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CHAPTER 11: USING DIGITAL TECHNOLOGIES TO ENHANCE YOUR TEACHING OF PHYSICAL EDUCATION

Julia Sargent and Ashley Casey

INTRODUCTION

Education is increasingly shaped by digital technologies (Selwyn, 2016). Physical education (PE) is not exempt from speculation surrounding the value of technology for teaching and learning. The challenge for the subject is to identify and use digital technologies in meaningful pedagogical ways (Casey et al., 2017a; Koekoek and van Hilvoorde, 2018). A significant barrier to technology use in PE is the disparity between the subject's drive for human movement/physical activity and the concern that some technologies may increase sedentary behaviour. In short, using digital technology to support movement and activity may not be the first thing you think of when planning to teach PE (Kretschmann, 2015).

The purpose of this chapter is not to encourage the use of technology for the sake of it. We don't want to see lessons filled with sedentary pupils holding iPads. Instead we want to facilitate and maximise learning with technology if, and when, it's appropriate. Using research, we highlight the diverse ways in which technology is being used globally to enhance the very things we want to enhance i.e. active learning, without inhibiting young people's movement. In this chapter we provide a practical, research-supported perspective on how and why digital technologies might be used to enhance the teaching of PE in your school/department/classroom.

At the end of this chapter you should be able to:
- Reflect upon your own teaching and your pupils' learning and consider how these might be enhanced through the use of digital technology;
- Identify and critique the digital technologies that are available to use in your teaching and understand how their use might enhance pupils' learning;
- Evaluate effective uses of digital technology in your teaching.

Before continuing complete Activity 11.1.

Activity 11.1 Observing technology use

If you have not used digital technology in your lessons before then try observing another member of your department (or if this is not possible, another member of staff) using digital technology. Use the questions below to guide your observations.

If you have used digital technology before in your lessons, then use the post-teaching reflective analysis (PTA) questions below to consider your own school experiences (these questions are adapted from Dyson (1994)).

Date: Class:

- What were the teacher's/your goals for the lesson?
- What uses of technology did you see used/use in the lesson and how did technology help to meet the goals identified in point 1?
- What were the positive aspects of using digital technology?
  - For the teacher/you?
  - For the pupils?
- What aspects of using digital technology do you feel didn't go well?
- What changes in digital technology use would you recommend/make next time?
- What are the specific goals for the next lesson?
- How might digital technology support these goals?
- What strategies will help the teacher/you to achieve these goals?

PEDAGOGY BEFORE TECHNOLOGY

Digital technology works when it solves a problem. Sometimes this is an obvious problem (e.g. getting from A to B faster) and sometimes it's a problem we didn't even know we had (like storing 10,000 songs on a device that fits in your hand i.e. an iPod). Technologies are designed to make our lives easier and better (although they might not always succeed). If the same premise can be applied to PE, then why shouldn't we take advantage?

The truth is, we don't always notice the multitude of ways technology makes our lives easier. At least not until they're lost or broken. Indeed, we also don't always remember the efforts

we went to make them work for us. But somewhere, and at some time, someone (maybe ourselves) had to convince us it was worth investing time, money and effort in making digital technology work. Teaching is no different. Through this chapter we aim to help you to begin to see how and why; or if you're already familiar with digital technologies, gain some new insights.

The next section is structured to focus on the educational outcomes of using digital technologies. Once we have explored the outcomes we touch on the digital technologies themselves. In doing so, we seek to draw your attention to the learning outcomes for your pupils *before* considering the technologies you might choose to support learning. We want to help you to think about what areas you want to address to enhance, in your own teaching, the gaps that pupils might have in their learning and identify which technologies may help you to address these gaps. In short, we explore several key aspects of PE and apply a technological filter to them. While it is beyond the scope of this chapter to cover safeguarding around digital technology in detail, we what you to understand that procedural and protocol issues need to be addressed with regards to safe practice. We therefore make reference to chapter 2/ Section 16: Digital Technology in the Association for Physical Education's (afPE) *Safe Practice in Physical Education, School Sport and Physical Activity* document (James & Elbourn, 2016).

