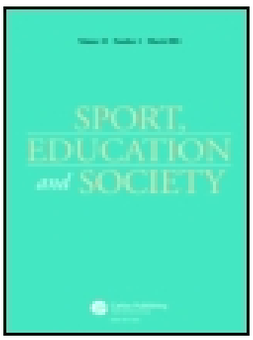

Sport, Education and Society

ISSN: 1357-3322 (Print) 1470-1243 (Online) Journal homepage: http://www.tandfonline.com/loi/cses20

Young people's uses of wearable healthy lifestyle technologies; surveillance, self-surveillance and resistance

Victoria A. Goodyear, Charlotte Kerner & Mikael Quennerstedt

To cite this article: Victoria A. Goodyear, Charlotte Kerner & Mikael Quennerstedt (2017): Young people's uses of wearable healthy lifestyle technologies; surveillance, self-surveillance and resistance, Sport, Education and Society, DOI: 10.1080/13573322.2017.1375907

To link to this article: https://doi.org/10.1080/13573322.2017.1375907

SPORT, EDUCATION AND SOCIETY, 2017
https://doi.org/10.1080/13573322.2017.1375907

Routledge
Taylor & Francis Group

Young people's uses of wearable healthy lifestyle technologies; surveillance, self-surveillance and resistance

Victoria A. Goodyear [a], Charlotte Kerner [b] and Mikael Quennerstedt [c]

[a]School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, Birmingham, UK; [b]Department of Life Sciences, Brunel University London, London, UK; [c]School of Health Sciences, Örebro University, Örebro, Sweden

ABSTRACT

An international evidence-base demonstrates that healthy lifestyle digital technologies, like exergames, health-related mobile applications ('apps') and wearable health devices are being used more and more within educational settings. Despite this, there is a lack of in-depth empirical evidence on young people's experiences and uses of healthy lifestyle technologies. In this article we focus on young people's uses of a wearable health device – Fitbit – and the associated health app. Informed by the work of Foucault, the purpose is to investigate the surveillance, self-surveillance and resistance that occur by young people. One hundred 13–14 years olds (53 females, 47 males), from five physical education classes in two UK schools participated. Data were generated through 8 focus group interviews, and the nominal interview group technique was applied. Data were analyzed using key concepts from Foucault's theoretical framework. The results demonstrated that, the daily 10,000 step and calorie burning targets set by the Fitbit device encouraged the young people to do more physical activity. Increases in physical activity occurred because of the self-surveillant practices promoted by the Fitbit through; (i) the monitoring and recording of steps and calories burned, and (ii) peer comparison (or monitoring). Surveillance and self-surveillance practices, however, were clearly connected to health equating to fitness and being 'fit' or not being 'fat'. These narrow interpretations of health, equally, underpinned resistance. Daily step and calorie burning targets, (i) did not sustain young people's engagement with the device beyond a few weeks, (ii) promoted negative feelings, and (iii) the device was resisted because it did not record physical activity accurately as part of young people's daily lives. In turn, the young people resisted the educational value of the Fitbit and demonstrated a sceptical stance toward introducing health devices in school and physical education settings.

ARTICLE HISTORY
Received 29 June 2017
Accepted 1 September 2017

KEYWORDS
Fitbit; physical activity; biopedagogies; gaze; power relations

An international evidence-base demonstrates that healthy lifestyle digital technologies, like exergames, health-related mobile applications ('apps') and wearable health devices are used more and more within educational settings (see Casey, Goodyear, & Armour, 2017; Gard, 2014). The intent of such technology-integration is largely based on the feasibility of these devices and apps to promote and/or enhance health, in terms of physical activity, body image perception, and diet/nutritional behaviours (Dennison, Morrison, Conway, & Yardley, 2013; Dute, Bemelmans, & Breda, 2016). A high level of advocacy for healthy lifestyle digital technologies is also evident in international policy (Rich & Miah, 2017). Digital technologies are increasingly being positioned as cost-effective

CONTACT Victoria A. Goodyear v.a.goodyear@bham.ac.uk School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK

preventative solutions to rising levels of obesity, sedentary behaviour and associated non-communicable diseases (HM Government, 2015; World Health Organisation [WHO], 2011).

Recent critical debates point at problematic consequences of the surveillance practices promoted by health devices and apps (Petherick, 2015; Rich & Miah, 2017; Williamson, 2015). Surveillance is the 'self-tracking practices [that] are directed at regularly monitoring and recording, and often measuring, elements of an individual's behaviours or bodily functions' (Lupton, 2016, p. 2). In young adults, self-tracking practices of healthy lifestyle technologies can impact negatively on health and wellbeing by encouraging obsessive/ addictive monitoring behaviours (Lupton, 2016) and by influencing body dissatisfaction, negative mood states and extreme weight loss behaviours (see Lewallen & Behm-Morawitz, 2016). Despite the potential for negative impacts, self-tracking could become an imposed school practice (Luton, 2015; Williamson, 2015). Quantifying and ranking physical activity in a physical education context could further impact negatively on young people's health knowledge and behaviours, by health becoming a practice of being told, adopting and repeating easily described behaviours (Gard, 2014; Rich & Miah, 2017).

These narrow and in many senses reductive notions of health in schools have widely been reported from many countries (e.g. Burrows & Wright, 2004; Harris, Cale, Duncombe, & Musson, 2017; Powell & Fitzpatrick, 2015; Quennerstedt, Burrows, & Maivorsdotter, 2010). Children and young people express quite a reductive idea of health that relates to body weight and size and where health is often connected to avoiding being fat (Burrows & Wright, 2004; Harris et al., 2017; Powell & Fitzpatrick, 2015). Equally, studies show that there is a danger that self-tracking will restrict teachers' capacity to support young people to become healthy citizens by self-tracking governing and controlling the entire educational process (Luton, 2015; Williamson, 2015).

