Talking 'bout digitality. An analysis of PE curricula in German-speaking countries

Stefan Meier*[1], André Poweleit[2]

[1] Center for Sport Science and University Sports & Center for Teacher Education, University of Vienna, Vienna, Austria
[2] Institute for Pedagogy and Philosophy & Center for Teacher Education in Sports, German Sport University, Cologne, Germany

* stefan.meier@univie.ac.at

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ABSTRACT

Digital technologies have permeated most aspects of modern life. In particular, the intersection of digitalization and physical activity has seen significant developments. Such digital technologies have become constitutive of adolescents' life, being a main source of information and a strong influence for their knowledge and behavior in physical activities. These developments have raised significant questions among educational stakeholders worldwide, providing the basis for digital education at all school levels. One of the core goals for the future is preparing the next generation to be able to use digital technologies within physical activities competently, while at the same time taking a constructive and critical perspective on the potentials and risks. The subject of physical education (PE) plays a major role in this intersection. Since it is the central role of a curriculum to act as a systematic framework for the course of learning, it is of particular interest to what extent issues of digitalization appear in PE curricula. Against this backdrop, this paper examines how digitalization is interpreted for official curriculum texts in and across current PE curricula in three German-speaking countries. A qualitative comparative document analysis has been applied. The findings demonstrate differences in what is valued in terms of digitalization and PE. Digital media appear with a predominantly functional character where media are primarily used as tools, for example, for movement analyzes aiming at improving sports skills. In addition, the critical reflection regarding the medial effects of, for example, fitness trends or body ideals embedded in media is only rarely addressed. The paper concludes that future curriculum reforms should address digitalization and PE in a more comprehensive way to empower students critically navigating through sport and movement in the digital realm.

Keywords

curricula, content analysis, country comparison, digital media, German-speaking countries, learning about digital media, learning with digital media, physical education

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Introduction

Throughout the past decade, digital technologies have permeated most aspects of modern life. In particular, the intersection of digitalization and physical activity (PA) has seen significant developments, such as digital health applications and wearable devices. Digital technologies have become constitutive of adolescents' social life and a major resource for, for example, the negotiation of health and embodiment within sports and PA. They have become a main source of information and a strong influence for adolescents' knowledge and behavior in this field (Goodyear et al., 2019a, 2019b). Current research highlights their role in how young people understand and shape their own bodies (Lupton, 2018; Rich et al., 2020). From a critical perspective, these practices often foster and reproduce norms associated with characteristics such as aggression, competitiveness, health imperatives, and thus favoring an ableist gaze (Camacho-Miñano et al., 2021; Lupton, 2015; Rich, 2018).

In this context, the subject of physical education (PE) plays a major role in empowering students to critically reflect the link between digitalization and PA. One of the core goals for the future is preparing the next generation to be able to use digital technologies competently, while at the same time taking a constructive and critical perspective on the potentials and risks (Greve et al., 2022; Raab et al., 2023). This critical function is founded within the concept of *Bildung* and has a long tradition in German-speaking countries (Horlacher, 2015; Wibowo et al., 2022). With regard to PE, students should be empowered to critically negotiate social norms such as, for example, body images (embedded within digital technologies) in the field of sports and PA. This agenda has influenced PE curricula in the three German-speaking countries – Austria, Germany and Switzerland – as there has been a consensus on the aim of PE for years (Geßmann, 2016; MacPhail et al., 2019; Naul, 2003; Naul & Scheuer, 2020). In the course of recent major curriculum reforms in these countries, PE curricula for all levels and school types have been renewed. This renewal process has been driven by the desire for standardized learning outcomes, which is in line with curriculum reform in the international arena (O'Sullivan, 2013; Paveling et al., 2019). As a result, PE curricula face the challenge of harmonizing PE's fundamental pedagogical idea with the notion of assessment and accountability (Ruin & Stibbe, 2021; Stibbe, 2016).