It's important to consider pupils e-safety and safeguarding, whether the data you are collecting is necessary, how it is being used and who is using it. Refer to your school's policies and procedures on digital technology, social media, video recording and general online safety to make sure you have permission to use any of the technologies discussed in this chapter or any other digital technologies. For example, consider the implication of producing digital photographs and video clip, i.e. storage, use and deletion. Equally, you could engage pupils in critical conversations about their use of digital technology and conversations regarding e-safety.

Activity 11.2 – Sourcing technology

The problem, as we see it, is "far too much work in educational technology starts with tools, and what we need to start with is humans" (Morris and Stommel, 2018, p.9). History tells us

that many tools or pieces of digital software are purchased with perceived needs or benefits in mind without considering the needs and requirements of the people or the context in which they will be used. Just look in your school's ICT storeroom and gaze at the bits and bobs that sit on the shelves gathering dust.

Using this 'equipment graveyard' as motivation, arrange to speak to different colleagues as your school (this might be an IT Manager, Curriculum Manager or a member of the Senior Leadership Team) to see what forms of technology (either software or hardware) are available in your school. Are there specific pieces of software that are used for assessment? Are there pieces of hardware you could borrow? Are there sources of funding that you could apply for? What are the safeguarding implications of using such technologies? Does the school's current policy adequately address these implications and concerns?

ASSESSMENT AND FEEDBACK

If your ambition is to assess and give feedback on pupils' skill performances or to have pupils self-assess their own performances, then using video recordings may not only help you to provide an alternative means of feedback, but it may also enhance your pupils' skill execution (Cassady et al., 2004; O'Loughlin, Chronin and O'Grady, 2013). Video not only allows you and your pupils to capture and review their skill performances (as many times as you'd like) in real time or slow motion, it also enables you to compare these videos with other performers, elite professionals' skills and/or assessment criteria (Weir and Connor, 2009). As a result, the use of digital video provides pupils with an opportunity to demonstrate their knowledge and understanding through a structured and evidence-based analysis of their own and other's performances (Penney et al., 2012). You may want to store these videos to contribute towards your summative assessment or evidence of pupils' progress. Electronic portfolios can be created on most Virtual Learning Environment (VLE) platforms and can be used to store and compare digital video data. Weir and Connor (2009) found that pupils enjoyed the creation of the portfolios and that it was a different way to capture development in pupil learning. Digital video can therefore provide an alternative means of capturing pupils work for current or future assessment. It is important, however, that you don't lose track of safeguarding in your excitement to develop and store this valuable information (see James & Elbourn, 2016, p. 278 for more advice).

An illustrative example of using technology for formative feedback would be the use of apps such as 'Hudl Technique', 'Coach's Eye' or 'my Dartfish Express' which allows you and your pupils to video their performances, crop out specific elements of a skill and compare this side by side with another video. Alternatively, the camera on many mobile devices allows for rewind, slow motion and annotation (James & Elbourn, 2016, p. 280). With any of these technologies, you or your pupils could record a voiceover or annotate the video to provide feedback or assess different elements of a skill. Research has shown the effectiveness, in terms of learning, of capturing performances for both summative and formative assessment (Lopez-Pastor et al., 2013; van Vuuren-Cassara and Lamprianou, 2006). Some have used Google Forms with pre-prepared questions (for example, "identify a segment of your skill that you think you executed well and explain why") to engage pupils in post lesson development and self-assessment (Sargent and Casey, 2019). In this sense, video can be used as a catalyst to support assessment and feedback by helping pupils build self-assessment abilities and (O'Loughlin, Chronin and O'Gray, 2013) help them verbalise components of the skill (Casey and Jones, 2011).

