

Social media as a tool for generating sustained and in-depth insights into sport and exercise practitioners' on-going practices.

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Abstract

The purpose of this paper is to suggest and empirically *illustrate* how social media can be used to generate sustained and in-depth insights into sport and exercise practitioners' on-going practices. This is achieved by discussing the potential for social media in research designs and presenting an analysis of 6 physical education teachers' and a researcher's tweets during a six-year school-based continuous professional development program. Through the use of *empirical illustrations* we suggest that social media promotes interfections i.e. an on-going deliberation between practitioners and researchers facilitated by social media. The key contribution of this paper is the argument that **social media offers researchers the opportunity to** capture sustained and in-depth insights into practitioners and their practices and/or to examine longer-term impacts of programs or interventions. The discussions are relevant to a range of practitioners within sport and exercise pedagogy, with teachers and teaching used as a representative example of this broad field.

Keywords: *Twitter, social media, interviews, reflection, pedagogy, practitioners*

Introduction

In sport and exercise pedagogy² an extensive, international and wide-ranging evidence-base exists about teachers and coaches and their respective practices (Armour and Chambers 2014; Griffiths *et al.*, 2016; Stodter and Cushion 2017). Yet in connecting this body of research with the wider fields of social sciences and education, there are key methodological limitations that constrain our understandings (see Cope *et al.*, 2015; Cordingly *et al.*, 2015; Flinders and Thornton 2014). Much research has been undertaken either as (a) large-scale studies, which have not investigated the in-depth complexities of teaching and/or coaching (Author 2016; Bradley 2009; Day *et al.*, 2007; Knight 2015), and/or (b) as small-scale investigations involving isolated ‘splash-downs’ into teachers’ and coaches’ every-day practices (Bradley 2009; Day *et al.*, 2007; Kirk and Haerens 2014; Knight 2015). As a result, the majority of existing evidence provides ‘zoomed-out maps’ or ‘snapshot views’ of practice (Hargreaves and Goodson, 2006, p. 4). The field has simply ‘peeked’ into the complexities of schools, classrooms and coaching contexts (Bradley 2009; Cope *et al.*, 2015) and there is a lack of longitudinal research that provides in-depth insights and/or accounts of longer-term impact.

Given that the quality of teaching and coaching has a major influence over educational outcomes and wider physical activity and health agendas (see Armour and Chambers 2014; Hattie 2009; Kyriakides *et al.*, 2010) it remains vital that we improve our understandings about teachers and coaches and their practices. A simple solution would be to adopt and use longer-term research designs. Existing longitudinal research, however, highlights that embarking on a sustained methodological approach is extremely costly and time intensive (Cope *et al.*, 2015; Kirk, Oliver and Hastie 2013; Knight 2015). Regardless of

² Armour and Chambers (2014, p. 857) define Sport & Exercise Pedagogy as “a foundational and integrative sub-discipline for those studying to teach, coach or instruct (or even parent) in a wide range of life course sport and exercise settings”.

the capabilities of interviews, questionnaires, reflections or observations to provide in-depth insights (Author 2014c; Burton, Brundett and Jones 2008; Cope *et al.*, 2015), these methods encounter organizational and economic challenges. As such, what is needed is not more of the same i.e. short-duration, one-off research designs, but research that develops new ideas on how to gain robust and sustained insights into teachers and teaching.

Social media has emerged as a powerful platform to generate data from users social interactions (Langlois 2015; Karatzogianni 2015; Papacharissi, 2015). Given that evidence suggests that practitioners in sport and exercise pedagogy are regularly posting to social media sites and exchanging pictures, resources, and information about their practice (Risser 2013; Sie et al. 2013; Straubhaar, 2015; Wesley, 2013), social media could act as a kind of user-generated archive of on-going practice. While Internet-based methods have existed for a number of decades (Jansen, Stoyanov, Ferarri, Punie and Pannekeet, 2013; Karaca, Can and Yildirim 2013), many agree that it is important that we acknowledge the methodological potential of social media to generate new and different types of insights (see Baker 2012; Housley, Williams, Williams and Edwards, 2013; Procter, Viss and Voss 2012). Indeed, Internet developments have been acknowledged as providing new and exciting frontiers for social research that can expand the researcher's toolkit (Beneito-Montagut, 2011; Hookway, 2008). Research that begins to examine how social media can be used to generate insights into teachers' and coaches' practices could make valuable contributions to the conduct of longitudinal qualitative research.

The purpose of this paper is to suggest and empirically *illustrate* how social media can be used to generate sustained and in-depth insights into sport and exercise practitioners' on-going practices. This is achieved by discussing the potential for social media in research designs and presenting an analysis of 6 physical education teachers' and a researcher's tweets during a six-year school-based continuous professional development (CPD) program. The

analysis is used to demonstrate that social media can provide a *valuable source of data*, data that can be used to *answer particular questions* within longitudinal research designs and/or data that can be used to examine *longer-term impacts*. The data presented in this paper, illustrates particular questions about, (i) teachers' changing practices, (ii) teacher professional growth, and (iii) and the sustainability of particular practices and/or beliefs. The analysis does not attempt to draw extensive conclusions from the empirical data on the CPD program, or deal with the methodological and ethical complexity of using social media as a research tool. Such details can be accessed in Author (2017, 2016, 2014). These papers show (i) how posts to Twitter and Facebook supported the development of a community of practice, thus acting as a powerful CPD mechanism (Author, 2016, 2014), and (ii) the challenges associated with maintaining teacher anonymity when using social media in research designs (Author, 2017). The key contribution of this paper is instead the illustration of the different types of data that can be generated from social media. Further, and in order for rich rigor, the illustrations exemplify how robust insights are generated when data from social media is connected to data gathered from within the physical context, for example, interviews, observations. These discussions are relevant to a range of reserachers and practitioners within sport and exercise pedagogy, with teachers and teaching used as a representative example of this broad field.

The paper is organised into four sections. In the first two sections we discuss, (i) the analytical focus developed for exploring teachers' tweets and (ii) the feasibility of using social media as a data source. These first two sections encapsulate our 'thinking behind the method' and the key empirical and methodological drivers for this paper. In the third theme, we provide a presentation of the analysis. Fourth, we discuss some insights and challenges we have encountered when using social media in qualitative research design, followed by a conclusion of the paper.