In addition, recent developments have raised significant questions among educational stakeholders regarding how adolescents could be equipped to navigate sport and movement-related questions in the digital realm. Therefore, national and international stakeholders are calling for digital education at all school levels (European Commission, 2021). This is present in many European models on digital competencies (Brandhofer & Wiesner, 2018). In light of ongoing digital transformations, PE must answer the question of how to address digitalization within curricula. Since it is the central role of a curriculum to act as a sys-

tematic framework for the course of learning (Ennis, 2013; Stibbe, 2016) and – more latently – to communicate the education philosophy of those in power (Penney, 2013b), it is of particular interest to what extent issues of digitalization appear in curricula. With these points in mind, the aim of this paper is to critically examine how digitalization is interpreted for official curriculum texts in and across current curricula in the three German-speaking countries We adopt a comparative approach to facilitate a deeper understanding of how digitalization is embedded within PE curricula in these countries to provide a platform for cross-border learning, understanding and thereby increasing PE teachers' capacity to engage in future curriculum debate as Gray et al. (2022) argue for the UK.

Call for digital education

Nationally and internationally, education policy makers agree that promoting basic digital skills and competences from an early age is important (European Commission, 2021). Looking at the three German-speaking countries, claims are also made to promote competent handling of media. In Germany, the digital strategy of the Kultusministerkonferenz "Education in the digital world" (2017) plays an important role in school policy discourse, according to which the promotion of media competence is an interdisciplinary cross-sectional task. Accordingly, pupils are to be enabled (early) to live an independent and empowering life in a digital world: "Since digitalization also includes all areas of life outside of school and – to varying degrees – all age groups, learning *with* and about digital media and tools should already be taught in primary schools" (Kultusministerkonferenz, 2017, p. 11; see also Ständige Wissenschaftliche Kommission der Kultusministerkonferenz, 2022). And in Austria, too, digital skills must be taught, which "[…] – against the background of the increasing importance of media and the reality conveyed about media for society – are fundamental to the education of young people […]" (Bundesministerium für Unterricht und Kunst, 2022, p. 252; see also the Austrian digitalization strategy, Bundesministerium für Bildung, 2017). Similar requirements can also be found in the Swiss curriculum, in which students are to develop basic knowledge and skills that enable competent, appropriate and socially responsible use of media (Deutschschweizer Erziehungsdirektoren-Konferenz, 2016b). All three countries formulate their demands on the promotion of media competence in schools in two directions: On the one hand it is about the competent use of media and on the other hand it is about the reflection of using digital media.

In principle, digital media ultimately have a double function in teaching and learning processes (e.g., Bastian, 2017; Greve et al., 2020): they support the specific acquisition of knowledge as a didactic-methodical tool or aid (learning *with* media), which also includes appropriate knowledge of the (functional) use of media. Besides that, as a content-related subject or topic (learning *about* media), they lead to a critical and reflective examination of how to deal with media (Poweleit, 2021b). Translated to PE, digital media can support – in the sense of learning with media – the acquisition processes of motor skills and abilities (e.g., video feedback as movement analysis) as well as movement and sport-related knowledge (e.g., obtaining information on end-user devices). With regard to learning about media, there can be a conscious thematization of digital spaces, worlds and tools in the context of movement and sport in which, for example body presentation in fitness blogs or the use of training apps or digital tools for self-measurement can be taken up critically and reflectively (Meier & Ruin, 2021; Raab, 2021). Bastian (2017) points out that a functional view of media predominates in educational policy discourse and that processes of reflection on media are given less consideration. As a result, an imbalance in content seems to be created by the education administration, which emphasizes learning with media more. However, to enable competent handling of media, (functional-technical) aspects of learning with media and (critical-reflective) aspects of learning about media are both important and must therefore – to the same extent or in relation to one another – be taken into account (see also Greve et al., 2020).

In the subject of PE, too, the focus seems to be more on application-related approaches, with digital media being used more to stage or support (movement-related) learning processes (Rode, 2021). As a result, an instrumental understanding of media dominates in many cases, which also leads to reductions of the PE's pedagogical purposes (Klinge & Przybylka, 2021).