That said, it does come at a cost. Watching a video takes time. Time that you may want to use for movement. The sedentary nature of these tasks is a concern, but many teachers and researchers have turned their attention to finding solutions. In a recent paper, we highlight two teachers use of Flipped Learning to provide time for pupils to learn between lessons (Sargent and Casey, 2019). Flipped Learning is used to describe a pedagogical approach in which the conventional notion of classroom-based learning is inverted (Sargent and Casey 2019). For example, teachers set students work to complete prior to class and in the classroom students engage in student-centred learning activities to expand their knowledge. These same teachers also used video replays in the changing rooms to give pupils a chance to re-engaged with their learning from the last lesson. Other examples from social media show teachers using video delay software to show pupils their performance as they stand in the queue for their next attempt. Feedback is subsequently received from the video and the assessment is reinforced by the teacher. The provision of simple questions and observational prompts helps to ensure that the inevitable time off task isn't wasted time but is learning time. In this way, teachers can exploit existing breaks in movement to consolidate pupil learning.

In summary, digital technology (and in particular video) can be useful tools in supporting you to capture pupil performances, review pupils' skill development and provide video evidence for assessment purposes. They also provide a means for pupils to peer and self-assess, engage pupils in the learning process and highlight areas of improvement.

Activity 11.3 provides you with the opportunity to reflect on your use of video supported assessment in your own teaching.

ACTIVITY 11.3 Video supported assessment

Choose an activity that you would like pupils to be able to improve their self-assessment of their skill performances. Check with your tutor and/or James and Elbourn (2016) for more advice regarding any protocols you need to follow concerning videoing pupils. Ask your pupils to provide a video illustration of their skill performance (you could also give the role of cameraperson to a pupil who is not physically taking part in the lesson – Goodyear et al., 2014). Write some simple questions and observational prompts for pupils to be able to answer in a written or audio format (you could also use some of the questions from Activity 11.3). Ask your pupils to submit their video/audio or written self-assessment using, for example, a Word document or Google Form.

ENGAGEMENT

When pupils are engaged they are more likely to experience success (Bevans et al., 2010). But pupil engagement isn't a simple process. It's multifaceted and composed of behavioural (e.g. attendance and participation in on task activities), affective or emotional (e.g. demonstrating interest, enjoyment or a sense of belonging) and cognitive (e.g. willingness to exert effort) investment in and connections with the environment (Bailey et al., 2009; Fredricks, Blumenfeld and Paris, 2004). That said, engagement does not always equate to learning. For example, if using technology, some pupils might engage with the technology but lose sight of the wider learning outcomes. Despite potential limitations, research has shown that digital technology can help some pupils to access different learning opportunities (Casey et al., 2017a). Furthermore, there are many factors that can influence your own

engagement with digital technologies such as your beliefs, budget constraints and time (Wyant and Baek, 2019).

Increased engagement in PE – especially for those who find the subject a challenging and/or uninteresting space – has been enhanced through the provision of technology-related pupil roles. Goodyear et al. (2014) found that the use of video cameras heightened pupil (specifically girls') engagement with learning. Pupils worked in learning teams and were given roles such as 'coach' or 'camerawoman' to help each other learn through the production of film video clips of their learning. Giving the girls such roles was pivotal to their engagement. Providing different roles for pupils to guide their learning with digital technology may support behavioural engagement with the task.

The use of technologies such as apps may not change the nature of the task (for example recording an answer to a question on an app rather than with pen and paper). Yet, using a different mode of delivery in which the activity takes place may engage some pupils in the task. Goodyear et al. (2017a), for example, found that mobile apps (such as 'Dartfish EasyTag') created new opportunities to enhance pupil learning. Pupils used the app to create basic statistics that could be used to identify strengths and weaknesses in performances. They concluded that such technologies helped to maintain pupil interest in the learning task and increased their engagement (Goodyear et al., 2017a).