Analytical Focus for the illustration

Teachers' changing practices, teacher professional growth, and the sustainability of particular practices and/or beliefs have emerged in educational policy and research as three important characteristics used to describe and promote the development of effective teachers and teaching (Armour *et al.*, 2015; Fullan 2015; Hattie 2012, 2009). Due to a lack of longitudinal research, robust and sustained insights into these characteristics are limited (Hargreaves and Fullan 2012; Fullan 2013), particularly in the fields researching physical education (Kirk and Haerens 2014). Consequently, the analytical focus for the illustration in this paper was (i) teachers changing practices, (ii) professional growth, and (iii) sustainability of particular practices and beliefs. A brief overview of these characteristics is now provided.

Teachers Changing Practices

Teacher change may be represented by three components; (i) the use of different teaching materials (instructional resources such as curriculum materials, standards or technologies), (ii) the adoption of novel teaching approaches (i.e., new pedagogies, especially learning partnerships with students) and, (iii) the emergence of new beliefs about a particular practice and/or educational situation (e.g., pedagogical assumptions and theories underlying particular new policies or programs) (Fullan, 2015). Practical and emotional/personal differences, alongside the local context, personal beliefs, students, and teacher training, are factors influence teacher change (Day *et al.*, 2007; Polikoff 2013; Voogt *et al.*, 2011). As a result, teacher change is not simple, smooth, or one-directional. Cook (2009) described teacher change as being a 'messy process' where teachers go backwards and forwards between old and new practices/beliefs before they change their materials, pedagogy and beliefs.

Professional Growth

Professional growth refers to the process of constant reconstruction of experiences (Armour *et al.*, 2015). Being a teacher is, therefore, an on-going process and it does not

involve changing practice towards fixed standards that are outside of the educational processes. Armour et al. (2015) argue that teacher professional growth represents ‘an appetite and aptitude for and engagement in further learning’ (p. 9). Critical features of teacher professional growth include; (i) conditions which ensure growth, (ii) recognition of the active role of teachers as learners, and (iii) understanding the process of growth in terms of difficulties to be overcome by reflective intelligent action (Armour et al., 2015).

Sustainability

Sustainability of particular practices and/or beliefs can be conceptualised as a time point when change gets built into the school system and when a belief or practice becomes an on-going part of teachers’ routines (Fullan 2007, 2015). Sustainability is characterized by the mechanisms that have supported teachers to uphold a practice and/or belief; for example, CPD and/or the school context (Groundwater-Smith *et al.*, 2014; Mockler 2013; Kemmis *et al.*, 2014), good leadership, teachers’ professional roles, and the chance to practise and share expertise. While the time point for understanding sustainability may vary, it has been reported to occur three years after teachers have initiated change or change was imposed on them (Fullan 2015; Knight 2015). Interpreting sustainability, however, is a complex task. Fullan (2015) argues that while a teacher may uphold a particular practice or belief, this may exist in a varied form from the original.

Discussions around teachers’ changing practices, professional growth and sustainability of particular practices and/or beliefs accordingly exemplify that sustained and in-depth insights into teachers and teaching are required in order to generate robust evidence on the professional lives of teachers and the complexities of their teaching. Qualitative methods and tools that can track how teachers change, and how and what they learn and sustain, would provide new understandings on the mechanisms that can support teachers to

have optimal positive impact on students. Our analytical questions that formed the focus of the argument and illustration of this paper were:

- How can social media be used to provide interpretations on changing practice(s)?
- How can social media be used to provide interpretations on professional growth?
- How can social media be used to provide interpretations on sustainability?

The feasibility of social media to answer the analytical questions

In this section, the feasibility of social media to answer our analytical questions is explored. This is achieved by exploring the functionality of social media, how teachers currently use social media, and the ways in which social media has been used within research designs.

The functionality of social media

Social media is an online tool where users interact with other online users to consume and produce content (Krukta and Carpenter 2016). Examples of social media include social networking sites (e.g., Facebook, SnapChat), wikis (e.g. wikispaces), media sharing services (e.g. YouTube), blogging sites (e.g. Blogger or wordpress), micro-blogging services (e.g. Twitter), social bookmarking (e.g. pinterest), bibliographic management tools (e.g. Zotero), and presentation sharing tools (e.g. Slideshare) (Faizi *et al.*, 2013; Greenhow and Lewin 2016; Manca and Ranieri 2016). Although varying types of social media exist, Greenhow and Lewin (2016) identify that these online spaces share common features. The use of a social media site, typically, involves users developing a profile. A profile often displays personal information (social media name, picture, and biographic information), and users upload photos, videos or text-based message, and posts of others they have ‘liked’ or shared. Interactions occur when users share or ‘like’ the posts of others or when they comment or message another user. Users of social media can access the uploads of others through news

feeds, message boards, pages or by viewing individuals' profile pages directly. Social media extends the passive nature of old media (e.g. television, magazines) (Wright & Hulse, 2014). Consequently, the varying ways in which social media can be used demonstrates that social media is an online space that promotes and relies on user-generated content (Brown, Czerniewicz and Noakes 2016; Selwyn 2014).

While Papacharissi (2015, p.1) asked us to remember that 'all media are social' and that 'we have always been social', social media is particularly unique as it facilitates mass socialisation of online interactions. Extending capabilities of, for example, using emails as a qualitative method of inquiry (James 2007), social media offers one-to-one, many-to-many, many-to-one, asynchronous, synchronous, direct and indirect forms of interaction (Anderson and Dron 2014; Jensen 2015). The access to multiple sources of information, the ability to interact with multiple people in diverse ways, and the openly shared nature of communication makes social media a powerful communication tool (Jensen 2015; Papacharissi 2015).