Curriculum theory

Curricula determine learning objectives for every school subject, thus serving as a guide for teachers (Kirk, 2015; Stibbe, 2016). At the same time, they incorporate and promote the education philosophy of those in power indicating what is valued by education policy makers (Penney, 2013b; Stibbe, 2016). Hence, curricula implicitly reveal, "what does not belong to this portfolio because it is considered alien and undesirable or has been excluded as subversive or simply overlooked" (Künzli, 2009, p. 135). As every curriculum is firmly embedded within its historical context, it must be understood within its particular settings, i.e., institutional, social, cultural and broader policy contexts (Penney, 2013a, 2013b; Posner, 2004). Thus, curriculum documents are recognized as so-called "essentially contested concepts" (Englund & Quennerstedt, 2008, p. 714). From a theoretical point of view, Bernstein's (1990, 1996) pedagogic device serves as a valuable lens providing insights into the relations and dynamics between knowledge, power, education and social (in)equality. He outlines the pedagogization of knowledge as a form of meandering through the fields of production, recontextualization and reproduction: new knowledge is produced by dominant agents shaping or regulating politics, economy or research, recontextualized by education and administration officials through selective relocation and reorganization of content and inherent power relations, and ultimately reproduced in educational practice (see also Fend, 2008).[1] In this framework, a curriculum comprises "what counts as valid knowledge" (Bernstein, 2003, p. 77). Even though scholars highlight the intricate nature of production, recontextualization and reproduction processes (Balz et al., 2013; Kölner Sportdidaktik, 2016; Poweleit, 2019), curricular documents can be considered insightful artifacts of recontextualized knowledge with a distinct power of interpretation at a certain point in history (Kilborn et al., 2016).

Worldwide, curriculum reforms are used by governments as a policy instrument to promote intended societal change or reflect societal transformations, and thus they continue to be of significant political interest (Penney, 2013b; Simmons & MacLean, 2018). For instance, curriculum reforms across the globe have intensely been influenced by neoliberal ideals of marketization in the last years. As a consequence, curricula often convey discourses on accountability, outcomes, and surveillance (Gray et al., 2022; Macdonald, 2014; Ruin & Stibbe, 2021). In this regard, an urgent matter is how innovations – for example driven by the ongoing digital transformations – are perceived and interpreted by those who have the capability to integrate them into authoritative educational policy documents. Recently, digital technologies have permeated most aspects of modern life and in particular the intersection of digitalization and PA has seen significant developments (Goodyear et al., 2019a, 2019b). Thus, there is a global agenda for digital education at all school levels (European Commission, 2021). Evidently, these issues have also been discussed in German-speaking countries. To the best of our knowledge, there are no studies in German-speaking countries investigating the extent to which these issues are integrated in curricula to date, although claims for such cross-country comparisons still exist (Stibbe, 2016, p. 65):

1. Finally, as active and practicing actors, teachers represent an important link between administrative requirements and actual teaching processes, since they are responsible for transferring the curricular learning goals into everyday practice. Ultimately, the curriculum requirements only become effective when they are received by the actors and transferred into practical action (Fend, 2008).

> In view of a continuous revision of the curriculum, comparative curriculum analyses will be necessary again and again in the future, which systematically examine country-specific ideas of physical education – also beyond Germany. It is important to make German findings internationally accessible to a much greater extent than before.

Recently, some studies emerge from the UK highlighting that learning's from comparative studies, for instance variations in how PE is conceptualized, might be valuable for developing capacities to read curricula critically and to engage in curriculum debates in future (Gray et al., 2022).

PE Curricula in German-speaking countries: A brief overview

As a specific feature, PE curricula in German-speaking countries are underpinned by the fundamental idea of PE's *dual mission* (known under the German term *Doppelauftrag*). It promotes the notion of learning in and through PA, sports, and exercise. The mission of learning *in* PA, sports, and exercise aims at students' development of sport- and movement-related competencies, e.g., to understand sport and movement culture and to be able taking part herein or not. Simultaneously, the mission of learning *through* PA, sports, and exercise aims at students' personal development, e.g., socio-emotional aspects within these activities. This underlying conceptual idea originated in one German federal state (North Rhine-Westphalia) in 2000 and has been adopted as a kind of "prototype" (Prohl & Krick, 2006, p. 21) by (all) other German federal states and beyond, for example Luxembourg (Ministère de l'Education nationale et de la Formation professionnelle, 2009). At the level of curriculum, this idea is specific and common in German-speaking countries, in Austria since 2014 (Amesberger et al., 2014) and in Switzerland since 2016 (Deutschschweizer Erziehungsdirektoren-Konferenz, 2016a). Founded within the concept of *Bildung* (Horlacher, 2015; Wibowo et al., 2022) PE should not only aim at competent performance (e.g., developing technique norms), but rather towards a critical understanding of PA in PE students' lives (e.g., a deeper understanding of PA). However, PE curricula in all three German-speaking countries have been renewed in the last years across all levels and school types. This renewal process has been driven by the desire for standardized learning outcomes, which is in line with curriculum reform in the international arena (O'Sullivan, 2013; Paveling et al., 2019). As a consequence, PE curricula face the challenge of harmonizing this pedagogical purpose with the idea of standardization (Ruin & Stibbe, 2021; Stibbe, 2016). More recently, connecting the claim for digital education (European Commission, 2021) – learning *with* and *about* digital media (see section Call for digital education) – with PE's dual mission (learning *in* and *through* sport) results in a *double* dual mission (Greve et al., 2020). Both these media and sport-pedagogical missions are to be implemented equally.