As an alternative, you may wish to use digital technologies to change the way you engage pupils with tactics and strategies. This has been shown to be an effective way to engage pupils in PE or to encourage pupils to learn about different activities or sports (Casey and Jones, 2011). Video games have been employed to help pupils acquire more specific declarative knowledge of strategies and tactics in activities such as dance (Quennerstedt et al., 2017). With the emergence of eSports, such games might allow teachers to harbour/create success in a virtual sport that may transfer to PE (Jenny et al., 2017). Such success and/or engagement may help to motivate pupils who might otherwise be reluctant to try out a new physical activity on their own or in front of the class (Hayes and Silberman, 2007). Some physical educators may feel that using video games will take time away from pupils' physical activity. However, video games could be used to reduce the time that pupils spend waiting to participate or are otherwise disengaged (Siedentop and Tannehill, 2000) by providing them with a motivating activity that does not require continuous teacher direction. You could give

pupils the task of video recording (guided by assessment sheets or online forms; see Activity 11.3) if they are not physically taking part in the lesson. This may allow you to develop a learning environment whereby all pupils are learning and engaging through their interactions and discussions with the technology, rather than simply participating in the physical performance (Casey and Jones, 2011).

ACTIVITY 11.4 Pupils as analysts

Pose the questions below to your pupils and get pupils to respond using videos, words, or pictures. This activity could be undertaken on an app such as 'Showbie' or you could use the online platform 'Padlet'. Both allow pupils to share their work with you or their classmates.

- Can you remember what the focus of the last lesson was?
- What are the objectives of this lesson? Do you understand them?

Work on your own (or in pairs) to answer the following questions:

- Can you identify someone in the room (or a group) who are completing an activity? What activity are they doing?
- Can you analyse their performance and identify two things they are doing well and one area that they could improve on?
- Evaluate whether they have improved their performance by the end of the lesson?
- Can you create a small coaching video or find a video that your peers could use to aid their performance?

SUPPORTING MOVEMENT

PE is the only subject in schools with a defined focus on physical activity. While physical activity promotion isn't the only focus/purpose of PE; a lot of time is given to supporting pupils' exploration of movement in lessons. As mentioned previously, there is clear misalignment between movement and technology and yet, as we've started to show, technology can be part of the pedagogical process in PE. It has been used to help pupils improve their skills and should be seen and valued as a resource when providing additional support to diverse groups of pupils. Fundamentally, technology is a tool. Fletcher (1996) argued that when you go to the DIY shop for a drill you don't want a drill, you want a hole.

The problem is they don't sell holes only drills. So, the drill becomes the means for making your hole. In this analogy we need to find our holes.

The hole for Quennerstedt et al. (2017) was dance knowledge and the ability of the teacher to spend time supporting her pupils' movement development rather than modelling the dance herself. When teaching dance in Sweden, the teacher found that using a video game with a digitally animated dancer – called an 'avatar'- pupils could follow the moves to the dance without her direct support. Pupils could also use the avatar as a resource/reference point to support the design of their own dance routines. Because the pupils were able to get the required modelling from the video game, the teacher could circulate the room and provide individual feedback to the pupils. If you don't have access to video games, you could use videos from YouTube or record/capture the demonstrations of yourself and/or other pupils.

Using a combination of video recordings of pupils' performances and teacher feedback has been shown to be beneficial in supporting pupil movement/technique and skill execution (Palao et al., 2015). Video recordings of pupils' movement was used in Athletics to support pupils' understanding of their hurdling technique (Palao et al., 2015). You may foresee other activities or sports where this combination of video and feedback may support pupil movement such as a handstand in Gymnastics or a Tennis serve. As a result, using video to provide a visual representation of a skill may support pupils movement. Whilst the sections above also demonstrate the use of video to support students learning, this section demonstrates how using alternative sources of information may aid you and your pupils exploration of movement.

COLLABORATION AND COMMUNICATION

Improving pupils' collaborative and communication skills is an important aspect of education; one that crosses different subjects. It's easy to picture those pupils who find it hard to speak in front of a class or those who struggle to work with and/or share their ideas with their peers. Supporting pupils to present their ideas, and helping them to work with each other, are areas of development often explored in PE. Whilst these may not be your primary learning objective they are important. For example, you may look to diversify the means by

which pupils communicate or collaborate in your classroom and/or beyond the four walls of the gymnasium or sports hall.

Many schools will already have access to a VLE such as 'Moodle', 'Frog' or 'Merlin'. If your PE department does not already make use of this space you could ask for IT support for a PE page to be set up on the platform, or you could ask to create your own using Google Classroom. You could use this online space to upload resources, tasks, create quizzes, upload videos or assignments. This may be particularly useful for GCE A Level pupils as they will be able to access resources from home for revision or upload assignments or coursework to be marked.

