

Technology, pedagogy and physical education

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Introduction

There are currently a whole range of health-related digital technologies available for use across a range of international and socio-economic contexts (Lupton, 2018). Notably, there are a number of different exergames, health-related apps and wearable health devices focused on aspects of health such as wellness, diet/nutrition and physical activity (Lupton, 2018; Quennerstedt et al., 2016). In addition, social media has become a very popular health-related space in the lives of contemporary young people, where a significant body of user-generated health-related information is created and shared on a daily basis (Goodyear, Armour and Wood, 2019; Hausmann et al., 2017). The health landscape is therefore vast and there are numerous digital spaces where health-related learning can take place. Yet we currently know very little about the role of digital technologies in physical education (Casey, Goodyear and Armour, 2017), and the opportunities, challenges and pitfalls presented by the dramatic increase in use of exergames, social media, apps and wearable health devices by young people (Goodyear and Armour 2019; Goodyear, Armour and Wood, 2019; Quennerstedt et al., 2016; Wartella et al., 2016). Beyond reports that physical educators are enthusiastic about technology integration, there is limited robust evidence on how health-related digital technologies have operated as an influential learning resource in a physical education context (Casey, Goodyear and Armour, 2016, 2017; Koekoek and Hilvoorde, 2018).

The purpose of this chapter is to consider the opportunities, challenges and pitfalls presented by digital technologies for young people's health-related learning in order to help physical educators make pedagogically informed decisions about technology integration. In particular, this chapter focuses on the debated issues surrounding whether digital technologies encourage or discourage physical activity knowledge and behaviours. The discussions centre around two forms of digital technologies: social media and wearable healthy lifestyle devices. These two forms of digital technologies have been chosen to represent children's digital lives both inside and outside of the classroom. A self-determination theory (Deci and Ryan, 2002) perspective is used as a guiding conceptual framework to explore how young people engage with digital health technologies and how

social media and wearable health devices have the potential to impact learning and lifelong physical activity knowledge and behaviours. In this chapter, digital technologies are therefore considered as both a help and a hindrance to physical activity participation.

Social media

Contemporary young people, from a range of different contexts, settings and circumstances, make extensive use of social media (Third et al., 2017). While, for the most part, young people use social media to communicate with their peers (boyd, 2014), social media has increasingly become a digital medium that young people turn to for information, including health-related material (Freeman et al., 2017; Shaw et al., 2015; Wartella et al., 2016). In areas relevant to physical education curricula, young people are seeking out information related to physical activity, diet/nutrition and body image (Freeman et al., 2017; Goodyear, Armour and Wood, 2018). Yet, there is confusion and uncertainty about whether it is the responsibility of physical educators to address young people's health-related uses of social media and what might constitute an appropriate pedagogical response (Goodyear and Armour, 2019; Kirk, 2019). The role of social media in physical education is therefore a key and debatable issue.

Young people's interest in accessing health-related information from technology and the media is well established, particularly in fields researching gender, culture, media, sport and exercise pedagogy (Armour, 2014; Oliver and Kirk, 2016). Scholars have explored the impact of wider popular culture, such as magazines or the Internet, on young people's experiences of physical education (Azzarito and Solmon, 2006; Oliver and Lalik, 2010). Extending passive media, however, the format of social media means that there is the potential for young people learn about their bodies, health and physical activity in different ways. For example, social comparisons young people make in magazines tend to be made against images of celebrities, whereas on social media comparisons can also be made against peers and/or other young people of a similar age (Goodyear, Wood and Armour, 2019; Hew, 2011). Furthermore, print-based media is often generated by an external third party, whereas much of the content on social media is user-generated (Freishtat and Sandlin, 2010). As such, young people are both creators and consumers of health-related material (Goodyear, Armour and Wood, 2019) and this occurs in digital spaces where commercial, government, community and individual contexts overlap (Freishtat and Sandlin, 2010). Given the established influence of passive media and the clear differences between print media and social media, it seems imperative that physical educators understand what young people learn about health from social media.