With this in mind, Rode (2021) highlighted tensions as digital tools (e.g., tracking watches) incorporate norms of health and fitness and are thus far from being "'innocent' tools" (Rode, 2021, p. 15). Also in the international arena, scholars point out both benefits and drawbacks in the use of digital tools for pedagogical purposes (Camacho-Miñano et al., 2021; Meier & Ruin, 2021; Poweleit, 2021b; Rich et al., 2020). Recent research illustrates ambivalences, when (H)PE-teachers introduce digital technologies into (H)PE: "Teachers identified a fundamental clash between several of the values, practices and aspirations of traditional HPE pedagogies and those of digitised pedagogies" (Lupton, 2022, p. 526; for Germany see Roth, 2022). To incorporate digital technologies into PE, scholars favor a critical use, which consists of a learning with as well as about digital media, e.g., to contrast the determination of health within a tracking watch with the students' subjective perspectives. Students should be encouraged to critically reflect on social norms incorporated within enacted digitized PE practices, also providing pedagogical possibilities for resistance (Rich, 2018). With regard to learning with and about digitalization, Greve et al. (2022), for instance, showed that the use of digital media opens up new possibili-

ties in the context of learning and experiencing movement (learning with media) and at the same time fosters students' learning about media and how to deal with it in primary school. Even if research reflecting on digitalization in light of PE's dual mission is at the very beginning, learning simply *with* digital tools can be interpreted as a constraint of pedagogical possibilities.

Against this backdrop, this paper is the first ever to explore to what extent issues of digitalization are addressed in recent PE curricula in German-speaking countries. Referring to Bernstein (1990, 2003) the analysis focuses on how knowledge has been recontextualized in the curricular texts. Our aim is to contribute to the research field of PE-specific curriculum design and reform, with a particular focus on the advancement of discussions around the consideration of the digital realm in authoritative educational policy documents.

Methods

Data material

The analysis focuses on the three German speaking countries Austria, Germany, and Switzerland. From a conceptual point of view, curricula were selected according to the criteria of guidance by the overarching fundamental and specific idea of PE in these countries. It is important to note that in Germany, curriculum development is ultimately in the hands of the sixteen individual federal states, whereas in Austria and Switzerland it is centrally prescribed. Hence, we focus on two of the sixteen German federal states, which are exemplary for different traditions of curriculum development in West and Eastern Germany to cover curriculum reform in Germany as best as possible (Stibbe & Aschebrock, 2007): North Rhine-Westphalia (NRW), and Saxony (SN). North Rhine-Westphalia was selected as an example for its traditionally innovative and pioneering role in curriculum development (Stibbe & Aschebrock, 2007). Saxony was chosen as one of the new federal states, with historically different traditions in terms of educational and sports development (Hinsching & Hummel, 1997), which became part of the Federal Republic with reunification in 1990.

Specifically, four curricula were selected for the analysis: the core curricula for upper secondary school level in Austria (Bundesministerium für Unterricht und Kunst, 2022), Switzerland (Deutschschweizer Erziehungsdirektoren-Konferenz, 2016a)[2], North Rhine-Westphalia (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2019) and Saxony (Ministerium für Kultus des Freistaats Sachsen, 2019). The last two focus on the Gymnasium as a special form of secondary school in Germany.[3] All curricula examined are aimed at an age level which is taught in principle at all secondary schools (comprising the 5^{th} to 9^{th}/10^{th} school year), not least due to the general system of compulsory education. The documents consist of general educational goals followed by content specific competence expectations (learning outcomes) and other aspects (e.g., specific recommendations, extra-curricular PE). The analysis focuses on secondary school level I, addressing the criteria of obligatory education (page range between 6 and 58).