Online or digital platforms (James & Elbourn, 2016, p. 281) may provide a space for pupils to feel more confident in collaborating and communicating with their peers when they re-enter the lesson space. Twitter can be used to communicate and interact with pupils (Calderon et al., 2017). You can set up a hashtag (#) for your class to share information with your pupils or set up a team Twitter account (James & Elbourn, 2016, p. 282) for pupils to post from. Google Hangouts can also be used to support pupils learning by creating videos, audio support or team activities for pupils to complete online (Calderon et al., 2017). Again, you need to check, and follow, school protocols when using social media to communicate with pupils.

Creating an alternative space for pupils to contribute ideas or answer questions on what they have learnt may encourage pupils to communicate and collaborate with others. The online platform 'Padlet', for example, can be used to pose questions to pupils. It has an online wall of sticky notes in which pupils can provide responses such as written notes, links to web pages or pictures. Pupils can respond anonymously (if you, or they wish) and are able to respond to other pupils' comments. This could allow you to gauge pupils understanding of the lesson content or as a means of formative assessment. It could also act as a reference point to recap key points or areas of improvement from a previous lesson.

Activity 11.5 – Reflecting on learning
Start up a Padlet board (or use an alternative piece of technology/software) and ask students to post one thing they learnt in the lesson and one area they think they can improve on. Refer

to the Padlet content when you plan the next lesson and at the start of the lesson to summarise areas of improvement and how these might be addressed in the following lesson.

PROFESSIONAL DEVELOPMENT

Enhancing your teaching of PE does not occur by focusing solely on your own practical teaching. We often learn from seeing other school experiences, hearing a different perspective or being introduced to a technique or method that we may not have experienced before. Developing your knowledge of practical teaching in different schools or countries is important for you to consider your own teaching approaches and the norms that may occur in your school. Social media (and in particular Twitter) can help change the way you think and go about your teaching (Gleddie et al., 2017). It has the potential for you to access tweets and resources developed by other teachers who are sharing ideas, discussions or debates on their own curriculum or challenges. One way in which you could engage with social media is through the bi-monthly Twitter chat through the hashtag #pechat. This chat explores topics related to PE and may allow you to begin to develop some ideas and discussion points faced by other PE teachers.

In addition to Twitter, there are professional blogs written by both teachers and academics that can help support your professional development. An example is the PEPRN website (http://www.peprn.com/) which explores major themes in PE. Themes and ideas in PE are discussed through written blog posts. You could read through these posts and reflect upon the implications for your own practical teaching. You could also discuss these with members of your department or colleagues through social media.

Now complete Activity 11.6.

ACTIVITY 11.6 Social media for professional development

Go onto Twitter (if you do not already have an account you can create one by clicking 'sign up'). Search for the hashtag '#pechat' and observe the conversations/posts that are covered on this topic. If you feel confident, you could contribute a question or suggest a topic for future

discussion. Alternatively, you may be able to provide some advice to a colleague by commenting on another user's post. Record some teaching ideas that you would like to explore or reflect upon your own experiences of the topics listed in the discussion.

FURTHER USES OF TECHNOLOGY

Table 11.1 presents an overview of a greater range of digital technologies that have been used by PE teachers, the functions they have used and how they are applied in their teaching. You could use this resource as a guide to try out different types of technologies and also to record your own reflections of how these worked for you in practical teaching (we've divided the final column of this resource into strengths and weaknesses, but you can adapt these). You could also use this as a resource to have a discussion in your department as to how these apps and devices could be employed and whether they will meet your aspirations for the curriculum or particular sections of an activity.