Despite opportunities, potential negative impacts, and possibilities that self-tracking will be imposed, there is a lack of in-depth empirical evidence on young people's experiences and uses of healthy lifestyle technologies (Dennison et al., 2013; Rich & Miah, 2017). This is an unfortunate omission, given the clear international policy and practice-referenced drives to use digital technologies to promote health, alongside the understandings that young people are active users of a range of apps and digital devices. The risk of this gap in research is that we continue to view technology either in terms of 'the solution' or as a quite deterministic technology of surveillance where young people's actions and agency seldom are taken into account. Rich and Miah (2017) and Petherick (2015) thus call for more research on what and how young people learn about health and how they experience the surveillance mechanisms of digital technologies.

In this article we focus on young people's uses of a wearable health device – Fitbit – and the associated health app during an eight-week school-based intervention. The purpose is to investigate the surveillance, self-surveillance and resistance that occur by young people. The research questions are:

- How does the process of health surveillance operate when Fitbits are used by young people?
- How do young people's self-surveillance appear as a consequence of this health surveillance?
- How does the possibility for resistance stand out when Fitbits are used in school?

Young people, digital technologies and health

Digital tools used for self-tracking, measurement and quantification, that according to Pink and Fors (2017) also traverses the online/offline binary, are becoming increasingly popular in young people (Depper & Howe, 2017). For example, one quarter of American 13–18 year olds reported using health-related apps, digital games and/or wearable devices (Wartella, Rideout, Montague, Beaudoin-Ryan, & Lauricella, 2016). The evidence-base on young people's experiences and uses of healthy lifestyle technologies is however limited and inconclusive (Dennison et al., 2013; Petherick, 2015; Rich & Miah, 2017). A recent systematic review on adolescents and young adults (age 12–25

years) identified only two empirical studies that measured the health-related effects of using nutritional and/or physical activity apps (Dute et al., 2016). Further, while a non-commercial app resulted in weight reduction and improvements to motivation, other nonrandomized interventions report no significant differences in diet/nutrition and/or physical activity behaviours (Dute et al., 2016). In our own study, reductions in motivation were reported, alongside feelings of guilt and internal pressure (Kerner & Goodyear, 2017). Similarly, Depper and Howe's (2017) concluded that apps reinforced narrow understanding of health that was related to fitness and slenderness in adolescent girls. Further understanding young people's experiences of healthy lifestyle technologies would accordingly provide much needed insights into the health of young people.

Surveillance

As beautifully laid out by Galič, Timan, and Koops (2017), there are different possible routes to go down in order to explore surveillance, self-surveillance and resistance. The basis for our study has been the work of Michel Foucault and his work on surveillance. Through the metaphor of Panopticon (a tower in a prison), Foucault (1977/2008) discussed practices of surveillance in terms of how prisoners were being watched or who felt they were being watched. Foucault suggested that the prisoners internalised the gazes of the prison guards and, in turn, regulated their actions toward certain norms (Vaz & Bruno, 2003). Surveillance thus becomes a system of constant registration and constant inspection (Foucault, 1977/2008/1977/2008). The continual presence of the gaze (in our case the wearable health device and app) together with the regulation of actions, regardless of the actuality of the gaze, is what gives surveillance such deep rooted and enduring influence (Webb & Quennerstedt, 2010).

Foucault's Panopticon metaphor has however been criticised as being top-down, hierarchical and mainly focused on disciplinary aspects of surveillance, thus overemphasising surveillance in terms of 'them on us' (Galič et al., 2017; Vaz & Bruno, 2003). Galič et al. (2017) also suggest that the metaphor is insufficient when studying technology and digital layers of surveillance. In our study, surveillance is therefore used as a tool to explore how power is exercised, but as Gallagher (2010) suggests the metaphor of Panopticon most fruitfully should be seen as a point of departure, something to build on and move beyond. We accordingly draw on Foucault's work on surveillance, but as Vaz and Bruno (2003) suggest, add other propositions of his work on self-surveillance, resistance and power relations in order to make sense of how young people act in relation to a wearable health device and health app.

In this sense, the practices of surveillance, at the same time, entail and promote self-surveillance, which as Rose (1998) state are grounded in norms and claims of truth. Within the frame of this paper, self-surveillance involves certain truths about how health and healthy behaviour is privileged. For example, that healthy behaviour is about doing 10,000 steps per day. An acceptance of norms of health and the regulation of the self, in terms of self-surveillance and in relation to self-tracking technologies like Fitbits, then becomes what Petherick (2015) calls a constant monitoring of young people's daily health practices. Through the device and app young people potentially become subjects of both the normalising gaze of health as well as their own self-surveillance of who to become.

With inspiration from Albrechtslund (2008) we agree that individuals can resist surveillance and also embark on alternate ways to relate to technology and digitalisation. For this we need to be able to involve both the surveillance practices of what Lupton (2016) term imposed self-tracking, as well as what Albrechtslund (2008) term 'participatory surveillance'. Where 'users are actively engaged in surveillance themselves as watchers, but they also participate voluntarily and consciously in the role of watched' (Galič et al., 2017, p. 29). In this way, surveillance is not only analysed in the data as disciplinary and reproductive where the students are exposed the gaze, but also potentially involving pleasurable, empowering and participatory aspects of the practice (see Albrechtslund, 2008; Best, 2010; Whitson, 2013).

In order to explore resistance, we find Foucault's (1982) notion of power as action-on-action helpful. Foucault argued that power and resistance are always interconnected in how power relations

are manifested. Power relations guide or direct us to act in a field of greater or smaller possibilities. Power then is about both limitations and possibilities, where some actions are made possible and others not and where there always is a 'possibility of action on the action of others' (Foucault, 1982, p. 345). It is accordingly through focusing on actions upon other actions that power relations can be understood. Power relations then:

> … operate on the field of possibilities in which the behaviour of active subjects is able to inscribe itself. It is a set of actions on possible actions; it incites, it induces, it seduces, it makes easier or more difficult; it releases or contrives, makes more probable or less; in the extreme, it constrains or forbids absolutely, but it is always a way of acting upon one or more acting subjects by virtue of their acting or being capable of action. A set of actions upon other actions. (Foucault, 1982, p. 789)

In this paper, we use the concepts of surveillance and self-surveillance with inspiration from the critical literature (e.g. Depper & Howe, 2017; Lupton, 2016; Petherick, 2015), but add young people into this equation in terms of resistance and how they act on these technologies, as well as on themselves and others.