The use of social media by teachers

In education contexts, teachers have used social media as a communication tool with learners. Teachers have created social, active and conversational environments where learners have been shown to reflect, inquire, critique, question, and engage in critical debates about specific issues or content (Fiaz *et al.*, 2013; Lebel and Mille 2014). In reviewing the evidence-base on social media use by teachers, Greenhow and Lewin (2016, p.16) summarised that:

Social media has been used in education for managing group work (finding partners, forming groups, sharing tasks), generating ideas, communication with peers and teachers (group discussion, asking questions, receiving feedback), sharing information, resources and links, documenting and communicating progress

(sometimes to audiences beyond the classroom), sharing project outcomes such as presentations, assessment and evaluation (peer, teacher).

The use of social media by teachers is not limited to interactions with learners. Teachers have been reported to regularly post and exchange pictures, resources, and information about their practice on social media sites (Risser 2013; Sie *et al.*, 2013; Wesley 2013). Equally, social media is emerging as a powerful platform for CPD, where teachers engage in dialogue with researchers and practitioners to learn, develop, and change their practices (Author, 2014; Carpenter & Krukta, 2014).

The uses of social media by teachers illustrate how social media could be used to generate sustained and in-depth insights into teachers and their teaching. The forms of interaction could be applied by researchers to extend what teachers are already sharing through social media and to prompt teachers to share specific information. For example, the many-to-many forms of communication (Anderson and Dron 2014; Jenson 2015) and the promotion of group discussions suggests that focus group interviews could be a possibility. The idea of interviews also seems possible since teachers and students are reported to ask questions through social media that, in turn, prompt reflection and inquiry (Author 2015b; Ranieri *et al.*, 2012; Risser 2013; Wesley 2013). Further, and given that teachers are tweeting about their teaching, the extraction and sampling of teachers' posts could act a kind of user-generated archive of on-going practices as they happen in real time (Author 2014b, 2013; Carlén and Maivorsdotter 2017).

The use of social media within research designs

Limited evidence exists on how social media has been used as a participatory, qualitative research tool. Social media has predominantly been used as a space to extract 'big data' (Langlois 2015; Karatzogianni 2015). For example, social media has been used to explore wider societal issues, and perceptions of, and actions within, the London Riots (Baker, 2012;

Procter, et al., 2013), the Fukushima nuclear disaster (Utz, Shultz and Glocka 2013) or business, advertising or political campaigns (Langlois 2015). Yet, as Housley et al. (2013, p.173-174) suggested, although ‘this media provides a wealth of opportunities for gathering and analysing significant amounts of user-generated content’, understandings of the context and why individuals make particular posts is limited (Dutton 2013). Dutton (2013, p.182) argued that ‘digital traces, whether a singular tweet or even large collections of data, cannot be interpreted without understanding their social context’. In addition, Karatzogianni (2015) cautioned against the sampling of, for example, a Facebook timeline or Twitter feed for providing ‘pre-packaged views’ on a specific issue. Karatzogianni (2015) argued that we must be mindful of the subjective, biased and fragmented nature of extrapolating ‘big data’ from social media.

In order to interpret the context and meaning of posts, Dutton (2013) suggested that researchers should look beyond the sources of information gathered from social media and explore the relationship of posts to particular events. Moreover, and specific to exploring teachers and teaching, participatory approaches that see participants constructing understandings together need to be further explored to provide in-depth and authentic interpretations of events (Langlois 2015). As Langlois (2015, p.1) suggested, however, ‘the marginalization of critical research into social media platforms raises crucial issues about the capacity to develop democratic and truly participatory forms of knowledge creation’.

A sustained and in-depth insight into teachers and teaching

The aim of this section is to illustrate how social media can be used to generate sustained and in-depth insights into teachers and teaching. First, a brief outline of data generation is discussed. Second, the phases of organising the data are presented. Third, empirical illustrations of teachers’ changing practices, teachers’ professional growth and the sustainability of particular practices and/or beliefs are provided.

Data Generation

The empirical illustrations are drawn from a longitudinal research project (currently concluding its sixth year) exploring physical education teachers' engagement with a sustained school-based CPD program. The focus of the program is an analysis of the adoption of the Cooperative Learning (CL) approach by teachers in one physical education department. The CPD program involved participatory action research and frequent interaction/support from a researcher/CPD facilitator (referred to as facilitator from this point forwards). As we have reported elsewhere (See Author 2014a), social media emerged, unexpectedly, as a high-functioning platform for CPD and interactions between teachers and the facilitator.

Data generation in the project involved video-recorded lessons, teacher interviews, facilitator field journal entries and posts made to Twitter. Additional ethical approval was gained to gather Twitter data and teachers provided informed consent. Further details on the ethical processes can be seen in Author (2017).

Organisation of Data

In this paper, analysis took place on data that were gathered over a two-year period from Twitter. Data were extracted using the Twitionmy application³. To engage with an analysis, three phases of data organisation took place.

Phase 1: Reorganisation of Data

The first phase of involved reorganising the data to place each teacher's posts and the facilitator's posts onto a timeline in a single Excel document. In this process of reorganization it was observed that posts were either singular (i.e. involved no reply from others) or involved interaction from others, most frequently (although not exclusively) with the facilitator. Posts that involved interactions were grouped into conversations (i.e. posts that involved a reply and/or occurred on different days) where applicable.

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Phase 2: Coding

The analytical process was framed by the three questions (as previously identified):

- How can social media be used to provide interpretations on changing practice(s)?
- How can social media be used to provide interpretations on professional growth?
- How can social media be used to provide interpretations on sustainability?

Similar to Procter et al. (2011) and Risser (2013) a code framework was used to interpret the content of tweets. The development of the code framework initially involved the first and second authors identifying and describing key behaviours or interactions that represented changing practice, professional growth, and sustainability, and placing these into a table. To ensure this process was robust and could provide credible and generalizable interpretations (Sparkes & Smith, 2013; Smith & McGannon, 2017), the authors drew on international literature (as stated in earlier sections of the paper) in education, and sport and exercise pedagogy. The code framework, however, was created using more than research literature. To strengthen credibility, rich rigor, authenticity, the expression of reality, and aesthetic merit, data generated from the wider study (see Author, 2016, 2014) and the first author's extensive involvement in the study (over 5 years) and the school context (7 years) informed the construction of the behaviours and interactions. Following this process, the third author, who was external to the research context, reviewed and offered an ongoing critique of the behaviours and interactions. Subsequently, a descriptive framework was created for the tweets to be coded by (i) change, (ii) growth or (iii) sustainability.