Table 11.1 Technology uses and functions

Application or device	Functions	How it has been used	Reflections in practice	
			Strengths	Weaknesses
Coach's eye and Ubersense (apps) (Goodyear et al., 2017a)	Performance analysis app that allows playback and capture video footage in real time, slow motion and frame-by-frame video clips. These clips can be annotated and placed side-by-side for analysis (Goodyear et al., 2017a).	Pupils work in teams to film and analyse clips of game-based scenarios (Goodyear et al., 2017a). Pupils adopted analysis roles to capture footage for analysis (Goodyear et al., 2017a). Teams compared and		

		analysed isolated skills against a 'perfect model' (Goodyear et al., 2017a)		
Socrative (app) (Goodyear et al., 2017a)	Question and answer app for teachers to ask questions and set quizzes (Goodyear et al., 2017a).	Send open-ended multiple-choice question and received answers from pupils to assess their learning (Goodyear et al., 2017a).	Strengths	Weaknesses
Edmodo (app) (Goodyear et al., 2017a)	Social network app where teachers create online networks for pupils and teachers to share resources and discuss learning (Goodyear et al., 2017a).	Content such as videos can be shared with pupils to aid facilitate discussion (Goodyear et al., 2017a).	Strengths	Weaknesses
Google Forms (web-based platform) (Gleddie et al., 2017; Parker et al., 2017)	A digital form building tool that is part of Google Drive. This app allows users to create online forms that facilitate data collection (Gleddie et al., 2017).	Conduct online assessments that can be analysed immediately (Parker et al., 2017a). Have pupils set goals for the next lesson.	Strengths	Weaknesses
Fitbit smart watch (device) (Parker et al., 2017)	A wearable device that provides (dependent on the model) individual pupil heart rates, calories burned, distance travelled and activity time	To capture pupils' fitness data for reflection and assessment (Parker et al., 2017a)	Strengths	Weaknesses

			Strengths	Weaknesses
	(Parker et al., 2017a).			
Google Docs (web-based platform) (Chambers et al., 2017)	Create and edit web-based documents, spreadsheets and presentations (Chambers et al., 2017).	To create an e-portfolio of pupils' work (Chambers et al., 2017).	Strengths	Weaknesses
YouTube (app or website) (Calderon et al., 2017)	A video-sharing website that allows users to upload, rate and share videos (Calderon et al., 2017).	Use to upload pupil's reflections of coaching practice and access videos that relate to lesson content (Calderon et al., 2017).	Strengths	Weaknesses
QR Code generator (https://www.qrstuff.com/) and QR code reader app (e.g. QR scanner)	QR codes or 'quick response' codes, are device-readable codes that allow users to quickly access information that is stored online (e.g. a website or video) by scanning the code using a digital device (Armour et al., 2017; Gleddie et al., 2017)	Use to help pupils quickly access Google Forms, websites or documents to support learning or assessment (Gleddie et al., 2017).	Strengths	Weaknesses
iPad (device) (Armour et al., 2017	A portable tablet computer that can be used to access a range of apps and that includes a camera and video function (Armour et al., 2017).	Record pupil's performances Pupils use of apps for video analysis.	Strengths	Weaknesses
Comic Life (app) (Armour et al., 2017)	Allow users to make unique resources that look like comic books (Armour et al., 2017).	Use to create user friendly resources tailored to the lesson content	Strengths	Weaknesses

		(Armour et al., 2017.		
Padlet (online) (Sargent and Casey, 2018).	Online message board where users can post notes and have discussions on a virtual message wall (Sargent and Casey, 2018).	Use to post questions for students to answer and videos to reflect upon for homework tasks (Sargent and Casey, 2018).	Strengths	Weaknesses

CRITICAL THINKING

We have seen in this chapter that digital technology has many potentially positive ways in which it may enhance your teaching of PE. However, it also has the potential to have negative impacts on pupils' learning about health, physical activity and the body (Casey et al., 2017b). For example, as Öhman et al. (2014) found, exergames can create the idea of specific health and body norms based on a measurable ideal, which can contribute towards pupils making negative self-assessments and the potential for self-monitoring (Lupton, 2015; Williamson, 2015). Other pieces of digital technology such as health promotion and fitness apps can also invoke pupils to exhibit self-tracking behaviours that may result in similarly negative outcomes (Gard, 2014; Goodyear et al., 2017b).