Narratives about young people, social media and health tend to be dominated by risk and the potential for negative impacts (Goodyear and Armour, 2019). Concerns have been reported in research and policy about the relationship between social media screen time and sedentary behaviour, as well as the

potential for social media content to intensify obsessive and addictive monitoring behaviours and increase levels of body dissatisfaction (Goodyear and Armour, 2019; Shaw et al., 2015). While there is a clear need for physical educators to be aware of these risks (Koekoek and Hilvoorde, 2018), there is also a growing body of evidence that points towards the positive role of social media in young people's health and well-being (Goodyear, Armour and Wood, 2019; Shaw et al., 2015). There is evidence that young people are critical users and generators of health-related material and can navigate potentially harmful material, as well as select material that may be relevant to their health-related needs at a particular point in time (Goodyear and Armour, 2018, 2019). For some young people, health-related content accessed from social media has increased their physical activity levels and increased levels of body satisfaction (Goodyear and Armour, 2018). The existing evidence base is therefore mixed and inconclusive and, some might argue, unhelpful for physical educators.

To expand this discussion further about the opportunities and risks of social media for young people's health, we analyse one aspect of social media through the theoretical tenants of self-determination theory (Deci and Ryan, 2002). Instagram is currently one of the most popular social media sites for young people (The Associated Press-NORC Centre for Public Affairs Research, 2017) and our discussion will focus on the physical activity and fitness content delivered through this social media site. Specifically, we discuss 'Fitspiration' content. Fitspiration is a hashtag that amalgamates the words 'Fitness' and 'Inspiration' and proposes to motivate individuals to pursue their health and fitness goals through diet and exercise (Tiggemann and Zaccardo, 2015). Fitspiration content features in millions of Instagram posts and typically contains selfies of athletic individuals, before and after 'transformation' photos, exercise plans, fitness models and motivational quotes such as 'strong not skinny' (Tiggemann and Zaccardo, 2018).

Much of the discourse around Fitspiration is negative. A common criticism is the focus on appearance and praising the athletic body as ideal, which may be an unrealistic expectation for many (Vaterlaus et al., 2015). The notion that male physical attractiveness is associated with an athletic body is well established (Jones and Crawford, 2005). Equally, there is an evolving view of physical attractiveness for females, from being a 'thin ideal' towards an 'athletic ideal' (Bozsik et al., 2018). This athletic ideal aligns with the images portrayed through Fitspiration, which provide opportunity for young people to compare their bodies and their physical activity with the images posted by others (Tiggemann and Zaccardo, 2015). Importantly, appearance-based comparisons usually begin during early adolescence (Mueller et al., 2010), with the online world providing opportunities in which young people can quickly and easily engage in these social comparisons (Tiggemann and Miller, 2010). The comparisons on Instagram are likely to be made against idealised images, which can be digitally altered and enhanced (Goodyear and Armour, 2019; Kramer and Winter, 2008). Given that around 80% of adolescent boys and girls experience body dissatisfaction (Kerner et al., 2018a), these are key issues to be considered in physical education contexts. Moreover, the clear

relationship between body dissatisfaction and physical education participation (Kerner et al., 2018b) further highlights the need for teachers to understand the types of health-related messages from social media young people can access and appreciate that these may shape young people's motivation for participation in physical education.

By drawing on the concepts of self-determination theory, how Fitspiration content may impact on young people's motivation to participate in physical activity and physical education can be better understood. Evidence on adult's engagement with Fitspiration content suggests that those who regularly post Fitspiration content are more likely to engage in maladaptive exercise behaviours, such as over-exercising (Holland and Tiggemann, 2016). Moreover, those who are regularly exposed to Fitspiration content are likely to be more inspired to engage in their health and fitness goals (Robinson et al., 2017; Tiggemann and Zaccardo, 2015). Fitspiration content, therefore, has the potential to increase physical activity levels. It should be noted, however, that Fitspiration uses guilt strategies to influence health-related behaviours (Deighton-Smith and Bell, 2018), positions physical attractiveness as the goal of exercise, focuses on the achievement of an external goal, e.g. the attainment of a physical ideal, and uses appearance as opposed to health to motivate behaviours (Simpson and Mazzeo, 2017). According to self-determination theory, these factors are representative of less self-determined forms of motivation, which are associated with negative physical activity outcomes (Owen et al., 2014) and negative physical education experiences (Shen et al., 2012). Those factors that contribute to less-determined forms of self-regulation conflict with the pedagogical principles of self-determination theory and have been reported to encourage the internalisation of motivation (Aelterman et al., 2012). As a result, while physical activity may initially increase due to Fitspiration content, it is unlikely that physical activity behaviours will be sustained.

