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# Why do Wii teach physical education in school?

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*Abstract:* Videogames including bodily movement have recently been promoted as tools to be used in school to encourage young people to be more physically active. The purpose of this systematic review has been to explore the arguments for and against using exergames in school settings and thus facilitate new insights into this field. Most of the arguments for and/or against the use of exergames can be organised in relation to health and sport. In relation to health, the dominant theme is about fitness and obesity. In relation to sport, the two main themes were skill acquisition, and exergames as an alternative to traditional PE. The idea why Wii teach PE in schools is that children are becoming more obese, which in turn threatens the health of the population. Schools seem to be an appropriate arena for this intervention, and by using exergames as an energy consuming and enjoyable physical activity a behaviour modification and the establishment of good healthy habits is argued to be achieved.

Key words: Exergames, review, synthesis, physical education, health

## **Introduction**

In society, video-games are often pointed out as risk factors in relation to physical inactivity, sedentary behaviour and increasing levels of obesity. In particular, young people's video gaming is portrayed as something that involves an excessive sedentary lifestyle. Media reports often tell us how television, computers, fewer young people engaging in sport, decreasing physical activity levels and reduced curriculum time for physical education in school lead to increased levels of obesity in society. In the Scandinavian countries, studies also

show how inactive people often stay inactive while the already active ones often increase their levels of physical activity (cf. Svensson et al., 2010). In short, both the media and public health research present us with a dreary picture, and limiting young people's inactive 'screen time' is often regarded as an important public health endeavour.

At the same time, computers are an important source of information, and IT-competence and experience are advantageous in society. At the centre of this paradox is the introduction of a new type of videogames, in which bodily movement and physical activity, rather than sedentary screen time, form a major part. These games – so-called *exergames* or active video games<sup>3</sup> – involve physical movement through the use of balance-boards, step-up boards, bicycles, dance-pads, or the use of a remote control as a tennis racket.<sup>4</sup> Several games also include webcams, so that the bodily movements of those playing the game can be tracked.

Exergames are increasingly promoted in several countries (e.g. Australia, Canada, the UK, the USA and Sweden) as tools that can be used in school to encourage young people to be more physically active. In particular, these games are regarded as part of the future of physical education (PE) and as a modern way of doing physical training in school. In this article, this idea will be explored by means of a review of existing literature in the field.

The purpose of this systematic review and synthesis is to explore the arguments for and against using exergames in school settings found in popular and research texts. As a first step, a review of popular 'literature' and scholarly texts relating

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<sup>3</sup> For example, Wii fit, Wii sports, Dance Revolution, Your Shape, Kinect, Move, etc

<sup>4</sup> These games have proved popular in many countries and are best sellers. According to statistics from Nintendo company Wii sports has sold 79 million copies, Wii sports resort 30 million copies and Wii fit plus 20 million copies up until march 2012.

to schools' use of exergames is conducted. In a second step, the synthesis, the assumptions made by both critics and advocates in terms of what is taken for granted regarding health and education is critically explored.

### **Why exergames and why now?**

Over the last twenty years or so, questions about obesity have been high up on the public health agenda (cf. Skidmore et al., 2004; Wald et al., 2004; Zarocostras, 2004). In particular, children and young people have been pinpointed as important interventional targets (Dietz, 2004; Ebbeling et al., 2002; Jerome et al., 2007; Marcus, 2005).

In this context, several studies show a clear relation between time spent on video- and computer games, low physical activity levels and increased weight (Carvalho et al., 2007; Vandewater et al., 2004; Wilson, 2004). At the same time, other studies with similar samples have been unable to identify this relation (Biddle et al., 2004; Lager & Bremberg, 2005; Telema et al., 2005; Wang et al., 2006). In other words, the relation between video gaming and health is somewhat ambiguous.