Now complete Activity 11.7.

ACTIVITY 11.7 Pupil voice

Plan and implement one of the uses of digital technology mentioned above, you may choose a single lesson or series of lessons. Once you have used the technology in your lesson(s), try conducting some mini-interviews with your pupils to listen to what they thought of the use of digital technology. You can use the answers to these questions as an evaluation of your teaching and add your own questions/reflections to this activity. This activity can enable you to begin to evaluate your use of digital technology and the impact of your teaching on pupils' learning. You could also compare your pupils' answers with the answers you collected in

Activity 11.1. Are there any differences in your opinions? What are the similarities in teacher and pupil thoughts on digital technology use?

Mini pupil interview guide

What piece(s) of technology were used in this lesson?

Why do you think digital technology was used in this lesson? What purpose did it have?

Did the use of digital technology support your learning? Is so, in what way?

SUMMARY AND KEY POINTS

In this chapter you have been presented with a number of research and practice informed ways that you could use digital technology to enhance your teaching of PE.

- We have discussed how digital technology may be applied to help you reach your intended learning outcomes such as skill development, engagement or supporting movement.
- Through the activities we have provided some potential methods of reflection for you to consider in your ongoing practical teaching with digital technology.
- We have also challenged you to evaluate your use of digital technology but, also considering the views of your pupils in this process.

Some key points to remember when using digital technology in your teaching is to be guided by your PE goals and pupils' learning outcomes, not the technology. If you can start with the outcome you'd like your pupils to achieve and then work backwards to identify which technologies may support them in reaching this outcome or goal, then you can begin to put the idea of 'pedagogy before technology' into practice. That being said, another key message to remember is not to innovate for innovation's sake. You may start with a very small change, such as seeking to enhance the efficiency of sharing resources, but these can be more effective than trying to use a piece of technology in your practical teaching just to appear innovative.

As digital technology continues to evolve and develop you will be presented with both possibilities for teaching but also challenges for pupils' learning. If you are able to consider the teaching and learning prior to the technology and use this thought process to guide your

decisions on when, how and why to use digital technologies, then you and your pupils will be best placed to benefit from and navigate through the future digital developments in PE.

FURTHER RESOURCES

The PE Geek https://thepegeek.com/

A website created by 'the PE geek', Jarrod Robinson who is a PE teacher from Australia. It contains podcasts, workshops, blogs and apps discussing digital technology use in PE. You can also find Jarrod on Twitter via the handle @mrrobbo where he tweets about webinars, resources, ideas and training.

Podcast: 100 ways to use technology in PE
https://www.podomatic.com/podcasts/thepegeekpodcast/episodes/2017-12-11T15_14_47-08_00
The PE Geek, Jarrod Robinson, shares 100 ways that you could use technology in PE. This podcast takes just under 30 minutes to listen to. If you would rather read a copy then you can access the online book here:
http://edt315.weebly.com/uploads/4/5/3/2/4532212/100_ways_to_use_technology_in_pe.pdf

Koekoek, J. and van Hilvoorde, I. (2018) *Digital Technology in Physical Education: Global Perspectives*, Abingdon, Oxon: Routledge.

This book contains contributions from authors from across the globe discussing how digital technologies are shaping PE pedagogy in theory and in practice. It offers practical based narratives, case studies and reflections on how PE practitioners can introduce technology into teaching and learning through the use of social media, video gaming, virtual reality, iPads and Wiki platforms.

Youth Sport Trust *The Class of 2035*, viewed 10 July 2019, from:
http://www.classof2035.com

A report commissioned by the Youth Sports Trust that investigates the future in terms of what PE and school sport may look like for young people. The consideration of digital technology and its role in our pupils' futures is key to this report. It provides a useful resource

for reflection in considering how the use of technology may impact on the future of our pupils and what aspects of our use will be important to consider and reflect upon.

Getting started on Twitter

As a starting point, you might like to follow @drashcasey, @joeyfeith, @afPE_PE or @ImSporticus or visit this website to find other PE teachers on Twitter

https://www.classtools.net/twitter4teachers/subject/PE.

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