Phase 3: Social Context

In acknowledging Dutton's (2013) argument that an understanding of the social context is required to interpret posts made to social media, the data from social media were intersected

with data generated from video-recorded lessons, interviews and the facilitator's field journal. The time and date of the posts were cross-referenced with dates and times of the other data sources. Descriptive narratives of the context and events were then aligned to tweets and these data have been included in our empirical examples.

Empirical Illustrations

This section provides empirical illustrations emerging from the organisation of data on: *teachers' changing practices, professional growth and sustainability of particular practices and/or beliefs*. The illustrations are the 'best' examples selected by the authors. Against this contextual backdrop, quality and validity measures were not based on the coherence and reliability of thematic interpretations of the data. As such, a level of author bias and selectivity is acknowledged given that the approach is highly deductive. In terms of selectivity, the empirical illustrations do not not represent all of the wider understandings from the coded data sets on change, growth, and sustainability. Despite these methodological limitations, the following characteristics are positioned as measures of quality and validity: for worthiness of the topic; the significant contribution of the work; credibility, through the time the facilitator spent with the teachers, alongside deliberation between the three authors on the illustrations that provide the best examples of, changing practices, growth and sustainability; transparency, on-going dialogue between the authors throughout the conceptualisation and writing of this paper (Burke 2016; Smith & Caddick 2012).

Following ethical guidelines, pseudonyms have been provided for teachers' names and Twitter handles. Tweets have not been anonymised but teachers have provided consent for these tweets to be published *verbatim* in the reporting of this paper (further details can be found in Author (2017)).

Teachers' changing practices

It is our intent in this illustration to present data that address Fullan's (2015) key characteristics of teachers' changing practices: (i) the use of different teaching materials, (ii) the adoption of novel teaching approaches and, (iii) the emergence of new beliefs about a particular practice and/or educational situation. We do this by presenting interactions between a teacher, 'Kelly', and the facilitator, drawn from Twitter posts and subsequent discussions in the school context over an 8-month period (October-May). The facilitator was the first author, who provided CPD support in the school context (through workshops, formal and informal group/individual discussions and lesson observations) and through social media, while generating data on teachers' practices as part of a participatory action research design (for further details see Author, 2017, 2014). In this sense, the facilitator was deeply embedded within the process of change. The following illustration is an example of how interactions between the facilitator and Kelly on social media supported the teacher to change her practice. As reported elsewhere, however, social media was not used as a standalone CPD tool and sustained school-based support that was both online and face-to-face supported the teachers to change, learn, and sustain their practices (Author, 2017, 2014).

In this illustration we start with a tweet where Kelly asked for ideas about how to develop a lesson on heart rate. Following this, interactions between Kelly and the boundary spanner on Twitter over a three-week period are used to demonstrate how Kelly began using CL in her PE-examination classes. Specifically, the tweet posts that contain 'took the dive today' 'using iPod touches' and 'this is new!!!' illustrate that Kelly had used different teaching materials and had adopted a novel approach to her teaching. These understandings came about when Kelly asked the facilitator a question, the question was answered, Kelly shared details of her practice with the facilitator and the facilitator asked Kelly questions for clarification or elaboration:

Kelly: Thinking of doing heart rate for a lesson obs [observation] ⁴anyone got any innovative ideas how to do it #pegeeks #PhysEd

Facilitator: collective score circuit- how does each team member's [points] vary based on their contribution to the group goal they set themselves (23.10.12 Twitter)

Kelly: cheers :) took the dive today did CL in gcse [examination physical education] with my [year] 9s today- created some random roles

Facilitator: awesome sounds great...go ok? was it harder doing it in theory [examination physical education]?

Kelly: pupils tend to ask more qs [questions] as they feel dont know the answers.

Think I'm going to do a jigsaw one for my obs [observation] on heart rate

Facilitator: that's interesting so u have to facilitate more... catch up when I am next in (Twitter 24.10.12)

Facilitator: have u had that CL lesson yet? how did it go?

Kelly: did one today on the respiratory system (Twitter 7.11.12)

Facilitator: awesome sounds great. Good luck with the obs

Kelly: I think everything is sorted for it using iPod touches too....

Facilitator: oh wow CL, technology, exam PE and observation - this is new!!! (Twitter 8.11.12)

Kelly: got an outstanding⁵ :)

Facilitator: awesome news nice one- was the feedback good

Kelly: feedback from James [head of department] was brilliant

Facilitator: awesome can't wait to hear about it (Twitter 14.11.12)

Interactions between Kelly and the facilitator continued through Twitter for the rest of the week. In the following posts, the facilitator is seen encouraging Kelly to engage with a

⁴ Explanations for the abbreviations used in tweets have been provided throughout the empirical illustrations.

⁵ Outstanding is the highest grade given to teachers following lesson observations in UK schools. Grades are based on the quality of teaching and a progression in student learning.

Twitter chat (i.e. #pechat) by asking her a question about her lessons. From this initial question, Kelly began to share her beliefs about the lesson and her practices of CL.

Facilitator: Kelly: we are talking apps in #pechat how did your lesson go last week using them in Jigsaw⁶

Kelly: the use of apps massively engaged my gcse group and all were excited about using them it aided motivation and learning #pechat

Facilitator: used Jigsaw within CL too to structure the lesson - 'prevents them being an add-on' #pechat

Kelly: the lesson needs to be directly linked to them also otherwise the students can get away with not using them #pechat (19.11.12 Twitter)

Further contextual understanding of Kelly's changing practice is gained from face-to-face interviews with the facilitator. Firstly, the facilitator asked 'Joey', the observer in Kelly's 'lesson obs', about his perception of Kelly's lesson. Second, the facilitator used her understandings from both the tweet discussions and her interview with Joey to prompt Kelly to further discuss her practice. The extracts of interview data below illustrate how Kelly had used different teaching materials, the perceived impact of her practice on student learning and her new beliefs about her teaching of examination physical education through the use of technology and CL.

Facilitator: So Kelly's outstanding lesson you watched?