Methods

Context and participants

A case study design was adopted to provide a contextually grounded, holistic, and detailed account on young people's uses of the Fitbit device and app. The case was defined as, *a group of 100 young people from two schools in the UK who wore a Fitbit and used the Fitbit app as part of an eight-week school-based intervention*.

One hundred 13–14 years olds (53 females, 47 males), from five physical education classes in two schools were invited to participate. A minimum age of 13 was selected due to Fitbit's terms and conditions on age of use (Goodyear, 2017). The two schools varied in their socio-economic background, that added variability to the data through providing different contexts in which the young people would use and experience the Fitbit. School one was a non-selective private school in the South-East of England. School two was a comprehensive state school based in the North-West of England.

Ethics

Prior to data collection, university ethical approval was granted and informed consent or assent was obtained from all participants. A detailed account of the ethical procedures followed can be accessed in Goodyear (2017) that also details the briefing and debriefing lessons the researchers used to minimise risk and harm during the research. Fitbits terms and conditions were also consulted and followed. In the reporting of the findings, anonymity has been addressed through referring to the young people in a numerical format (e.g. Student 1).

Fitbit

The participants were provided with a Fitbit Charge to wear for an 8-week period. The main feature is the recording, monitoring, and measuring of the number of steps travelled during a day, where for example, a standardised target of 10,000 steps and calculations of calorie consumption is provided. The Fitbit Charge is a physical activity wristband that has a visual display. The visual display shows the time, steps taken, distance travelled, floors climbed and calories burnt. The individual's data can be wirelessly synced to a computer or mobile device. An 'app' can be downloaded to a mobile device that automatically synchronises the individual's data from the wristband to the dashboard. The app allows the individual to monitor their data in graphs, adapt their physical activity goals, compete with friends, earn badges for physical activity progress, record exercise, track sleep patterns and log food intake.

Data generation

Data were generated from focus group interviews. While data was also generated from questionnaires and the Fitbit device, as part of the wider study design, these data sources did not align with the research questions and the stated purpose. This data was, therefore, not included. For further information, please see Kerner and Goodyear (2017).

Focus group interviews took place following the eight-week period. Focus groups were selected to create a supportive environment that could encourage the expression of personal, multiple and sometimes conflicting viewpoints (Smith & Sparkes, 2016). 8 focus group interviews were conducted (3 interviews school 1, 5 interviews school 2; $n = 41$) with group sizes ranging from 4–6 participants, thus meeting an acceptable quantity of interviews and participants (Smith & Sparkes, 2016). Participants volunteered to participate in the interviews as part of the assent process. Focus groups were then formulated by the class teacher based on: (i) the inclusion of participants from a range of ability groups in their physical education classes; (ii) varied friendship groups; (iii) a range of socio-economic backgrounds.

Focus group interviews were conducted by the researchers and a research assistant within a space adjacent to the participants' physical education lesson. An adapted version of the nominal group technique was used (Macphail, 2001), and within the group, each pupil was asked to respond to a statement in turn that was presented to them by the interviewer. For example, statements introduced were 'I would recommend using the Fitbit to other people my age because … ' and 'as a result of wearing the Fitbit I learnt … '. The benefit of this technique was that it provided data on participants' immediate and individual responses to the statements. To gain further and in-depth insights, after every student had given their response they were then prompted to discuss their opinions and perceptions as a group until agreement was reached. The group were then guided by the interviewer to reach a level of consensus in their response to the statements. Toward the end of the interview, students were asked, in a more un-structured format, to share their experiences of the Fitbit. The interviews lasted between 15 and 30 min.

Data analysis

The concepts of surveillance, self-surveillance and resistance from Foucault were used to analyse the data. Tracy's (2010) end goals for qualitative research, as well as Gordon and Patterson's (2013) use of Tracy's criteria, were further used as a compass during a process of deliberation in order to scrutinise and evaluate each step in the research process in terms of quality.

In a first step, all transcripts were read through by the authors to identify important segments. The authors were guided by the concepts of surveillance, self-surveillance and resistance that occurs when young people relate to the Fitbits. In the second step, four analytical questions derived from Foucault were deliberated, decided upon and used. This process ensured that the research questions remained a central focus while also remaining open and reasonable to emerging understandings. Our analytical questions were: (i) how do students act upon the wearable technology device, (ii) what do they act upon and in what direction, (iii) how do students resist the use of the wearable technology device, and (iv) what is resisted?

In the third step, we used a *deliberative strategy*, inspired by Tracy's (2010) end goals for excellent qualitative research. Analytical questions were used by all researchers independently to answer the research questions. Each researcher formulated initial themes that became the basis for deliberation to make the themes something 'in common'. In the fourth step, the agreed themes were discussed in relation to the end goals put forward by Tracy (2010) regarding presentation of results and a consensus over the final themes reached. The presentation of the analysis was organised in two sections: (i) surveillance and self-surveillance; (ii) resistance. In the results section, data from School 1 is highlighted in interviews 1–4 and School 2 interviews 5–8.