Data analysis

A qualitative content analysis was performed via the software MAXQDA 2022 in a two-step coding process (Creswell, 2014; Kuckartz & Rädiker, 2019), applying a deductive-inductive coding system combining "emerging and predetermined codes" (Creswell, 2014, p. 199).

In a first step, preliminary considerations are translated into a general framework of categories and applied to the gathered material in a top-down approach. A thorough review of literature in the field of

2. This document comprises primary to secondary school level I.

3. A Gymnasium is a type of advanced secondary school with a strong emphasis on academic learning and preparing students to enter a university for advanced academic study. It is comparable to British grammar schools, and US preparatory high schools.

PE served to identify the central dimensions of digitalization which have become significant in prior research so far. This enables the definition of what is covered by digitalization and, at the same time, the differentiation into two understandings of digitalization: learning with digital media and learning about digital media. These two categories date back to Bastian's (2017) theoretical considerations and have already been used in research (Greve et al., 2020; Meier & Ruin, 2021; Poweleit, 2021b) and by a scientific commission of the Conference of Ministers of Education. To identify relevant text passages, we independently coded all documents with the deductive category system. Inter-rater reliability was calculated using Cohen's kappa coefficient (*K*), testing the coding of both researchers against each other across the entirety of data. The determined value was $K = 0.83$ for 95% overlap of coded segments, thus achieving near to perfect agreement (Landis & Koch, 1977). In addition, segments with slight coding differences were compared and consensual agreement was sought.

In a second step, each text passage identified by deductively derived categories was analyzed in-depth and further coded in a bottom-up process to differentiate the coding system in more detail and thus expose specific themes and patterns within the data (Fereday & Muir-Cochrane, 2006; Hay & Cope, 2021): Text passages assigned to each of the categories were compared to each other to reveal the (potential) different ways in which they represent the categories. Each researcher commented on the marked passages in a circular way. As we found text passages simultaneously assigned to both categories and thus not clearly expressing a learning with or about digitalization, we added an ambivalent category. This appeared to be necessary in cases in which a critical use of digital media was mentioned without further specification or where only keywords were used lacking any additional explanation.

With this deeper understanding, the final category system with the three main categories *learning with digital media*, *learning about digital media*, *ambivalent learning with/about media* and differentiated subcategories was devised (see Table 1). Summing up, the codes were first analyzed individually, and then finally compared between documents to dissect the similarities and discrepancies. As a result, the ways in which digitalization is addressed in and across the curricula with reference to the three main categories were identified to be the focus of the results section of this study.

Results

Overall, 77 text segments across all four documents were assigned to a category. However, it must be mentioned that the four documents address digitalization to different extents: we coded no text passage within the Swiss curricula and one text passage within the Austrian curricula, whereas there were 67/9 (SN/NRW) text passages in the German curricula. In terms of the three main categories, 45 text passages were assigned to *learning with digital media*, 8 to *learning about digital media*, and 24 to *ambivalent learning with/about media*. To provide some context for our comparative approach, below we first present detailed findings for each of the three countries. Subsequently, we present the outcomes of our comparative analysis, highlighting similarities and differences across the curricula, drawing attention to issues that might be worthy for cross-border dialogue, understanding and future curriculum debates (Gray et al., 2022).

Austria

In the Austrian PE curriculum, there is no text passage on the main categories of *learning with media* and *learning about media*. Only one text passage which could be interpreted as *ambivalent learning with/about media* was found in the document: "Against the background of high-performance sport presented by the media, students should learn that ethical sports action is required by the indispensable value of personal and human dignity" (Bundesministerium für Unterricht und Kunst, 2022, p. 376). Here it is unclear to what extent high-performance sport presented by the media

Table 1
(Sub)Categories of analysis

learning *with* digital media	**learning *about* digital media**	**ambivalent**
digital media as a methodical tool	health and body	critical use of digital media with unclear context
digital media supporting sport-specific learning outcomes	sustainable development	mention of keywords without explanation
	sports in media	

should be made a topic and how the aspects of sports morality and personal and human dignity should be discussed. As a result, keywords are listed but are not described further or related to each other.