Also in relation to the use of exergames in school there are differences of opinion. In a recent review of research on video games and health, Papastergiou (2009) argues that video games can offer “potential benefits as educational tools for HE and PE<sup>5</sup>, and that those games may improve young people’s knowledge, skills, attitudes and behaviours in relation to health and physical exercise” (Papastergiou, 2009, p. 603). However, from a critical point of view, Vander Schee and Boyles (2010) argue that exergames can instead be seen as a body pedagogy that produces certain narrow meanings about health, and that the uncritical implementation of exergames in school – under the pretence of

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<sup>5</sup> HE stands for Health Education and PE for Physical Education.

solving the crisis discourse of obesity – is a problematic way of justifying the placement of commercial products in school.

### **Methodological approach**

In this study, a systematic but non-comprehensive review of research and ‘popular’ literature was performed in order to explore the arguments for and against using exergames in school settings (Andrews & Harlen, 2006; Cornelius-White, 2007; Greenhalgh et al., 2005; Marston & King, 2006). The study includes summarising as well as synthesising features. As Quennerstedt (2011) argues:

... a summarising approach can have the purpose of highlighting what has been explored and said within a specific field of research, and perhaps also look at the perspectives and methods used. A synthesis has a somewhat different ambition in that it aims to produce knowledge that reaches beyond the sum of its parts (Campbell et al. 2003, Greenhalgh et al. 2005). Individual studies are thus combined and integrated to a whole, bringing themes and concepts together to make new concepts and theoretical insights possible. (p. 663)

Our study uses both popular and scholarly texts in order to conceptualise the field of using exergames in school settings in new ways. The searches in the review were performed in September 2011 in the following full text databases: Cambridge Journals Online, DOAJ, EBSCO/Academic Search Elite, Emerald, JSTOR, MUSE, Oxford University Press, Journals Online, Sage, ScienceDirect (incl. back files psychology), Springer, Wiley and Google Scholar. Google was used for the popular literature searches. These databases cover most major journals in the field. Further, by means of so-called snowballing, the reference lists of included articles and web page links were examined for additional articles.

We used the following keywords and search strings in our searches: “physical education” OR “pe” OR “sport” AND “video game” OR “exergame\*” OR Wii OR “computer game\*” AND “school\*”. The reason for the use of search terms is in relation to the purpose of the paper to explore arguments in school settings. The searches resulted in many thousands of hits for popular literature and over two thousand in the databases. The first 300 hits of each search were viewed until saturation was reached and few additional arguments arose. The inclusion criteria for an article to be incorporated in the study were that it related to the use of exergames in a school setting or concluded with explicit consequences for school settings. These criteria therefore excluded articles about exergames and the rehabilitation of injuries, the medical effects on adults, exergames as an activity for older people, the promotion of self-efficacy, video game design related to health and physiological studies of strength, balance or energy expenditure. In total, the review and synthesis of the literature included 26 journal articles and 61 popular articles.<sup>6</sup>

We are aware of the limitations of this study, occasioned by the sole use of keywords in the English language. There is consequently no comprehensive claim for the review, and the results of the study reflect the arguments in mainly English speaking countries.

The analysis of the literature is made in two distinct steps. In the first step, what Culler (1992) calls *understanding*, we clarified what the texts say about the use of exergames in school. Culler argues that this is an analytical strategy where the researcher asks questions that the literature so to speak insists on. Here the arguments for and against the use of exergames in school settings were

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<sup>6</sup> Of the 61 popular articles included in the study, 34 were from the USA, 16 from the UK, 5 from Australia, 2 from Singapore, 2 from Sweden and 1 from Canada. Two articles could not be identified by country.

categorised into different themes and a search for patterns and regularities in the arguments included in the texts was conducted. In this part, the arguments were coded in terms of arguments for and against using exergames in school settings and subsequently organised into main themes. These themes are presented in the first part of the findings section.