A deliberative strategy: a note on the process

Even if we share Gordon and Patterson's (2013) and Smith and McGannon's (2017) hesitation about universal criteria for evaluating qualitative research, Tracy's (2010) eight hallmarks for qualitative researchers can be useful as a guide for high quality research. In this paper, the hallmarks are not positioned as universally viable criteria but as aspects open for deliberation, and Tracy (2010), importantly, makes a distinction between 'common end goals of strong research (universal hallmarks of quality) and the variant mean methods (practices, skills, and crafts) by which these goals are reached' (p. 839). Tracy (2010) argues that with the distinction between end goals and variant means, the end goals are potentially flexible and that they in order to be relevant must undergo 'dialogue, imagination, growth and improvisation' (p. 837) to work with the practices, skills, and crafts of different research traditions. What, for example, credibility becomes will inevitably be different depending on tradition. In this sense, we agree with Smith and McGannon (2017) that judgements have to be made continuously in the research process and that these judgements must be made clear and open for scrutiny.

Tracy's (2010) end goals cover the whole research process from the scientific problem, via data collection, data analysis to presentation of the research. We have used the end goals as part of *a deliberative strategy*. Inspiration is drawn from Englund (2006), to argue that the deliberative strategy involves: 'intelligent deliberation and balanced consideration of alternatives through mutual communication' (p. 508). The deliberative strategy is accordingly not a process to come closer to an essential truth, but as a procedure to reach as high quality research as we can. In the process we have tried to clarify to ourselves and as a consequence to the readers our theoretical and methodological assumptions so that the research process and the claims are made clear (Smith & McGannon, 2017). The goal of the deliberation is a form of collective agreement where all co-authors are given the possibility to make judgements in relation to different alternatives, views and arguments. It is accordingly the process of deliberation in relation to the end goals rather than exclusively focusing on the categories, themes or results that is central for the quality of the research. The authors' different backgrounds and experiences together with the respectful endeavour to clarify what the points of agreement were can be seen as a resource in the four steps of the analytical process in the study.

Results

Surveillance and self-surveillance

Reaching 10,000 steps makes you fit and healthy

Surveillance and self-surveillance were clearly connected to a norm of health equating to fitness and being 'fit'. The young people spoke of how the Fitbit device and app supported their health and fitness: '[the Fitbit] helps a lot with keeping you fit' (Interview 5); '[it] helps you to improve your fitness' (Interview 7). The messages young people referred to as a measure of fitness were related to doing steps and burning calories.

Steps were the strongest message the young people related to fitness. For example, 'if you are interested in your fitness and everything, I think it does help you, like for your steps' (Interview 3). In turn, young people frequently spoke of how they valued the surveillance practices offered by the Fitbit: 'I liked seeing how many steps [I] done' (Interview 4); '[it was] helpful for tracking how many steps you do' (Interview 6). In this way students expressed pleasurable and participatory surveillance.

In terms of the panoptical gaze, the norm of 10,000 steps per day became the measurement of health. For example, 'I learnt that you have to do 10,000 steps a day' (Interview 7) to be healthy. This measure of health was seldom questioned, even though some young people created personal targets of, for example, 12,000 steps 'I set it to 12,000 to see if I could hit it' (Interview 2). The understanding that health equals fitness and that fitness equals doing 10,000 steps became a deep-rooted

norm regarding health as a claim of truth. This truth was seen to stem from external sources: 'what some people recommend' (Student 1) or that 'some scientists' (Student 2) (Interview 2) recommend that doing 10.000 steps is healthy.

The young people related to the messages from the self-surveillance practices through perceptions that they felt healthier if they achieved the goal of 10,000 steps: 'it makes you feel good if you reach the target' (Interview 2); 'it makes you feel healthier' (Interview 1). Due to these positive feelings, the young people claimed that they were more motivated to engage in physical activity: 'when you have it, you want to do more … it motivated me, probably, to move around a bit more' (Interview 6); 'it's helpful for tracking how many steps you do … and just kind of motivates you to do a bit more exercise than you might otherwise do' (Interview 6). Some young people became quite occupied with the self-surveillance practices in terms of constant monitoring of their step data: 'I'm a bit addicted to check it … constantly checking it' (Interview 3); 'some people get obsessive over it' (Interview 7). While obsession was evident, most described how the device helped them to achieve their step goal: 'it keeps you on track of aiming for a goal' (Interview 1). By consequence, the young people acted on the data from the device by becoming 'more active' (Interview 1), and increased levels of activity often occurred upon realisation that they hadn't met the step target.

Interviewer: So if you weren't approaching that [i.e. 10,000 steps], come, say, like six/seven o'clock of an evening, would you do anything about it?
Student 1: Yeah (laughs) … . go on a run or something (laughs).
Student 2: We were all just running.
Student 1: Yeah, we started running in the house
Student 2: We were going on a run, then after a few weeks we just kind of …
Student 1: We were just doing star jumps and that (laughs). (Interview 3)

The young people thus regulated their actions for both encouraging and harmful reasons toward a certain claim of truth i.e. 10.000 steps = health. The idea of being healthier was also evidently connected to a narrow interpretation of health equating to not being fat. As the below interview demonstrates, the young people report on the usefulness of the device for keeping their step count up as a way of being more active. The importance of being active is then related to the maintenance of an ideal weight, where health is viewed as not being fat.

Student 1: It gives you an incentive to want to maybe do more sport and get your steps up, achieve your goals, etc.
Interviewer: And why would you want to do that?
Student 1: Well, to keep more active, stay active and, yeah.
Interviewer: Anyone want to say why it's important to be active?
Student 2: So you stay an ideal weight …
Student 1: Keeps you healthy.
Interviewer: Keeps you healthy. What does healthy mean?
Student 1: Not fat. (Interview 1)

Health as not being fat thus became the norm of how to act as well as who to become. The device and/or app was particularly useful to, and reviewed positively by the young people, who defined health by being active as a means to not be fat:

If you wanted to track your calories it's quite an easy way to do it, because you don't have to add everything yourself, it'd just do it for you. (Interview 3)
It makes you feel slimmer because you're like, I've done 2,000 calories (Interview 2)

In relation to the norm of health as not being fat, calorie consumption equalling being slim was not challenged as acts of health. Even if some of them said that the notion of how many calories they burn did not bother them, they also confessed that they were constantly checking both steps and calorie consumption. For example, 'it showed how many calories you burn on average per day' (Interview 3). The students also mentioned that in order to get fitter, monitoring and recording how many calories they were burning was essential, and thus that being fat equals being unhealthy.