Joey: ... she loaded up loads of different apps [mobile applications] and basically used them as different resources. It was absolutely quality, students were all engaged and they all showed significant progress in their understanding of the respiratory system.... (Interview, 16.11.12)

⁶ Jigsaw is an approach to using Cooperative Learning

Facilitator: So your lesson of theory [examination physical education] went well....Joey just said it went well, so was it Apps [applications] and Jigsaw

Kelly: yeah...it makes things so much easier because the content that the kids start discussing without even having to prompt them, because everything is already there for them and coz then like what I am going to do with them, is because they have done the respiratory system now and then they have done circulatory, I'll create a booklet now for each group and then from their booklets they will be in their home teams feeding back to each other for the next kind of like two lessons and then I'll set them like a group test to see if it has had any kind of impact..... (Interview, 16.11.12)

Six months later, in the same academic year, we are see further illustrations of Kelly's changing practices by exploring posts she made to Twitter and the questions the facilitator asked her. Below is an example of how Kelly continued to use technology and apps – iPods and comiclfe – in the design of resources for her students. Kelly further adapted her teaching approach when moving from using the Jigsaw structure of CL to Numbered Heads (see Author 2016).

Kelly: each team had an iPod with the memo then when they were confident they knew them they ticked them off and I 1/2

Kelly: randomly selected the numbered heads and questioned their understanding - all done as a comp [competition] for points

Facilitator: how much facilitation was involved...could they do it independent from the voice memo then you extend?

Kelly: I could have pushed it and had each task explanation on a memo. (Twitter, 22.5.2013).

This illustration demonstrates that key understandings of a teacher's changing practices were generated from interactions that occur through both social media and in the

school context. Interactions on social media involved both the sharing of ideas and a facilitator's questions and prompts to the teacher. Moreover, a researcher can use information generated from social media to inform further data generation in the school context to further develop detailed insights into teaching materials, the adoption of new approaches and teacher beliefs.

Teachers' professional growth

Critical features of teacher professional growth include, (i) conditions which ensure growth, (ii) the active role of teachers as learners, and (iii) the process of growth in terms of difficulties to be overcome by reflective intelligent action (Armour et al., 2015). Empirical illustrations of these three critical features were provided in the previous section. It was shown, for example, that Kelly was supported to change her practice through discussions with the facilitator through Twitter (i.e. conditions), how Kelly sought advice for her practice through Twitter (i.e. active learner) and how Kelly engaged in an on-going process of changing her practice through considering the impact on student learning (i.e. reflective intelligent action). It is our intent in this section to further illustrate how social media can be used to generate data related to when key moments of teacher professional growth occur. We do this by demonstrating how posts to social media can be intersected with data generated from field journals and interviews. In doing so, critical features of teacher growth could be tracked; the collegial practices of a department, the active role of teachers as learners, and reflective intelligent action.

In the following Twitter post, 'Heidi' told the facilitator (and her twitter followers) that the department had recorded a group meeting where they shared 'good practice'. In responding, the facilitator asked if anything significant or important was discussed. Heidi suggested that two members of the department, 'James' and 'David', were sharing resources.

The following Twitter interaction illustrates how conditions for teacher professional growth existed in the department through the teachers' support of each other's practices.

Heidi: we recorded a part of dept [department] meeting tonight either sharing good practice or talking about our current units

Facilitator: awesome will catch that tomorrow - anything interesting??

Heidi: I think David and James are sharing resources this term. Also David showed what he had done to share resources for the future!! (17.4.12)

The significance of this interaction becomes evident when it was intersected with data generated within the school context. Below, the facilitator's field notes provide insight into how the tweet conversation represented the first time (as far as she knew) that the teachers had shared information about their practice when the facilitator was not present.

This was one of the first times the department has scheduled time in the meeting and have chosen to speak about CL on their own rather than it being enforced from me...They went around and shared what they had done in the past and what they had planned to do. Although I was surprised that none of them asked questions to each other or challenged each other's units they just listened to what each other had to say. (20.4.12 Field Journal).

Evidence of the act of sharing resources and practices was also evident in teacher interviews. The interview in the school context below shows how David and James, who were identified in the original tweet, continued to share resources. The transcript from David's interview also illustrates how he sought further advice and how he moved from accepting the practices of others (as seen in the field journal) to critically reflecting on and adapting the practices of others to design effective learning experiences for his students.

David: [whilst pointing at a resource card] Well team relays by nature is a team one [event] so they only had two times [for each practice] so one was like 57 seconds [for one relay]... we will see how it goes when it comes to it

James; we are sharing resources...

David: well I have actually adapted his score card, well he didn't have room for a team improvement score so I have adapted Joey's. I had an individual process so yeah. I told them yesterday that they would be doing shot put

Facilitator: Have they got the coaching cards to learn in between?

David: I have sought advice from Claire and James and this is where I was a bit of cross roads actually because I said is it teaching cards and they said no you're allowed to demo so that is the route that I have gone... (May 2012, Interview)

From the illustrations provided in this section, we argue that social media can be used to track teacher professional growth by intersecting posts made to social media with other gathered data. Through this approach, we were able to identify key moments when and in what way (i.e. conditions) a change in teacher professional growth may have begun to emerge. In addition, throughout this section, the teachers' changing practices section and the discussions about sustainability that follow, the illustrations identify the facilitator as an important condition for growth. The facilitator's questioning through social media prompted teachers to continuously reflect, inquire, and develop their practices because there was a two-way exchange of ideas about practice. Social media was, therefore, also a key platform for understanding and supporting teacher professional growth.

Sustainability of particular practices and/or beliefs

Sustainability is characterized by the mechanisms that have supported teachers to uphold a practice or belief. Such mechanisms are often related to CPD and/or the school context (Groundwater-Smith *et al.*, 2014; Mockler 2013; Kemmis *et al.*, 2014). Sustainability can be

conceptualised as a time point when change gets built into the school system and when a belief or practice becomes an on-going part of teachers' routines (Fullan 2015, 2007). In this section we will provide a series of tweet interactions to illustrate how evidence of the CPD and school-based mechanisms that support teachers to sustain a practice can be gathered from social media. Similar to the discussions in the teacher professional growth section, we add to the data presented to illustrate teachers changing practices by showing how sustainability of practices or beliefs can be tracked.