The second step of the analysis – the synthesis (Greenhalgh et al., 2005; Quennerstedt, 2011), or what Culler (1992) calls *overstanding* – consists of a reading where we compare the understanding in step one with other possible ways to explore the literature. The synthesis is thus a shift between understanding and overstanding in terms of what the arguments do in relation to health and education. In this step, the assumptions made by both critics and advocates about what is taken for granted regarding health and education in relation to the use of exergames is critically explored. It is consequently not the validity of arguments that is the scope of the synthesis, but the construction of arguments in relation to health and education.

### **Arguments for and against using exergames in schools**

In the review of both research and popular literature, most of the arguments for and/or against the use of exergames in school can be organised in relation to health and sport. In relation to health, one theme is dominant, namely that *fitness and obesity* include ideas about how children become obese, how they can improve their fitness levels, the importance of activities that are fun to do, deception and testing children's abilities and fitness. Two themes were identified in the research review that relate to health and where the lines of argument are against the use of exergames in school: that exergaming can damage children's *self-image* and that exergames involve a problematic *control over corporeality*.



In relation to sport, the two main themes of *skill acquisition* and exergames as an *alternative to traditional PE* were identified in both the academic and popular texts. A minor theme was also identified in the popular texts: that exergames can be used as a *technical solution* to problems of place and equipment.

The review of popular texts also displayed arguments that were more related to education. These arguments were all for the use of exergames in schools and were about using exergames as *educational tools* for behavioural management, inclusion of children with special needs and for developing critical ability.

In both the research and popular literature, *economic* arguments against introducing exergames in schools were identified; arguments that related to problems with the cost of purchasing, updating and repairing the games and with how to secure funding. This minor theme is not presented in detail in the results section, however.

Table 1. Themes in the arguments for and against the use of exergames in school settings. The items in bold type are major themes that were identified in the analysis.

Theme	Schools for	Schools against	Research for	Research against	Main argument
Fitness and obesity	<b>X</b>	x	<b>X</b>	x	Health-related arguments about making children more fit
Self-image				x	Health-related arguments about how exergames can damage self-image
Control over corporeality				x	Health-related arguments about exergames as part of the management of people's bodies.
Skill acquisition	<b>X</b>		<b>X</b>		Sports-related arguments about promoting sports- and motor skills
Alternative to traditional PE	<b>X</b>	x	<b>X</b>		Sports-related arguments about using exergames as an interesting alternative to ball games
A technical solution	x	x			Sports-related arguments about technical solutions to problems of place and equipment
Educational tools	x				Educational arguments about learning and discipline in school

*Exergames can make children fit and help to combat obesity*

The major line of argument in the academic articles and popular literature related to issues of fitness, weight control, stimulating positive activity

behaviour, the possibility to make children more fit, and, in the long run, helping to combat obesity problems in society. Although the majority of these arguments were for the inclusion of exergames in schools, there were also a few arguments against.

Arguments for the use of exergames in school revolve around the idea that they can provide a tool to increase students' *physical activity levels* (Fogel et al., 2010; Graves et al., 2010; Jacobs et al., 2011; Sell et al., 2010) and stimulate positive activity behaviour (Graves et al., 2010; Kiili et al., 2010; Macvean, 2011) in order to improve the health of today's youth (Papastergiou, 2009; US 1, 3, 4, 9, 14, 19, 41, UK 11, 15, 43). The basic assumption is that obesity, and particularly child obesity is a major risk in society (Kiili et al., 2010; Jacobs et al., 2011; Song et al., 2011) and that exergames can help to combat the obesity problem (Quinn, 2011; Papastergiou, 2009; Staiano & Calvert, 2011).

In this risk discourse, exergames are held forth as an effective *health intervention* for young people in terms of increased heart rate (Brox et al., 2011), promoting activity (Graves et al., 2010; Kiili et al., 2010; Quinn, 2011), weight loss and weight control (Jacobs et al., 2011) and energy expenditure (Graves et al., 2007; Sell et al., 2011). Hansen and Sanders (2010) conclude that, in their study, exergames were more physically demanding than normal PE-classes among fifth grade students. The games are especially regarded as a way of helping children who need it most, i.e. those who are overweight (Papastergiou, 2009).