We can further understand how social media content may impact physical activity behaviours through considering the three basic psychological needs of competence, autonomy and relatedness that are associated with self-determination theory (Aelterman et al., 2012). The theory proposes that self-determined motivation can be encouraged through an environment that satisfies the three psychological needs of competence, autonomy and relatedness (Haerens et al., 2013). The need for competence relates to a desire to feel capable and confident when executing behaviours (Skinner and Belmont, 1993). This can be developed by environments that focus on providing young people with positive feedback on performance (Koka and Hein, 2005) and also clear guidelines and expectations (Sierens et al., 2009). For example, if the physical activity and health goals set through social media are perceived as unrealistic then the need of competence may be thwarted and young people may be entering a physical education lesson with a diminished sense of physical ability. Research in adult females supports this proposition by arguing that Fitspiration images oversell the attainability of an ideal body, thus setting individuals up for failure (Robinson et al., 2017).

The need for autonomy relates to an individual's perception of choice in their behaviour and can be supported by contexts that provide a clear rationale for an activity, offering encouragements, hints and feedback on performance (Reeve and Jang, 2006). Similarly, social media may negatively impact perceived autonomy through promoting an athletic ideal that aligns with a specific form of exercise, e.g. weight training. Thus, this may subsequently impact young people's activity preferences in physical education. Finally, a need for relatedness is associated with an experience of connectedness with others (Baumeister and Leary, 1995) and can be experienced in environments in which individuals feel socially connected to and accepted by others (Deci and Ryan, 2002). Relatedness and connection to peers may be undermined by the sense of isolation created through digital technologies (Depper and Howe, 2017). It is important to acknowledge these potential risks of Fitspiration content on social media.

While there is the potential for health-related risks, content like Fitspiration can be used as a learning resource for young people to learn about their bodies and health that, in turn, might strengthen young people's engagement with physical activity (Kirk, 2019; Quennerstedt, 2019; Rich, 2019). Indeed, in applying salutogenic concepts to young people's uses of social media for their health Quennerstedt (2018) identified five health resources that develop health-related knowledge and behaviours: (i) social relations, communication and reliability; (ii) education and learning; (iii) public expression and affirmation; (iv) knowing social media and (v) critical awareness. In physical education contexts, Quennerstedt (2019) argued that critical inquiry and/or digital citizenship practices could be used to frame pedagogical contexts that help young people understand the role of social media as health-related resource. Similar to Quennerstedt (2019), Kirk (2019) has argued that young people's extensive uses of social media makes it an important health-related learning resource to drive young people's learning about health. Kirk (2019) proposed three pedagogical strategies that teachers could implement to assist young people with social media: (i) the development of health literacy; (ii) the development of pedagogies of affect and (iii) teaching explicitly and critically about the ways in which different social media forms influence content. Reinforcing the debatable nature of this issue, the work of Quennerstedt (2019), Kirk (2019) and others (see Goodyear and Armour, 2019), therefore, demonstrates that social media might best be positioned in physical education contexts as a health-related learning resource, rather than a medium that merely hinders health development.

Wearable healthy lifestyle technologies

The role of wearable healthy lifestyle technologies in physical education is another debatable issue. Activity trackers such as pedometers and accelerometers have been available for physical activity promotion for a substantial period of time and have been used within schools to encourage participation (e.g. see Gu et al., 2017). However, until relatively recently such devices were generally not

commercially available. In 2007, the first commercially available wearable health device was released by Fitbit, allowing for widespread accessibility of devices that permit the tracking, monitoring, assessment and regulation of health behaviours, including physical activity. These commercially available devices provide promise and opportunity for integration into physical education to encourage learning and promote physical activity (Schaefer et al., 2016). For example, traditional step counters have been used in physical education to assess, promote and teach physical activity (Morgan, Pangrazi and Beighle, 2003) and new wearable healthy lifestyle technologies have a range of additional features and capabilities that look to extend this pedagogical potential (Goodyear, Kerner and Quennerstedt, 2019; Kerner and Goodyear, 2017). Yet, despite new opportunities for learning, little is known about whether young people find wearable healthy lifestyle trackers interesting, engaging and/or beneficial to use and whether and how these devices influence their health-related knowledge and behaviours. Pedagogical strategies that support the use of wearable healthy lifestyle technologies, therefore, require further critique and examination.