> I just find it kind of interesting about how many steps I do and I like to set targets, like every day, to reach a certain amount of calorie burn (Interview 5)

The measuring of 10,000 steps guided the young people towards a feeling that they were healthier. The device supported the young people how they should act and they could constantly monitor their behaviour towards certain norms of health. The young people were quite clear about self-surveillance appearing as a consequence of the health surveillant gaze of the Fitbit. They in some senses willingly participated in the surveillance. The device and/or app motivated them to be more active, and the measurements and daily targets set by the device encouraged them do more physical activity. Health, as a certain claim of truth, was defined as something that a person can reach and was constituted as a condition of continuous calorie burning that was related to doing a sufficient amount of steps.

Peer surveillance makes you want to do more (or not)

While a number of young people were only interested in their own data (for example, 'I liked just seeing what I did' (Interview 4), peer comparison was appreciated by many: 'I quite liked the friend feature so you can see how your friends are doing' (Interview 8); 'I was like, Oh how many steps have you done in a day?' (Interview 8). Peer comparison therefore functioned as an important part of ongoing surveillance and regulation of actions.

Peer surveillance was most frequently represented in the form of competition, where the young people used the Fitbit app to create and engage with step count competitions: 'people would have competitions to see how many steps they could do in an amount of time' (Interview 4). Engaging in what was described as a 'friendly competition' (Interview 6) encouraged young people to increase their step count: 'I think doing it with your friends, it gives you competition and it encourages you, definitely' (Interview 1); 'it gives you a challenge' (Interview 1). In these competitions, peer-comparison became part of the surveillance that influenced exercise behaviours: 'it makes you do a lot more walking because you want to try and beat your friends' (Interview 3); 'I was encouraged to do a lot more sports when I was wearing the Fitbit … I wanted to try and beat my friend's record, like steps' (Interview 1). Friendly competition thus constitutes surveillance through pleasurable regulation.

Not all students regarded the competition as friendly however. For some, peer comparison developed a winning-at-all-costs mentally. For example, one young person stated that they 'did 25,000 steps' in one day in attempt to win the competition (Interview 6). The young people who could not beat or match their peers step counts often removed themselves from the competitions: 'I think I just pulled out of it because I kept losing' (Interview 4). Alternatively, the young people began to engage in extreme exercise behaviours, as a result of the fears of negative peer-comparison.

> You can sometimes feel guilty. Like when I first got this Fitbit, if I hadn't done 10,000 steps before I went to bed, I used to just walk up and down the corridor because I couldn't let someone else beat me. (Interview 7)

Through knowing that their peers could check their step counts, peer surveillance through the app acted to increase young people's levels of physical activity. Using the device and app was about accepting the surveillance and gaze of others, and accepting the norm that you should want to compare and should want to win over your peers. Peers accordingly acted as a significant part of the daily surveillance practices of doing 10,000 steps or more.

Resistance

Measuring is not accurate and it can make you feel bad or bored

The young people frequently described their experiences of using the Fitbit as interesting: 'it was interesting to know how many [steps] you have done' (Interview 6); 'it's interesting to see how much you're doing' (Interview 4). Yet interest in the device and/or app was not sustained: 'it was

interesting, but it got a bit boring after a while' (Interview 2). An overwhelming message was that interest and engagement with the device and/or app only lasted a few weeks: 'I just stopped and did normal' (Interview 3).

Student 1: We did the first few weeks
Student 2: Then we kind of stopped
Student 1: Yeah … I don't really know we just stopped doing it
Student 2: We stopped, yeah, just didn't use the app as much. (Interview 3)

The regulation of action thus seemed to stop, and for most of the young people, data from the Fitbit was not important in their lives. For example, '[it's] not essential' (Interview 4); 'you can go without [it]' (Interview 4). The device just became a fancy watch and they didn't act upon or bother much about it:

Student 1: I got in the shower with it on and then realised I had it on and throw it over the curtain.
Student 2: Yeah, and then you leave it there and you completely forget about it, and then you don't wear it. (Interview 8)

Many participants only felt comfortable monitoring behaviours that they understood. In this regard, step count was seen as the primary measure and they often disregarded data that they didn't understand. For example, calories were a source of confusion and seen as unimportant, or not relevant for them: 'I didn't use the calories one just because I didn't really get it. So (laughs) I just don't get it' (Interview 3). Counting calories was too time consuming since calorie intake must be registered individually and some students questioned the value of monitoring their calories at their age. For them, calories might be important later on in life, but not now: 'you had to log all your food as well' (Interview 3). The young people regulated their actions around information that could easily be related to and interpreted.

While some of the young people simply forgot and/or became disinterested in the device and/or app, others through their actions resisted the surveillance practices. A key reason underpinning resistance was how the surveillance practices impacted on wellbeing. If a young person was not achieving 10,000 steps per day, they began to feel bad about themselves: 'if you don't do a lot of exercise in a day, then you just feel really bad' (Interview 8); 'you sit there and realise it's seven o'clock and you've got like ten steps and you feel really bad' (Interview 2); 'it makes you feel fat' (Interview 2); 'it puts pressure on you' (Interview 2). To navigate against these negative feelings of self, the young people disregarded the device and/or app. As one person noted, 'when I'm not wearing it, it's less pressure to get the steps done' (Interview 4).