Exergames are also seen as an interesting *educational intervention* in school. The targets for this intervention are primarily overweight children, as "a potential cure for overweight youngsters ... to help the most at-risk youngsters out of their sedentary lifestyles" (UK 43) (Cuningham et al., 2010; Graves et al.,

2010; Hansen & Sanders, 2010; Macvean, 2011; Papastergiou, 2009). It is all about getting them to move and encouraging them to get fit (UK 25). In this endeavour, exergames in school PE help to entice them to exercise (US 14), break into a sweat (US 8, 12, 41), make them out of breath (US 14) and be more physically active than they already are (US 4, 19, UK 15, 25). Accordingly, PE has to ensure that students get the physical activity they need during school hours (US 4, 14, 16, UK 15) and that they develop their fitness levels in terms of strength training. In relation to exergaming, an eight-grade student in the US said that: “it helps your arms and your biceps and everything ... I have muscles ... I even got abs too” (US 12). However, more often than not, the arguments are about how energy expenditure and weight management can be achieved by including exergames in PE in order to combat childhood obesity (US 2, 3, 19, 48, UK 15, 25). One school stated that there were a lot of ways of burning calories and that exergames were a great way of getting children to exercise (US 1). One US student also said that: “it’s exciting, because you actually lose weight without even knowing it” (US 12).

In this vein, some schools argue that exergames is a way of making children physically active almost without realising it (US 2, 8, UK 15, 38). These arguments are about *tricking the students* into being more physically active. As one PE teacher stated: “the no.1 goal is they aren’t going to realize they are really doing physical activity” (US 2). Another US PE teacher continued: “some kids play the Wii just because it is on a TV; they like the video game aspect of it and will do anything if it is on TV” (US 8).

An argument that is linked with issues of fitness and obesity reduction is that exergames are *fun and enjoyable* and that they are able to activate and motivate children and young people to move around under the guise of having fun (Cuningham et al., 2010; Graves et al., 2010; Hansen & Sanders, 2010;

Macvean, 2011; Papastergiou, 2009) (US 2, 5, 9, 12, 16, 18, Canada 57). Several schools regard exergames as an engaging and enjoyable activity in which all students could happily participate. It reduces the “boredom of exercise” in a way that today’s youth can relate to (Canada 57, US 16, 18). As one US PE-teacher put it (US 58): “It fits the kids’ needs and their attention span ... Plus it’s fun”. The games are also depicted as a great motivational tool in PE practice. (US 4, UK 11). One US PE teacher (US 18) supported exergames by saying that: “this is the first time in 11 years of teaching PE that I’ve had to kick kids out of class who don’t want to stop exercising.” Part of the enjoyment is also the idea that through fun and enjoyment the students more thoroughly engage in learning opportunities in PE (US 7). These positive learning experiences, or, as one school called it, ‘the wow-factor’ (US 1), are also dependent on the possibility of being successful in the activities at hand: “Regardless of what sport they do on the Wii, they experience success. It is good to see them experience success without the risk of being ridiculed” (US PE-teacher 8).

In research, fun is regarded as an important factor for how long a person will continue to be physically active (Staiano & Calvert, 2011). It is also important because fun activities like exergames can increase students’ motivation for exercise in general (Fogel et al., 2010; Papastergiou, 2009). Exergames are also said to promote positive PE experiences, in that students choose active games rather than other activities because there is more choice, fewer rules and a better potential for success (Hansen & Sanders, 2010). They also enjoy the challenges of the games (Hansen & Sanders, 2010). Thin (2010) further argues that exergames are enjoyable because they are exciting and competitive. Exergames are thus promoted as an enjoyable tool that complements other PE activities (Papastergiou, 2009).

