing teacher knowledge of cognitive terms and teaching styles (or pedagogical styles) that require the learner to employ specific cognitive operations could encourage teachers having the knowledge and ability not only to use a greater variety of teaching styles, but also to use appropriate teaching styles to meet the *general objectives* (QSA 2004). Based on the points raised, it is appropriate to argue for teachers to receive information and systemic professional development or training that will assist them in creating learning experiences that require students to apply specific cognitive functions. Teachers need to know how to create appropriate types of episodes.

To expand the range of teaching styles used, Ko et al. (2006) suggest that "more complex PD (professional development) content that requires changes in both teachers pedagogical and subject matter knowledge may require resources that include on-site support in addition to extensive planning materials" (p. 412). The authors support the development of teaching resources for professional development and post-professional development attempts to diversify the choice of teaching styles used to teach PE.

The findings of this study may be evidence of what happens when a syllabus with ill-defined terminology is implemented, and it is presumed that teachers know how to use a variety of teaching styles and have the knowledge required to reflect the *general objectives*. It appears from this research that the pedagogical underpinnings of the QSPES are not being honoured and that the general objectives cannot be adequately met. It is thus reasonable to argue that there is a misalignment between the aims and objectives of the QSPES (QSA 2004) and the teaching styles outlined for implementation within the document. The authors argue that for any syllabus to work, teachers need not only the necessary skills and knowledge about teaching styles and syllabus requirements, but also an environment that supports them in this effort.

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