There are different varieties of wearable healthy lifestyle technologies, including Fitbit, Garmin and Jawbone. Although there are slight variations in their functional capabilities, these technologies tend to be structured around a watch interface with visual displays that connect to a mobile application ('app'). The user of the wearable device gets quantified information on their health, such as step count, heart rate and calories burnt (see Lupton, 2018). The app allows the individual to access and tailor their health goals, connect with their friends, gain rewards for achieving their health goals, as well as share their health-related information and/or progress on social media (Lupton, 2018). Given young people's extensive uses of social media (as reported in the previous sub-section), the ability to share data from the device to sites like Instagram and within communities like Fitpiration could act as a driver for young people's engagement and their uses of wearable technologies to improve physical activity behaviours.

In 2016, the Fitbit was reported in the national press to be the 'latest status symbol for children in the playground' (www.thetimes.co.uk/article/the-latest-status-symbol-for-children-the-fitbit-znx26liddn), reflecting the growth and popularity of the devices in young people. Forms of wearable healthy lifestyle technologies are being intentionally developed for use with young people.¹ As such, children are being actively targeted as consumers of wearable healthy lifestyle devices, yet very little is known about how these devices impact young people's health and well-being or how to pedagogically use them to support young people's learning in physical education. Similar to young people's uses of social media for health (see previous sub-section), a negative discourse tends to surround young people's uses of wearable healthy lifestyle devices (Goodyear and Armour, 2018). Concerns have been raised about the negative consequences of self-tracking and the normative and idealised notions of health that, for example, generic step targets promote (see Gard, 2014; Lupton, 2015; Rich and Miah, 2017; Williamson, 2015). Yet there have been few empirical accounts in

this area. As a result, this discussion will draw on the theoretical propositions of self-determination theory (Deci and Ryan, 2000) and a case study from our own research (see Goodyear, Kerner and Quennerstedt, 2019; Kerner and Goodyear, 2017 for more details) to discuss the potential of wearable healthy lifestyle devices to act as a help and/or hindrance to health-related learning and physical activity behaviours.

There are extensive and international evidence-based reports that physical education should be encouraging self-determined or volitional forms of motivation in order to promote physical activity behaviours (see Van den Berghe et al., 2014). As discussed in the previous sub-section, self-determined motivation can be encouraged through a physical education environment that satisfies the three psychological needs of competence, autonomy and relatedness (Haerens et al., 2013). The feedback provided through healthy lifestyle technologies could theoretically act to support competence in the classroom, through the provision of feedback on performance (Koka and Hein, 2005). For example, when an individual achieves 10,000 daily steps on a Fitbit – a pre-determined physical activity level – his/her Fitbit will vibrate and flash to signify that this physical activity goal has been achieved. Further, the individual can gain certain badges (displayed on the app) for meeting different types of physical activity targets, such as walking the accumulated distance of the Serengeti. The potential to personalise physical activity targets through healthy lifestyle technologies could support young people's sense of autonomy through the provision of choice and hints and feedback on performance (Reeve and Jang, 2006). The social features and associated apps on most healthy lifestyle technologies could allow for a sense of connectedness with physically active peers and thus enhanced relatedness through the promotion of an environment in which individuals feel socially connected to others (Deci and Ryan, 2002). This can be supported through young people's experiences of digital technologies which allow for enhanced communications, connectivity and socialisation (O'Keeffe, Clarke-Pearson and Council on Communications and Media, 2011). These features of self-determination theory highlight the significant role that wearable health devices might play in young people's health-related learning and their physical activity behaviours.