Some of the exergames include features like *measurement*, for example the measurement of balance, heart rate or coordination. These features are regarded as ways in which children can test themselves while exercising their bodies (US 40). In one US school (12), some of the children said that the exergames programme at their school had taught them a lot about their bodies and allowed them to track of their progress in terms of weight and skills levels. In one Australian school (60) the children recorded pulse rates, times for game races and dancing scores in order to measure their improvement over time.

However, there are a number of arguments against exergames in school within this theme (UK 11, US 17). For example, Nick Seaton from the Campaign for Real Education states that: “This smacks of poor discipline – the schools seems to be pandering to the whims of those who are lazy” (UK 11). Another debater, who was critical of 26 New York City middle schools using Wii fit as weight loss programmes, argued that the fitness value of exergames was around zero (US 17).

In a research context, the arguments against using exergames are mainly related to a problematic idea that PE should be a site for interventions in order to solve the obesity epidemic (Millington, 2009) and that exergames uncritically promise to reduce an “alleged public health catastrophe” (Vander Schee & Boyles, 2010, p. 170). Other lines of argument against using exergames within this theme are that exergames do not provide as much physical training as authentic sports (Graves et al., 2010) and that video-gaming per se encourages sedentary screen time (Staiano & Calvert, 2011).

#### *Exergames can damage self-image*

Two arguments against using exergames in school are identified in research in relation to self-image. The first is related to the avatar (the Mii) representing you

on the screen that, in some cases, is influenced by the actual weight, height and BMI of the player. In this regard, Seung (2009) argues that players who create an avatar that reflects an ideal embodied self show higher levels of interactivity in the game than those who create an avatar that reflects the actual embodied self. Further, Song, Peng and Lee (2011) report that seeing yourself mirrored on the screen in the games has a positive impact if you are satisfied with your body image, but has a negative impact if you are unhappy about this. Thus, the image on the screen potentially decreases exercise self-efficacy and enjoyment among people with body image concerns.

### *Exergames exert control over corporeality*

A strong critical voice in the scholarly arguments against the use of exergames in school is how such games become part of the supervision and management of people's bodies in risk-based societies (Millington, 2009; Vander Schee & Boyles, 2010). Millington (2009) criticises how games like Wii fit tend to be regarded as fitness experts prescribing basic fitness solutions. In this management of bodies, the games diagnose behaviour by using balance, Body Mass Index (BMI) and chronological age as determinants of normal bodies and good health. According to Millington (2009), the ideal corporeality becomes the calcul(able) body. Millington as well as Vander Schee and Boyles (2010) further argue that bodily knowledge becomes politicised in terms of risk, and that deviance from a dubious measurable normality is something that must be corrected. In this vein, Vander Schee and Boyles (2010) problematize how students' bodies become commercial spaces due to the inclusion of exergames in school and that PE as a school subject becomes dependent on the companies providing the products.

### *Exergames support skill acquisition and transfer*

Some studies explore how sport games can help students to learn different motor skills that can be transferred to authentic sports (Papastergiou, 2009). For example, Fery and Ponserre (2001) explored putting skills in golf and concluded that there was a positive transfer from playing golf video games to learning putting skills in real golf. Some studies also argue that exergames can improve students' visual-spatial skills, hand-eye coordination, foot-eye coordination and reaction time (Papastergiou, 2009). They further conclude that exergames can act as a gateway for sedentary individuals to improve their skills so that they can then become involved in 'real' sporting activities.