We observed, in the following three tweets, how James shared with the facilitator the department's decision to construct shared schemes of work, plan for CPD within the department and devise plans to embed the CL innovation into the whole school curriculum. These tweets are, therefore, illustrative of the school-based and CPD mechanisms that support sustainability.

James: Just writing our first CL SOW [schemes of work] for games making activities.

James: you'll be pleased to hear that CL CPD is scheduled in two weeks on the calendar.

James: there is also a plan to implement CL across the curriculum. :)

Facilitator: sounds great can't wait to hear all about it... (4.9.12, Twitter)

Later in the year, Twitter provided further evidence that the department had engaged with CPD. James shared his perceptions of the CPD when the department had the 'go ahead' to embed CL into the whole school curriculum.

James: Today the P.E team got the go ahead to run whole school CPD throughout the school year on CL #PEChat #pegeeks cont...

James: With the support of @Author we'll create a sustainable learning model for the whole school driven by the P.E dept #PEChat #pegeeks (6.11.12, Twitter)

James: A successful, PE led, CL CPD session with our Cross curricular buddies. In prep of whole school CPD #PEChat (15.11.13, Twitter)

More specific details on how the department were building CL into the school system became evident through the facilitator's Twitter-based interactions with the departmental Twitter account. The interaction below shows how the department shared pictures of some of the changes to teaching and learning that had occurred in the school. The facilitator's questions encouraged the department to further elaborate on the CPD and school-based mechanisms that were supporting the sustainability of the CL initiative.

Department: Comic on how CL started to its current position in our school #pegeeks #ukedchat #edchat #CPD [link to picture removed]

Facilitator: This is brilliant, are there briefings tomorrow?

Department: we have also made comics for each non negotiable and main cl structures

Department: briefings are happening again tomorrow with our buddy dept

Facilitator: oh wow can't wait to see them what a useful resource for everyone :-)

Department: they've gone up on a cl board in the corridors and are being laminated for all staff to put in their teaching areas (13.2.13, Twitter)

In moving beyond the school-based and CPD mechanisms that support sustainability it is also important to acknowledge that practices of a curriculum that are sustained are often difficult to track since they may exist in different forms as teachers use them over time (Fullan 2015). Interactions that occurred on Twitter, however, generated an understanding that the way in which CL was used was beginning to change. This is illustrated when Kelly sharing the context of her lesson with the facilitator and the facilitator asking clarification questions about Kelly's approach. It can be seen from the conversation below that the facilitator's questions enabled Kelly to explain her approach to CL prior to the facilitator's

visit to the school. This, inevitably, prepared the facilitator to look for specific things during her next observation of Kelly's lesson.

Facilitator: Hey Kelly I take it the lessons are still disrupted due to snow...weather permitting can I come see yours next thurs?

Kelly: yeh they should have started their sports leaders' sessions where they are leading each other for 15mins so fingers crossed

Facilitator: oh cool is it learning teams then?

Kelly: it is but 1 learning team is leading the whole group then the gp is based on a critique

Facilitator: oh ok so is one learning team teaching the others through CL being ur role as a facilitator?

Kelly: Yeh that's right - they all have to lead an hour in total so doing small 15 min chunks hopefully cl will have prepped them well

Facilitator: oh I get it so its the transfer of CL you're looking at not u delivering an actual CL lesson?

Kelly: In part it still has elements of cl but not complete

Facilitator: ok cool would b interested to see...see u next week then hopefully
(23.1.13, Twitter).

The illustrations of sustainability in this section have shown how social media can be used to track understandings of the changing school-based and CPD mechanisms that have supported a particular new practice to be sustained. Moreover, social media can be used to interpret how a practice has been adapted following its longer-term use. Interactions that occurred on Twitter that generated these types of understandings included teachers sharing school and departmental practices and the facilitator asking questions of teachers through Twitter.

Insights into using social media in qualitative research designs

Social media provided the teachers and the facilitator with a space, external to the school site, in which to communicate. Interactions on social media involved the sharing of ideas by teachers and questions and prompts from the facilitator. Questions and prompts from the facilitator encouraged teachers to reflect, inquire, and develop their practices; especially where there was a two-way exchange of ideas. In-depth insights were generated when interactions on social media were connected to face-to-face forms of inquiry. Interactions on social media, (a) informed subsequent data gathering in the school context, and/or (b) were intersected with data generated in the school context over time to track and provide a detailed picture of change, growth, and sustainability. The on-going interactions between the teachers and facilitator, therefore, illustrate how social media can be used in qualitative research designs to provide in-depth and sustained insights into teachers and teaching.

The capacity of social media to facilitate on-going interactions adds to our understandings of the methodological potential of social media in qualitative research. Social media has been used elsewhere to generate significant amounts of user-generated content to explore wider societal issues (see Baker 2012; Housley *et al.*, 2013). While wide-scale data extraction provides big data and a timeline of key events, there are clear limitations. Data can be subjective, biased and fragmented (Karatzogianni 2015) and an understanding of the context and why a user has made a particular post is limited (Dutton 2013). In advancing the field of social media research, this paper has demonstrated the value of routinely embedding social media material with other forms of inquiry. The illustrations showed that social media is a medium through which researchers and teachers can initiate and engage in conversations that can be continued in the school context. Equally, teachers and researchers can use social media to continue discussions that began in the school context. In this way, and as Beneito-Montagut (2011) highlight, the offline and online aspects of people's lives do

not have to be viewed separately. Indeed, Benito-Montagut (2011) suggests that interactions quite often begin online before then passing on to face-to-face conversation, which was something evident in our illustrations. Thus, social media should not be seen as a single entity or as a process where messages, comments and tweets can be triangulated with other sources of data for the sake of analysis. Instead, and in an effort to account for the complex and messy realities of teachers and their teaching, additional data generated from further questions, prompts, discussions and reflections in the school context are often required.