In our research focused on young people's experiences of using Fitbit devices and the associated Fitbit app, a self-determination perspective was applied to better understand how they used and engaged with a Fitbit (see Goodyear, Kerner and Quennerstedt, 2019; Kerner and Goodyear, 2017). The study was conducted with 100, 13–14-year-old boys and girls. Data demonstrated that adolescents resisted the use of these wearable healthy lifestyle technologies in schools (Goodyear, Kerner and Quennerstedt, 2019). These adolescents questioned the educational value of measuring steps and calories within physical education and reported that the use of wearable health devices in physical education would negatively impact their well-being. Moreover, the monitoring of steps and calorie intake was not seen as part of the physical educator's role. The young people resisted the idea that the quality of a physical education lesson should

be measured quantitatively and by step count. The data indicated that young people's resistance was related to a need for personalisation and the perceived pressure and subsequent guilt that might be felt should teachers set physical activity targets. In a way, the young people resisted how wearable health devices provided teachers with an additional power and normative notions of health via step count. In particular, the young people resisted a one-size-fits-all norm regarding health in education. A strong part of that resistance relates to the educational message offered that equates to health being measured and valued in terms of steps.

It is important in the digitised society to consider if and how these types of technologies could be used in physical education to support learning and meaningful experience. On one side of the debate, there is the argument that young people are unable to negotiate features of these devices and that adult support and formal integration into the educational curricular is required (Schaefer et al., 2016). Pedagogical integration could provide opportunities for pupils to receive technological support and to help personalise and individualise physical activity goals. However (and as we have outlined above), on the other side of the debate and in opposition to this, young people adopt a critical perspective to the use of these technologies in physical education and suggest that teacher support to use the devices may lead to increased pressure and guilt. For example, one pupil said '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' (Goodyear, Kerner and Quennerstedt, 2019). If wearable healthy lifestyle technologies are to be used in physical education, teachers need to engage with the devices from a critical perspective. 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 and Wright, 2004; Casey, Goodyear and Armour, 2017; Gard, 2014; Harris et al., 2018; Powell and Fitzpatrick, 2015). The suitability of a critical approach, rather than an exclusively physical activity promoting approach, is supported by the voice of young people in our own research (Goodyear, Kerner and Quennerstedt, 2019). 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.

Lifelong participation and technology

The debates in this chapter have focused on the use of self-determination theory (Deci and Ryan, 2002) as a lens through which to explore young people's engagement with digital technologies and the related impacts on their health-related

knowledge and behaviours. This approach allows us to draw on an established body of literature in physical activity (e.g. Owen et al., 2014) and physical education (e.g. Van den Berghe et al., 2014) that positions the establishment of a pedagogical social context to promote lifelong physical activity (e.g. Haerens et al., 2010). Digital technologies are likely to act as external motivators of physical activity, for example, by using guilt or pressure as the strategy through which activity and engagement is encouraged. For example, if a pupil sees a Fitspiration post on Instagram of their friend or an online ‘influencer’, their motivation to engage is likely to be aligned with a pressure to conform to health and body norms. Similarly, if pupils are offered a step competition on a Fitbit in a physical education lesson, they are likely to be driven to participate through the external reward of competition. Thus, on the surface, digital technologies present risks for lifelong participation by potential reductions in self-determined motivation. However, teachers have been seen as a key source of encouraging autonomous motivation and subsequent lifelong physical activity through need-supportive teacher behaviours (Haerens et al., 2013). Thus, it could be debated that, with appropriate and careful pedagogical integration by teachers, there is the potential to turn this risk into a resource. From a pedagogical perspective, and by using the concepts of self-determination theory, it is important to ensure that pedagogical practices support autonomy, competence and relatedness through need-supportive teacher behaviours (Haerens et al., 2013). Many of these need-supportive behaviours can be considered alongside technology integration. For example, providing clear guidelines and expectations on how technology is going to be used within the lesson may lead to fostering sense of capability of students to engage with the task and subsequently support competence. Furthermore, providing meaningful choice on how pupils engage with technology, and taking the perspectives of pupils into consideration, is likely to support autonomy and relatedness, respectively. These teacher behaviours could become the pedagogical foundation for technology integration and lifelong physical activity.