In the popular texts, most of the arguments relating to skill acquisition are for the use of exergames in school. Here teachers give prominence to how exergames promote motor skills like balance, hand-eye coordination, foot-eye coordination posture, agility and flexibility (US 4, 16, 41, Sweden 61), or social skills like sharing, taking turns, helping each other and teamwork (US 2, 4, 8, UK 32). It is also argued that as sporting skills are promoted, where teachers are able to teach the basics of games like tennis, bowling or basketball as simulators to learn the routes (Singapore 26, Australia 29, UK 32, US 58). For example, one Swedish six-grader said that "volleyball is good. There we can practice moves that work as preparation for real volleyball" (Sweden 61). Further, in the dance games the teachers draw attention to how students learn timing, rhythm, reaction time, sequence of movement, listening skills, dance moves and how to follow a dance routine (US 5, 27, Australia 60). Arguments are also put forward that skills are transferable between the game and the 'real' activity, such as balance and posture helping children's transition into yoga (US 5) and that sports techniques are transferrable to real sports (UK 32, US 58, Sweden 61).



### *Exergames are an alternative to traditional PE*

In the research context, two specific articles argue that the use of exergames in school can provide fruitful alternative modes of physical activity in school PE (Papastergiou, 2009; Fogel et al., 2010). Papastergiou (2009) argues that exergames can complement traditional PE and facilitate self-practice, instead of being exposed to a competitive environment of team-based sports. Fogel and colleagues (2010) further describe how the students in their study became more physically active when exergames were used in PE compared to the standard PE programme.

Similarly, many of the arguments in popular literature are about exergames being a new and interesting alternative to traditional PE (US 39): “The old PE was just for the jocks. How about the other 90-percent of the kids?” (Chairman of a US school PE department) It is often the plethora of ball games in the PE curriculum that is criticised as not being relevant for most children, especially when they are not in school (Singapore 26). One PE teacher even stated that: “when you’re talking about traditional PE with just football and basketball, that’s so far out the window. We’ll do sports skills, but we don’t just teach basketball or football ... That’s why so many kids hated PE ... We work on different things that they can do that don’t always involve a ball” (US 5).

The arguments are thus primarily about how exergames can be an interesting complement to other activities. Some schools even argue that children prefer exergames to traditional PE (US 14). Exergames can thereby encourage students who would otherwise watch from the sidelines, or who consistently miss PE, to be more active (US 5). However, most schools arguing for the use of exergames emphasise that they should not replace other forms of PE. Further, the arguments are about how exergames can be a way of reaching students with an aversion to traditional games and fitness training (US 2, 18, 41, UK 32). Ball

games like dodge ball are often taken as a negative example in this regard (US 27). In this line of argument, the less athletic children are targeted and children in general are portrayed as gamers. One UK PE teacher argued (34) that exergames were “his way of beating the enemy at its own game. ‘They’re going to play video games anyway, we might as well steer them to the right ones’”. Also, the embarrassment that some children feel in PE is criticised. Instead, “the screen allows for social inhibitions to be reduced. Kids would normally be checking out their peers, but they don’t care because they’re looking at what’s on the wall” (PE teacher US 5).

There are also arguments against using exergames within this theme. Here the focus is on why exergames cannot be regarded as an alternative (US 3, 5, UK 11, 15, Australia 33). These arguments include the dangers of replacing team sports and group drills with exergames. In this respect, exergames are depicted as problematic, in that their use would mean social aspects of sport like teamwork, play, social interaction, sportsmanship and goal setting (US 3, Australia 33) being eliminated from the curriculum. Another line of argument is that it is better for children to play tennis on a real tennis court instead of a Wii console (US 5).

*Exergames can be used as a technical solution to problems of place and equipment*

In schools there are arguments both for and against the use of exergames in relation to *avoid being out in the difficult nature*. Arguments for relate to cold weather, in that exergames can be an activity that is more engaging than spending winter days outdoors or cooped up in a gym (US 1, 31), and to warm weather in terms of it being too hot and too sunny to be outdoors (Singapore 26, 30). One school official argued that: “they’re using it with great success as a motivator during winter months, and on a day like today, when you can’t go out.