A strong resistance against the predetermined target of 10,000 steps was also identified. The young people felt the need to recognise difference and called for targets that were more personalised:

> I think you should have your own target for you to … because some people do more exercise than others, and some people walk more … some people are fitter than others … everyone's different. (Interview 8)

The need for personalised targets was reflected in the ways the young people reported on the unfairness of the device to represent physical activity in their daily lives. For example, 'steps don't show how much exercise you can do, so you can do a lot of steps but it doesn't really count how much exercise you've actually done' (Interview 4). The device was also positioned as unfair because it could not measure all the activities they engage with: 'I do rowing, so it doesn't really count the amount of exercise I actually do' (Interview 4); 'I don't get to see what I do from the swimming' (Interview 5); 'in football, if you come in for a strong challenge, it comes off quite easily' (Interview 4). By consequence, a lack of trust was placed in the device and the young people claimed the device was inaccurate: 'it wasn't very accurate' (Interview 5).

The level of trust in the Fitbit's ability to act as a credible tool of self-surveillance and peer comparison was further questioned through the inaccuracy of the readings. The young people began to observe that the device did not record their sedentary behaviour accurately and that they could

manipulate the data recorded on the device. Further, the young people learnt that they could shake their hands to increase the steps recorded.

> When I went to Sicily, we left school at half past one in the morning and, in that day, I managed to get 30,000 steps and 210 floors because the bus was bumpy and the aeroplane had turbulence. (Interview 6)
> When you look at your steps, sometimes you think it's not high enough, so you do that [shaking hand] or something, just to try and get your steps up. That's what quite a lot of people did. (Interview 4)

The surveillance and self-surveillance practices were therefore resisted for a number of reasons: (i) the data was not essential and/or interesting; (ii) the data from the Fitbit made them feel bad about themselves; (iii) the device did not record physical activity as part of the daily lives. In turn, the device and/or app was resisted through, (a) not wearing the health device and/or (b) manipulating the step count. The young people did not trust the accuracy of the device, yet they trusted the norm of 10,000 steps equalling health.

Measuring steps has no educational value

Since the Fitbit device and app were introduced within physical education lessons, part of young people's resistance was about if the Fitbits should be used within educational contexts. Related to the key reasons for resistance, the young people questioned the educational value of measuring steps and calories within physical education. The young people opposed the view that the teacher should add another layer of surveillance and saw this additional layer of surveillance impacting negatively on their wellbeing. Moreover, the monitoring of steps and calorie intake was not seen as part of the physical educator's role.

> I think teachers shouldn't have to worry about telling us how much we should be doing because people will start worrying that they're not doing enough and it will mess with their heads and stuff. (Interview 7)
> It is not teachers job to talk about or check how many calories you burn or how many steps you take. That is for nurses or the family. (Interview 2)

In this way the teacher was resisted as a valid authority on these issues of health. While peer-comparison was highlighted as a way to support young people's engagement with physical activity, competition in relation to step count in physical education was resisted. Class wide competitions could impact on their feelings of guilt and would encourage their peers to cheat, as a means of winning:

> Interviewer: What about if you had a class competition? So you were all friends on the friends-app thing and you were all competing against each other, would that be a good or a bad thing to do?
> Student 1: I don't think I'd like that.
> Student 2: No, I wouldn't like it.
> Student 3: Yeah, I wouldn't like that … .
> Student 1: Because I think certain people would make you feel guilty about how much you're doing.
> Student 2: Yeah, some people would turn it into a—
> Student 1: And there'd be cheating and then people would just be unreliable.
> Student 2: Yeah, and I think it would turn into a horrible thing rather than a good thing. (Interview 7)

The young people also resisted the idea that the quality of a physical education lesson should be measured quantitatively and by step count. Although it was not part of the study design for the teachers to use the Fitbit's as an educational tool, the young people's accounts of measuring steps within lessons highlights a lack of perceived relevance: 'I don't think it'd be useful at all because, in the end, she had us walking round benches and stuff to get more steps, and therefore it's a better exercise than press-ups and that' (Interview 4). The resistance was also related to the need for personalisation and the perceived pressure that would result from step targets being set by teachers: 'I think they [teachers] shouldn't, but I think you should do an amount of steps that you feel comfortable with. I don't think you should be forced to do an amount of steps' (Interview 8); 'if you do less than that [steps], then you're going to feel under pressure to do it, just because they've said so' (Interview 6). Overall the perception was that physical education teachers, 'should tell them just to be healthy, not how to do it' (Interview 2).

The young people's resistance demonstrates a quite sceptical stance towards introducing wearable health devices like Fitbits in school. In a way they resisted how power was exercised on the teacher by using steps as a norm for educational content. They also resisted a one-size-fits-all norm regarding health in education, and a strong part of that resistance relates to the educational message offered that equates to health being measured and valued in terms of steps.

Discussion

Qualitative data drawn from an eight-week school-based intervention focussed on 100 young people has provided clear evidence on the surveillance, self-surveillance, and resistance when young people use a wearable health device. In terms of surveillance, the daily 10,000 step and calorie burning targets set by the Fitbit device encouraged the young people to do more physical activity. Reported increases in physical activity occurred because of the self-surveillant practices promoted by the Fitbit through; (i) the monitoring and recording of steps and calories burned, and (ii) peer comparison. Surveillance and self-surveillance practices, however, were, in line with previous studies in schools (e.g. Burrows, 2010; Harris et al., 2017), clearly connected to health equating to fitness and being 'fit' or as Powell and Fitzpatrick (2015) also highlight, not being 'fat'. These narrow interpretations of health, equally, underpinned resistance. Daily step and calorie burning targets, (i) did not sustain their engagement with the device beyond a few weeks, (ii) promoted negative feelings, and (iii) the device was resisted because it did not record physical activity accurately as part of their daily lives. In turn, and in slight contrast to previous studies, the young people explicitly resisted the educational value of the Fitbit and demonstrated a sceptical stance toward introducing surveilling health devices in school and physical education settings.