The digital future of physical education

Given that young people’s bodies are becoming increasingly digitised (Lupton, 2015; Rich and Miah, 2017), it seems imperative that we begin to debate and consider the potential impact that this digitisation has upon the future physical education experience of young people. One of the key points to highlight in relation to the digital future of physical education is the complexity of the digital landscape and how this is changing at an unprecedented pace. The pace of change and the clear gaps between adults and young people’s understanding and uses of digital technologies have often resulted in moral panic (boyd, 2014). Many adults, including physical educators, tend to associate digital technologies with risk, and the potential for negative impacts (Goodyear and Armour, 2018, 2019). What we have demonstrated in this chapter is that there is inconclusive evidence about risk and that there are limited casual relationships

between young people's uses of contemporary digital technologies and negative health outcomes. Instead, what we have illustrated, perhaps somewhat contrary to popular opinion, is that digital technologies have the potential to operate as positive and important health-related learning resources for young people. This 'alternative' perspective has been developed from working with young people to understand their experiences of digital technologies and through research that has sought to promote pupil voice in understandings about digital technologies, health and learning through participatory methods. To understand the digital future of physical education, and as argued by Enright and Gard (2019), there is a clear need to engage with pupil voice to understand learning and to support the design of effective and productive pedagogical strategies for young people. For teachers, activist and/or critical inquiry approaches are key pedagogical strategies to engage with pupil voice to co-design new and more effective pedagogical contexts to support young people's learning and physical activity behaviours.

Summary

While there is an emerging body of evidence that explores both the risks and opportunities that health-related digital technologies present to young people, there is a need to develop this literature further in order to allow teachers to make evidence informed pedagogical decisions. Some forms of digital technologies, such as Fitbits, have the potential to be integrated into the classroom to encourage learning, whereas other digital technologies such as social media may not immediately be considered a classroom-based pedagogical tool. Yet, the digital space outside of the classroom is a space in which children are being educated about the physical – learning about their bodies, health and physical activity. Thus, understanding how young people are being digitally physically educated is not restricted to the confines of the gymnasium walls. Using the tenants of self-determination theory (Deci and Ryan, 2002), we can begin to theoretically explore the potential of digital technologies to compliment or undermine the need-supportive behaviours that encourage lifelong physical activity and identify key teaching behaviours that will support learning.

Questions for reflection

- 1 To what extent will pupils and teachers comply with or resist an increasingly digitised physical education?
- 2 How are young people being digitally physically educated beyond the classroom context?
- 3 Do the opportunities of digital physical education outweigh the risks?

Further reading and resources

Casey, A., Goodyear, V.A. and Armour, K.M. (2016) *Digital Technologies and Learning in Physical Education: Pedagogical Cases*, Abingdon, Oxon: Routledge.

The book has been created using the ‘pedagogical cases’ framework. Each chapter centres on a narrative, written by a PE practitioner, explaining how and why technology is used in their practice. Each practitioner narrative is analysed by a team of experts from different disciplines. The aim is to offer a multidimensional understanding of the possibilities and challenges of supporting young people’s learning with digital technologies.

Goodyear, V.A. and Armour, K.M. (2019) *Young People, Social Media and Health*, Abingdon, Oxon: Routledge.

This book draws on novel research to understand, explain and illustrate young people’s experiences of engagement with health-related social media as well as the impacts they report on their health, well-being and physical activity. Using empirical case studies, digital representations and evidence from multi-sector and interdisciplinary stakeholders and academics, this volume identifies the opportunities and risk-related impacts of social media.

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The following physical education journals should support further reading. There are also many education journals which contain articles related to relevant topics across education more generally, which are useful to extend debate further. They may also contain physical education specific articles.

- *European Physical Education Review*
- *Journal of Teaching in Physical Education*
- *Physical Education Matters*
- *Physical Education and Sport Pedagogy*
- *Quest*
- *Sport, Education and Society*

Note

- 1 Garmin has a ‘Just for kids’ section on their website, with a device designed specifically for children. Although the device has a minimum user age of 13 years, there are a range of band styles that may be attractive to younger users, such as Disney characters. Furthermore, in 2018 Fitbit released the ‘Fitbit Ace’, their first healthy lifestyle technology specifically to be used with children aged 8+.

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