There are a lot of ways to burn calories while you're inside" (US 31). However, there are also arguments against using exergames in school because they counteract children being outdoors. In these arguments, critics of exergames contend that unstructured free play in nature is a more positive way of being active (US 5). Also, the idea of doing sport in front of a TV indoors is criticised. In this critique, competitive sports outdoors is proposed as a positive alternative (Australia 29, 33).

It is also argued that exergames are used when there is *limited space and lack of equipment*. Some schools report that students can test activities that are normally unavailable to them, perhaps due to the lack of a gym, weight room, tennis court and sports field (US 2, 58). One PE teacher stated that: "It offers me some things that I can't do otherwise. Kids can get a feel of what it's like to do bowling without going to a bowling alley. Without a facility, I'll take everything I can get" (US 2). In another US school, the PE teacher suggested that Wii allows students from lower-income families to try things that they have never tried before, such as golf or tennis.

#### *Exergames can be used as educational tools*

In several schools exergames are used as *behavioural management*, in terms of reward and motivation for good behaviour (US 1, 4, 5, 14, 19, 49, UK 6, 11). Here, exergames are regarded as a 'carrot on a stick' that encourages children to enjoy exercise. They are also regarded as a way of motivating children who try to avoid PE by leaving their kit at home. One US school reported that they experienced improved behaviour and fewer discipline problems in PE after introducing exergames. Another US school added that fewer students were late for class because they enjoyed playing the games.

Some arguments also suggest that exergames could be used as a way of *including special needs students* in regular PE. These arguments involve the idea that some students can learn to navigate IT-technology while having fun and the idea to create inclusive classrooms in which students who have disabilities can be better integrated (US 22).

One Australian article also touches on how videogames are used in PE both as physical activity and as a way of *developing students' critical ability* (Australia 60). In the particular school referred to, exergames are used for media analyses of characters, music and the use of colours in the games in order to enhance students' media awareness in what is known as critical media literacy.

### **Assumptions about the use of exergaming in school**

In the second step of the analysis – the synthesis – the assumptions made by both critics and advocates in terms of what was taken for granted in health and education in relation to the use of exergames is explored. In this analysis, the focus was on the arguments that could be identified in the texts and how the logic of these arguments could be critically elucidated in terms of why exergames like Wii 'teach' physical education in school.

#### *Assumptions about health*

One basic assumption in the arguments is that health is understood as something that is threatened by obesity, sedentary behaviour and lack of exercise. The assumption is that the western world is experiencing an obesity epidemic and that this epidemic is a major health problem in society that affects everybody, everywhere. Health is thus perceived to be a lack, a deficit or an absence of something, such as not being obese and the absence of obesity related diseases. In relation to this quite unsubstantiated claim, critical scholarly voices have been raised against the ideologies and norms that constitute what is often referred to

as the childhood obesity epidemic (Gard & Wright, 2005; Evans et al., 2004; Rich & Evans, 2005; Kirk, 2006). This critical debate has raised questions like: Is it an epidemic? From what is this epidemic constituted? Can we blame video- and computer gaming for this? Is everybody inactive? What does BMI really tell us? The critique is especially strong when it comes to turning obesity into an educational issue (Evans, 2003; Johns, 2005; Kirk, 2006; Quennerstedt, 2008; Vander Schee & Boyles, 2010). The arguments around the use of exergames, however, are, with a few exceptions (Millington, 2009; Vander Schee & Boyles, 2010), quite estranged from this critical debate.

In this vein, health is not either discussed in line with the World Health Organisation's (WHO) definitions as physical, psychological and social well-being (1947, 1986) or in line with similar descriptions of health that are visible in PE syllabi in countries like Australia, New Zealand or Sweden (Quennerstedt, Burrows & Maivorsdotter, 2011). There is consequently a clear biomedical, pathogenic notion of health in the arguments (Quennerstedt, 2008). Exergames are thus unproblematically included as a means to solve childhood obesity.