Germany

Both German curricula intensively address *learning with digital media*, with a clear focus on highlighting digital media as a methodical tool and using digital media to support sport-specific learning outcomes. The first refers to a variety of learning arrangements (single, partner, group work), which should make use of different methods and media: "Attention must be paid to a change in social forms and methods, the use of traditional and digital media and the use of extracurricular learning locations" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 6).

By pointing to traditional media on the one hand – or "analog" (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2019, p. 31), which is used similarly – and digital media at the other hand, the curricula clearly identify the relevance of both for learning processes in PE. Corresponding to making use of digital media, we often found specifications such as "internet search" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 47), "geocaching" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 55) with a clear intention of using digital media as a tool for learning. There are also numerous examples of other content areas that point in the same direction. In this context, it is seen as information procurement towards sport-specific knowledge on different levels: "[…] to explain sport-specific action (e.g., tactics, line-ups)" (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2019, p. 31), to gain knowledge about institutions such as the "German Olympic Sports Confederation, German Sports Aid Foundation […]" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 60) as well as to give feedback using digital media. In the same way, learning with digital media also targets students' capabilities of independent learning, although mentioned less frequently. The SN curriculum highlights that making use of it fosters students' use of digital media during self-reliant learning (Ministerium für Kultus des Freistaats Sachsen, 2019, p. IX).

In line with this, digital media to support sport-specific learning outcomes more directly addresses sport-specific learning outcomes, mostly in the context of training processes. For example, the SN curricula points to "movement analysis" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 57) in learning fundamental and more specific skills in inline skating (similarly in the field of gymnastics, track and field, sports games), whereas the NRW curriculum also mentions: "Imitating, rearranging and redesigning movement designs alone or in a group with the help of digital media" (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2019, p. 29).

Here, digital media serves the function of best promoting motor learning. In particular, digital media is identified as a way to "analyze and support motor learning" (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2019, p. 28) and students should

learn to make use of it, also by comparing traditional and digital media. Digital media is referred to in the same way when addressing fitness and/or health. For example, "pulse control" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 56) is mentioned to learn training principles.

There is comparatively little reference to *learning about digital media* in both German curricula, addressing aspects as health and body, sustainable development, and sports in media. In particular, there is reference to the first subcategory health and body. As kind of a general statement, health-oriented PE should "critically use and reflect on digital offerings" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 45) as they carry the potential to think about the "ideal of beauty, physical inactivity, drugs, nutrition" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 31). In this context, the complex relation of norms and ideals towards health, body and beauty are mentioned. This is linked to fitness, gymnastics, aerobics and dance. Furthermore, both curricula sensitize for body- and fitness-norms which are conveyed by media: "Pupils can critically assess the health effects of sporting activities, taking particular account of fitness trends and body ideals conveyed by the media, including gender aspects" (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2019, p. 32). However, the imperative to critically reflect on how health and/or body are perpetuated about digital media is clearly implied here. Furthermore, there is reference to sustainable development goals. On this issue, "critical assessment of articles from the sporting goods industry […]" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 43) is stated with regard to outdoor sports and, e.g., meteorology and avalanche awareness.

Further text passages can be found on the *ambivalent learning with/about media* category, which can be divided into two subcategories: critical use of digital media with unclear context and mention of keywords without explanation. Regarding the first subcategory, the SN curriculum shows brief references such as "critical use of digital media" (inter alia Ministerium für Kultus des Freistaats Sachsen, 2019, p. 10), "critical use of the internet" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 54), critical use of photo and video technology" (inter alia Ministerium für Kultus des Freistaats Sachsen, 2019, p. 58). Here, however, it remains open and can hardly be deduced from the context of the content to what extent critical use should take place. These aspects are often mentioned in the course of sport-specific objectives, for example when digital media should also be used critically while (deductively and inductively) working out the basic techniques (football, basketball, handball, hockey; Ministerium für Kultus des Freistaats Sachsen, 2019, p. 10) – how exactly such critical use is to take place remains vague in the different passages.