In considering the methodological process in which social media was used, we suggest the concept of ‘interflection’ as a way to understand the particular deliberation going on in social media. The term interflection, builds upon Pompa (2004) and Tabuenca-Cuevas et al.’s. (2012) understanding that interflection is a conversation that encompasses a combination of self and collaborative reflection in an online space. Extending this understanding, interflection can be thought of as an on-going deliberation between practitioners and researchers that is facilitated by social media. ‘Inter’ highlights the two-way process of dialogue and the use of questions and prompts by a researcher (similar to an interview). ‘Flection’ relates to the meeting point and represents the two-way exchange of ideas that potentially occurs at this rendezvous. Taken together the terms inter and flection - hence interflection - are used to demonstrate how teachers’ reflections are developed over time, and possibly taken to a deeper level, when deliberation and the understanding of another (e.g., a researcher or other teachers) is brought to bear on the situation. In the process of co-constructing new understandings, and similar to face-to-face methods of inquiry (see Brunton *et al.*, 2008) and CPD facilitation (see Author, 2016, 2014), the researcher should be responsive to participants, replying to tweets, messages or discussions in the school context in a supportive and open-ended inquiry-driven manner that encourages participants to express their own interpretations of events. Subsequently, in-depth interpretations about practitioners

and their practices can be generated from a process of continuous dialogue that occurs in the school context together with communication through social media.

Limitations and Challenges in using social media in qualitative research designs

Despite illustrating that social media can be used to generate sustained and in-depth insights into practitioners and their practices, there are a number of limitations in this paper. The first limitation is related to the sample size. The empirical illustrations were drawn from six teachers in one school. In turn, researchers should not assume that all practitioners are prepared to be current or future users of social media simply because the six teachers represented in the illustrations are. Researchers should acknowledge the ‘digital divide’, differing levels of digital literacy, accessibility, and individuals’ personal desire to use social media, as some of a handful of factors that may influence differing uses of social media. Future research should explore a range of practitioners in sport and exercise pedagogy to further identify the feasibility of social media in research designs.

A second limitation concerns the singular social media site explored in this paper. In this paper practitioners uses of social media were narrowly related to and illustrated through one site, Twitter. Given that different social media sites have different functions new challenges may exist when social media is used within research designs. On a related point, practitioners may not sustain their engagement with the same social media site. In deciding to use social media in longitudinal research, researchers may be required to change and adapt the sites they use to generate data.

A key methodological challenge relates to ensuring that professional dialogue and the use of social media does not become oppressive. Twitter was an additional space for the teachers and researchers to engage with discussions, that was not a formal component of their professions. Although social media has been illustrated as a feasible space for research, there is a need to not overburden teachers and/or researchers with additional work, ensuring an

appropriate work-life-balance. As we have reported elsewhere (see Author, 2014), not all teachers are willing or able to engage with social media. Engagement with social media should be voluntary and not a condition of a wider research design or CPD program. Further, and given that not all teachers will engage with social media, researchers should acknowledge that their use of social media for research may provide narrow and selective interpretations within sport and exercise pedagogy.

The final methodological challenge is associated with the validity of information that is shared by practitioners through social media. In particular, and drawing on Cook (2009) there is a need to acknowledge that teacher change, is a ‘messy process’. Teachers go backwards and forwards between old and new practices/beliefs before they change their materials, pedagogy and beliefs (Cook, 2009). Capturing such mess through social media can be problematic. For example, the empirical illustrations demonstrated that social media posts teachers make were mostly positive. Similar to Author et al. (2014), the teachers portrayed themselves as star performers. In turn, capturing potential mess that encapsulates struggles and challenges associated with change is likely to be problematic.

Conclusion

The aim of this paper was to suggest and empirically *illustrate* how social media can be used to generate sustained and in-depth insights into sport and exercise practitioners’ on-going practices. The presentation of the empirical illustration in this paper, showed that social media can be used to answer particular questions within longitudinal research designs. This paper focussed on analytical questions related to teachers’ changing practices, teacher professional growth, and the sustainability of particular practices and/or beliefs. Empirical illustrations were used to demonstrate how social media can be employed on a smaller scale, and within qualitative research designs, to provide in-depth insights into the work of sport and exercise pedagogy practitioners. Social media allows for a public debate of ideas to occur

both inside and outside of formal sport and exercise contexts. The public, in this paper, was often inter-teacher conversations in the school context or through public tweets. Social media, therefore, served as a conduit for ongoing public debate where ideas were deliberated and shared publically so as at least to invite a response. Through this lens, social media extends the capabilities of other digital tools – e.g., phone, text messages – as it allows for many-to-many conversations. Interflection, as a type of on-going conversation that is facilitated by social media, is a possibility not just for one-to-one communication between the researcher and one practitioner but an interflection involving a researcher and, potentially, several different practitioners. Social media, therefore, offers new possibilities for qualitative research that allows researchers and groups of practitioners to sustain discussions and construct new understandings together.

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| Comments to Reviewers | |
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| We would like to thank the editors and the reviewers for their comments on this paper. In terms of the editors' comments, thank you for the suggestion to draw on the recent paper by Smith and McGannon (2017). This paper was particularly helpful in framing the rigor of our approach and we have highlighted how this has been used in the comments to the reviewer | |
| Reviewer Comments | |
| Thank you authors for revising the paper, and responding to the feedback in detail. The paper has been strengthened substantially and is almost ready for publication. There are a few more areas that require clarification. | Thank you for this comment and the suggestions for further revisions. In the following sections of the table we have identified how each of the comments have been addressed. Changes in the manuscript have been identified in red text |
| “social media can be a place to look”- is there way to rephrase that and state your point more eloquently? | This has been changed to social media offers researchers the opportunity to |
| Great illustration of the need for longitudinal research. The paper however then comes out and introduces that it used social media in a longitudinal design. Yet, there is no introduction of social media, social media research, the potential of social media in education/pedagogy etc. I know the authors state some of this later on, but a paragraph here right before stating the purpose of the paper would certainly increase the clarity of the paper, and demonstrate the role of social media in the paper. Otherwise, the social media component currently comes out of the blue and detracts from the paper. | Thank you for this suggestion. We have added an additional paragraph to the introductory part of the paper on page 4 Social media has emerged as a powerful platform to generate data from users social interactions, in many areas (Langlois 2015; Karatzogianni 2015; Papacharissi, 2015). Given that evidence suggests that practitioners in sport and exercise pedagogy are regularly posting to social media sites and exchanging pictures, resources, and information about their practice (Risser, 2013; Sie et al. 2013; Straubhaar, 2015; Wesley, 2013), social media could act as a kind of user-generated archive of on-going practices. While Internet-based methods have existed for a number of decades (Jansen, Stoyanov, Ferarri, Punie, & Pannekeet, 2013; Karaca, Can, & Yildirim, 2013), many agree that it is important that we acknowledge the methodological potential of social media to generate new and different types of insights (see Baker, 2012; Housley, Williams, Williams, & Edwards, 2013; Procter, Viss & Voss, 2012). Indeed, Internet developments have |