To date, the point of reference for positioning healthy lifestyle technologies in education has been adult perspectives, that centre on two assumptions: (i) young people will be willing and able to use healthy lifestyle technologies to inform and regulate their behaviour; or (ii) young people will experience negative impacts on their health and wellbeing because they will adopt regulative and disciplinary behaviours (Casey et al., 2017; Gard, 2014; Luton, 2015; Petherick, 2015; Rich & Miah, 2017). Data from this study suggests that young people regulate their actions towards a norm of health equalling 10,000 steps, but in doing so they, at least short term, are encouraged to increase their physical activity levels. The data also suggest that they resist the self-tracking behaviours promoted by a Fitbit device and app, indicating that healthy lifestyle technologies will fail to impact on young people's health. One reading of this could be to disregard healthy lifestyle technologies from education contexts. On the other hand, the pervasiveness of healthy lifestyle technologies in society, their growing use by young people (Depper & Howe, 2017; Wartella et al., 2016), and the role of body pedagogies outside of school influencing health-related behaviours (Powell & Fitzpatrick, 2015; Wright & Halse, 2014) encourages further thought and consideration about the role of technology in schools and in physical education.

It was clear from the data that the young people resisted the Fitbit device/app – for accuracy and fairness – but they never resisted the norm of 10,000 steps as a measurement of health. Drawing on Wright and Halse (2014), the biopedagogical practices of the Fitbit thus worked to instruct, regulate, normalise, and construct an idea of a healthy young person as being active, fit and motivated to do 10,000 steps per day. Similar to cautions raised by Gard (2014), Powell and Fitzpatrick's (2015) and Depper and Howe (2017), daily step targets reproduced an idea that health was achieved through 10,000 steps, positioning the young people as being active or inactive, fit or fat, healthy or unhealthy, good or bad, or those who cared or didn't care about their health. Young people's attendance to and acceptance of this narrow interpretation that health equates to numbers and health is a behaviour that can be quantified (Gard, 2014; Williamson, 2015) is an issue that needs to be addressed in physical education, particularly if self-tracking will become an imposed practice (Luton, 2015).

In agreement with a substantial and international evidence-base, critical pedagogical approaches are required in schools to address the societal, narrow and normative discourses of health (Burrows &

Wright, 2004; Casey et al., 2017; Gard, 2014; Harris et al., 2017; Powell & Fitzpatrick, 2015). The suitability of a critical approach rather than an exclusively physical activity promoting approach is further supported by the views of young people in this study. In contrast to literature that advocates for the value of surveillance and the use of healthy lifestyle technologies in physical education contexts (Casey et al., 2017; Williamson, 2015), the young people stressed that there would be no educational value of integrating technology and that technology could negatively impact on their wellbeing. Yet, while a critical approach is commonly cited as way of supporting young people to navigate societal health discourses, evidence on the skills young people need to acquire, what a critical approach entails and how physical educators might practice a critical approach is more limited, particularly with regard to self-tracking and digital technologies (Casey et al., 2017; Powell & Fitzpatrick, 2015; Rich & Miah, 2017).

Armour (2014) and Dudley, Goodyear, and Baxter (2016), as well as others, stress that the starting point for any pedagogical encounter should be the diagnosis of learners needs, understandings and skills. Young people's understandings and skills act as an important 'springboard' to begin conversations and work productively with young people (Powell & Fitzpatrick, 2015, p. 481). Data from this study provides new insights into young people's current needs, understandings and critical skills in relation to health and healthy lifestyle technologies. We know from earlier discussions that young people require support to address health equalling to numbers like BMI, steps or results on fitness tests (e.g. Petherick, 2015; Wright & Halse, 2014).

On the other hand, the young people in our study express that health should be personalised to the individual, seen through the ways in which they appreciate that different people have different physical activity behaviours. In terms of skills, the young people also critically considered the value of healthy lifestyle technologies in their lives and in education, seen through the way they questioned the capabilities of self-tracking devices to regulate their individual physical activity behaviours and the measurement accuracy of the devices. Some young people do, however, lack the skills they require to respond to and navigate feelings of pressure and negative feelings of self, seen through their experiences of peer competition and narrow notions of health as not being fat (Powell & Fitzpatrick, 2015). A critical approach to healthy lifestyle technologies in physical education would, therefore, need to address the competing discourses of normativity and personalisation, in terms of how young people understand health, as well as supporting young people to further develop their existing critical skills to evaluate how they can best respond to pressure and negative feelings of self, an unfortunate product of using healthy lifestyle technologies. Educators could build on young people's already questioning stance and develop a health-wear-ability so they can critically scrutinise both the measuring, the measuring devise as well as what is measured including the surveillance that these devices are examples of. Equally, young people's capabilities to act as critical consumers of healthy lifestyle technologies should be further developed and extended, to support them in constructing more nuanced understandings of a healthy young person.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by Richard Benjamin Trust [grant number RBT 1507].

ORCID

Victoria A Goodyear http://orcid.org/0000-0001-5045-8157
Charlotte Kerner http://orcid.org/0000-0002-7387-3625
Mikael Quennerstedt http://orcid.org/0000-0001-8748-8843

References

Albrechtslund, A. (2008). Online social networking as participatory surveillance. *First Monday*, *13*(3), Retrieved August 15, 2017, from http://journals.uic.edu/ojs/index.php/fm/article/view/2142/1949

Armour, K. M. (2014). *Pedagogical cases in physical education and youth sport*. London: Routledge.

Best, K. (2010). Living in the control society: Surveillance, users and digital screen technologies. *International Journal of Cultural Studies*, *13*(1), 5–24.

Burrows, L. (2010). Push play every day: New Zealand children's constructions of health and physical activity. In M. O'Sullivan & A. MacPhail (Eds.), *Young people's voices in physical education and sport* (pp. 145–162). Oxon: Routledge.

Burrows, L., & Wright, J. (2004). The good life: New Zealand children's perspectives on health and self. *Sport, Education and Society*, *9*(2), 193–205.

Casey, A., Goodyear, V. A., & Armour, K. M. (2017). Rethinking the relationship between pedagogy, technology and learning in health and physical education. *Sport, Education and Society*, *22*(2), 288–304.