Another assumption in relation to health is that physical activity is a basic human need and that it is unnatural for people in general – and children in particular – to pursue a sedentary lifestyle. The unquestioned solution to this problem is increased physical activity at a moderate level and more energy expenditure for all. Weight is therefore a problem that everybody should be concerned about. As the consequences of this alleged obesity epidemic (cf. Evans, 2003; Gard & Wright, 2003; Kirk, 2006) affect society at large, it is thought that schools should be involved in solving the problem. Accordingly, in this societal health effort, the use of exergames in school becomes a reasonable solution in which energy in versus energy out, not educational values, becomes the rationale for the intervention.

### *Assumptions about education*

In terms of exergames in education, the assumptions in the analysed literature are to do with behaviour modification as a pedagogical practice. The games are thus introduced as a teaching aid in order to modify children's unwanted behaviours. This modification is about establishing 'good' habits regarding physical activity and sport, and also disciplining children into taking responsibility for their own health. However, it is seldom about learning in a wider sense, in terms of new ways of acting, new familiarities, new relations, new connections, new and more possibilities, increased complexities or a changed participation in knowledge and value communities of practice (see e.g. Hodkinson et al., 2007, 2008; Lave & Wenger, 1991; Säljö, 1998; Wickman & Östman, 2002). The exergames thus in an unquestioned way become a teaching aid supporting more behaviouristic ideas about learning, a view that is not in line with many national curriculum documents.

In addition, the direction and the content of the behaviour modification seem to be taken for granted. In relation to health, the content is taken for granted in that PE is regarded as a school subject with the sole aim of enhancing physical activity levels for all by means of fun and enjoyment. In the arguments, the obesity problem is put forward as something that can be solved by more physical activity and with more physical activity in PE. These activities have to be fun and enjoyable so that teachers can trick children into being active. It is particularly important to lure sedentary children. The problem with sedentary behaviour in young people can accordingly be solved if we offer and let them find forms of activity that are fun-filled and enjoyable enough.

In relation to sports, a content that is about 'real' sport, with its techniques, rules and values, is taken for granted. It is the real sport that is supposed to be learned, not movement in a wider sense, where the finished product and what a certain

move means or looks like is open to negotiation (Larsson & Quennerstedt, 2012). This echoes for example Kirk (2010) and Mordal-Moen and Green (2012) who argue that PE in school is almost exclusively about the teaching of sport skills.

The analysis also reveals that the arguments involve a certain view of the child – the student – in education. Our analysis echoes Vander Schee and Boyles’ (2010) arguments in relation to the use of exergames in schools, which are that: “students are lazy, overweight and addicted to video-gaming” (p. 177). The basic assumptions in the arguments that we analysed in our review are that society and schools have to save children from themselves. They are even described as ‘the enemy’. The children are pinpointed as unmotivated to get away from video games, so unless PE in school supports their (un)natural need to sit still in front of a screen and, through exergames, deceive them into being physically active, then it will be difficult to save children from the terrors of obesity. Society and schools will consequently need to step in and take over the responsibility for their health in order to, at a later stage, hand it back to them.

### **Concluding remarks**

The purpose of this systematic review and synthesis has been to explore the arguments for and against using exergames in school settings and, in so doing, bring themes and concepts together to facilitate new insights into this field.

In this article we have shown how health, in relation to the question of why exergames are used in schools, is outlined as the absence of obesity and obesity related diseases. Health is under threat in contemporary society and the solution to develop health is more physical activity for all. Schools accordingly become part of this solution, and bringing in exergames as a new and exciting way to exercise seems to be a logical and fresh step to take as a common sense solution.

We would, however, argue that these arguments are potentially flawed in relation to both a wider notion of health visible in many national curricula (Quennerstedt et al. 2010), and also in relation to contemporary ideas about education and educational values. The question thus needs to be explored and discussed further, however, with the inclusion of critical arguments like those presented in this article.

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