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| | <p>been acknowledged as providing new and exciting frontiers for social research that can expand the researcher's toolkit (Beneito-Montagut, 2011; Hookway, 2008). Research that begins to examine how social media can be used to generate insights into teachers' and coaches' practices could make valuable contributions to the conduct of longitudinal qualitative research.</p> |
| <p>P. 4 l. 43-44 (examine longer-term impacts of programs or interventions). Given the framing of this last bit, it would be helpful to provide an example if and how social media can do this. Either from your own empirical work, or from the literature.</p> | <p>We have adjusted this section to provide details of the papers</p> <p>Such details can be accessed in Author (2017, 2016, 2014). These papers show (i) how posts to Twitter and Facebook supported the development of a community of practice, thus acting as a powerful CPD mechanism (Author, 2016, 2014), and (ii) the challenges associated with maintaining teacher anonymity when using social media in research designs (Author, 2017).</p> |
| <p>Phase 2 coding- p. 12, L. 19-32. The authors identified that their coding was guided by three questions. It is unclear what this coding led to? In the papers current form, it appears that the paper was coded and that's it. Although the authors identify that they used a code framework, what did this look like in practice when engaging in it? How did you delimit the codes you identified? Some more details would really help strengthen the paper about the authors' interpretations</p> | <p>Further details of the construction of the coding framework have been provided:</p> <p>The development of the code framework initially involved the first and second authors identifying and describing key behaviors or interactions that represented changing practice, professional growth, and sustainability, and placing these into a table. To ensure this process was robust and could provide credible and generalizable interpretations (Sparkes & Smith, 2013; Smith & McGannon, 2017), the authors drew on international literature (as stated in earlier sections of the paper) in education, and sport and exercise pedagogy. The code framework, however, was created using more than research literature. To strengthen credibility, rich rigor, authenticity, the expression of reality, and aesthetic merit, data generated from the wider study (see Author, 2016, 2014) and the first author's extensive involvement in the study (over 5 years) and the school context (7 years) informed the construction of the behaviors and interactions. Following this process, the third author, who was external to the research context reviewed and offered an</p> |

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| | ongoing critique of the behaviors and interactions. Subsequently, a descriptive framework was created for the tweets to be coded by (i) change, (ii) growth and (iii) sustainability. |
| p. 18, l. 35-42. In the current format, it appears that twitter is the mechanisms of changing teachers' practices. However, a more critical reading suggests that the facilitator is deeply embedded in the process of change, yet the role of the facilitator in this particular section has not been clarified. Please outline further twitter is not the only mechanisms of promoting change, but as identified by the authors, tied up in the nexus of the facilitator and field work. The central question is: should/can twitter be used as a standalone tool (as suggested in the paper) or are other methods required as well. | <p>Further details on the role of the facilitator have been provided at the start of the changing practice illustration. Given that this section introduces the role of the facilitator, we felt it was best to insert this discussion here rather than in the teacher professional growth section.</p> <p>The facilitator was the first author, who provided CPD support in the school context (through workshops, formal and informal group/individual discussions and lesson observations) and through social media, while generating data on teachers' practices as part of a participatory action research design (for further details see Author, 2017, 2014). In this sense, the facilitator was deeply embedded within the process of change. The following illustration is an example of how interactions between the facilitator and Kelly on social media supported the teacher to change her practice. As reported elsewhere, however, social media was not used as a standalone CPD tool and sustained school-based support that was both online and face-to-face supported the teachers to change, learn, and sustain their practices (Author, 2017, 2014).</p> |
| p. 20, l. 4-7. I can see how social media was a platform for supporting teachers' growth. But given that these interactions primarily occurred outside of school time, would all teachers respond the same way? Would everyone buy in, or might there also be resistance? A sentence or two clarifying this position would strengthen the argument. | Given that this comment relates to all sections of the illustrations, we have chosen to not focus on it specifically here. However, we have expanded our discussion in the discussion sections of the paper, as recommended in later comments (please see below) |
| p. 25 l. 14 "the researcher should remain analytical without imposing his/her interpretations on the participants". Two methodological questions here. The first, is this epistemologically and ontologically possible or for that matter even desirable given that the point above stresses the co-constructed nature of interreflection? The second question, it seems that this | <p>Thank you for this comment, we now appreciate that the idea to not impose his/her interpretations was misleading. This term has been deleted and we have focused on the main point, which was to encourage researchers to be responsive to participants. The change is:</p> <p>In the process of co-constructing new</p> |

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| <p>'objective' stance contradicts both your epistemological and ontological framing of the paper and the co-constructed nature of qualitative research. Please clarify this point as adding in the reference afterword is misleading.</p> | <p>understandings, and similar to face-to-face methods of inquiry (see Brunton et al., 2008) and CPD facilitation (see Author, 2016, 2014), the researcher should be responsive to participants, replying to tweets, messages or discussions in the school context in a supportive and open-ended inquiry-driven manner that encourages participants to express their own interpretations of events.</p> |
| <p>p. 26. L. 23-25. The authors speak about appropriate work-life balance? How would this look like if we're asking teachers to engage in changing teaching practices outside of school hours. Some more clarification required here.</p> | <p>We have expanded on our existing points to state: As we have reported elsewhere (see Author, 2014), not all teachers are willing or able to engage with social media, where engagement with social media should be voluntary and not a condition of a wider research design or CPD program. Further and given that not all teachers will engage with social media, researchers should acknowledge that their use of social media for research may provide narrow and selective interpretations within sport and exercise pedagogy.</p> |