Dennison, L., Morrison, L., Conway, G., & Yardley, L. (2013). Opportunities and challenges for smartphone applications in supporting health behaviour change: Qualitative study. *Journal of Medical Internet Research*, *15*(4), e86.

Depper, A., & Howe, P. D. (2017). Are we fit yet? English adolescent girls' experiences of health and fitness apps. *Health Sociology Review*, *26*(1), 98–112.

Dudley, D., Goodyear, V. A., & Baxter, D. (2016). Quality and health-optimizing physical education: Using assessment at the health and education nexus. *Journal of Teaching in Physical Education*, *35*(4), 324–336.

Dute, D. J., Bemelmans, W. J. E., & Breda, J. (2016). Using mobile apps to promote a healthy lifestyle among adolescents and students: A review of the theoretical basis and lessons learned. *JMIR mHealth and uHealth*, *4*(2), e39.

Englund, T. (2006). Deliberative communication: A pragmatist proposal. *Journal of Curriculum Studies*, *38*(5), 503–520.

Foucault, M. (1977/2008). "Panopticism" from discipline & punish: The birth of the prison. *Race/Ethnicity: Multidisciplinary Global Contexts*, *2*(1), 1–12.

Foucault, M. (1982). The subject and power. *Critical Inquiry*, *8*, 777–795.

Galič, M., Timan, T., & Koops, B. J. (2017). Bentham, deleuze and beyond: An overview of surveillance theories from the panopticon to participation. *Philosophy & Technology*, *30*(1), 9–37.

Gallagher, M. (2010). Are schools panoptic? *Surveillance & Society*, *7*(3/4), 262–272.

Gard, M. (2014). eHPE: A history of the future. *Sport, Education and Society*, *19*(6), 827–845.

Goodyear, V. A. (2017). Social media, apps, and wearable technologies: Navigating ethical dilemmas and procedures. *Qualitative Research in Sport, Exercise and Health*, *9*(3), 285–302.

Gordon, J., & Patterson, J. A. (2013). Response to tracy's under the "big tent" establishing universal criteria for evaluating qualitative research. *Qualitative Inquiry*, *19*(9), 689–695.

Harris, J., Cale, L., Duncombe, R., & Musson, H. (2017). Young people's knowledge and understanding of health, fitness and physical activity: Issues, divides and dilemmas. *Sport, Education and Society*, *38*, 1–5.

HM Government. (2015). *Sporting future: A new strategy for an active nation*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/486622/Sporting_Future_ACCESSIBLE.pdf

Kerner, C., & Goodyear, V. A. (2017). The motivational impact of wearable healthy lifestyle technologies: A self-determination perspective on FitBits with adolescents. *American Journal of Health Education*, iFirst.

Lewallen, J., & Behm-Morawitz, E. (2016). Pinterest or Thinterest?: Social comparison and body image on social media. *Social Media + Society*, *January–March*, 1–9.

Lupton, D. (2016). The diverse domains of quantified selves: Self-tracking modes and dataveillance. *Economy and Society*, *45*(1), 101–122.

Luton, D. (2015). Data assemblages, sentient schools and digitised health and physical education (response to Gard). *Sport, Economy and Society*, *20*(1), 122–132.

Macphail, A. (2001). Nominal group technique: A useful method for working with young people. *British Educational Research Journal*, *27*(2), 161–170.

Petherick, L. (2015). Shaping the child as a healthy child: Health surveillance, schools, and biopedagogies. *Cultural Studies? Critical Methodologies*, *15*(5), 361–370.

Pink, S., & Fors, V. (2017). Self-tracking and mobile media: New digital materialities. *Mobile Media & Communication*, doi:2050157917695578

Powell, D., & Fitzpatrick, K. (2015). 'Getting fit basically just means, like, nonfat': Children's lessons in fitness and fatness. *Sport, Education and Society*, *20*(4), 463–484.

Quennerstedt, M., Burrows, L., & Maivorsdotter, N. (2010). From teaching young people to be healthy to learning health. *Utbildning och Demokrati*, *19*(2), 97–112.

Rich, E., & Miah, A. (2017). Mobile, wearable and ingestible health technologies: Towards a critical research agenda. *Health Sociology Review*, *26*(1), 84–97.

Rose, N. (1998). *Inventing our selves: Psychology, power, and personhood*. Cambridge: Cambridge University Press.

Smith, B., & McGannon, K. R. (2017). Developing rigor in qualitative research: Problems and opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology*. Advance online publication. doi:10.1080/1750984X.2017.1317357

Smith, B., & Sparkes, A. (2016). Interviews: Qualitative interviewing in the sport and exercise sciences. In B. Smith & A. Sparkes (Eds.), *Routledge handbook of qualitative research in sport and exercise* (pp. 103–123). London: Routledge.

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry*, *16*(10), 837–851.

Vaz, P., & Bruno, F. (2003). Types of self-surveillance: From abnormality to individuals 'at risk'. *Surveillance & Society*, *1*(3), 272–291.

Wartella, E., Rideout, V., Montague, H., Beaudoin-Ryan, L., & Lauricella, A. (2016). Teens, health and technology: A national survey. *Media and Communication*, *4*(3), 13–23.

Webb, L., & Quennerstedt, M. (2010). Risky bodies: Health surveillance and teachers' embodiment of health. *International Journal of Qualitative Studies in Education*, *23*(7), 785–802.

Whitson, J. R. (2013). Gaming the quantified self. *Surveillance & Society*, *11*(1/2), 163–176.

Williamson, B. (2015). Algorithmic skin: Health-tracking technologies, personal analytics and the biopedagogies of digitized health and physical education. *Sport, Education and Society*, *20*(1), 133–151.

World Health Organization (WHO). (2011). *Mhealth: New horizons for health through technologies. Global observatory series, 3*. Geneva: World Health Organisation.

Wright, J., & Halse, C. (2014). The healthy child citizen: Biopedagogies and web-based health promotion. *British Journal of Sociology of Education*, *35*(6), 837–855.