In the context of a "dealing critically with heart rate monitors and fitness watches" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 22) in the field of athletics, principles for "independent practice and training" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 22) should be derived on the one hand and "times and distances" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 22) should be measured independently. On the other hand, "experience of movement and physical experience" should also be described (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 22). References to *learning with media* and to *learning about media* can definitely be made here. However, an interpretation is required as to whether the experience of movement and PA should take place in the course of a critical-reflexive analysis of the fitness watch or whether the fitness watch is to be used primarily functionally to optimize the training process and to measure values. If necessary, both can also take place.

There is also a passage in the NRW curriculum that could imply both learning with and about media. However, it is not entirely clear here either whether media are used purely functionally to record and interpret one's own movement behavior or whether the effects of media on one's own movement behavior should also be taken up, which in turn can produce benefits and risks: "Record patterns of your own movement behav-

ior (in everyday life and in sporting action situations) using digital media and analyze them with regard to health benefits and possible risks" (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2019, p. 32).

With a view to the second sub-category, mention of keywords without explanation, the keyword "media education"[4] – in the sense of learning about media – is often listed in the SN curriculum, without however describing in more detail to what extent this is done or how this is linked to the corresponding goals and content. This keyword is used, for example, in relation to selected disciplines of athletics or also for the analysis of gymnastic movement structures (Ministerium für Kultus des Freistaats Sachsen, 2019, pp. 24, 28). In addition, the keyword "informatics education"[5] – in the sense of learning with media – can be found at various points in the SN curriculum. Here, too, it is mostly vague as to how this is to be implemented with the associated goals and content. In the field of sports games, for example, students should acquire knowledge of sports game-related issues (Ministerium für Kultus des Freistaats Sachsen, 2019, p. 13): In this context, the keyword is given in connection with a "historical development of selected sports games". In addition, there should also be a "reflexion of sports games on social life". Whether digital media (only) function here as a methodological aid to obtaining information on the topic or whether the media portrayal of sport is also to be critically reflected upon is not explained in detail.

Switzerland

The Swiss curriculum for PE does not contain any passages on digital media. It was therefore not possible to encode anything in this document. References to digital media are only made on a general, interdisciplinary curriculum level (Deutschschweizer Erziehungsdirektoren-Konferenz, 2016b). Digital competencies to be learned are formulated in a separate section "Media and Informatics" as an interdisciplinary task. Again, however, no explicit reference to PE is made, rather only cross-references to selected subject areas (Deutschschweizer Erziehungsdirektoren-Konferenz, 2016c).

Discussion

Based on the particular importance given to the issue of digitalization in the international discourse on PE (Goodyear et al., 2019a, 2019b), our intention in undertaking this research was to portray the understanding of digitalization in these three German speaking countries. As a specific feature, the curricula investigated are underpinned by the fundamental idea of PE's dual mission (Geßmann, 2016; Naul & Scheuer, 2020). With reference to Bastian's (2017) considerations of learning with digital media and learning about digital media, the focus was on the extent to which digitalization is understood in and across the curricula. Thus, our analysis gains insights into how PE's dual mission and the claim for digital education (European Commission, 2021) match.

Similarities and differences between the analyzed curricula

It became evident that substantial reference to digitalization is made in both German curricula (Ministerium für Kultus des Freistaats Sachsen, 2019; Ministerium für Schule und Weiterbildung des Landes Nor-

4. The SN curriculum defines "media education" as follows: "They [the students] expand and deepen their knowledge of media and their function, design and effects. They learn to use media independently for their own learning and to grasp and analyze media-related problems and to strengthen their media-critical reflections" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. VIII).

5. The definition of "computer literacy" in the SN curriculum is as follows: "Students learn to extract, classify and use information to expand, restructure and apply their knowledge. They develop skills to use modern information and communication technologies safely, properly, appropriately and responsibly. They know how they work and use them to creatively solve problems" (Ministerium für Kultus des Freistaats Sachsen, 2019, p. VIII).

drhein-Westfalen, 2019), whereas in the Austrian (Bundesministerium für Unterricht und Kunst, 2022) and Swiss documents (Deutschschweizer Erziehungsdirektoren-Konferenz, 2016a) issues of digitalization are hardly mentioned. The latter lack a clear orientation to what extent digital media and learning in and through PA should interact in the course of learning. Thus, there is no clear agenda for a PE teacher. In terms of curricula serving as a systematic framework for teachers (Kirk, 2015), one could argue that the Austrian and Swiss curricula fail in this function as the findings highlight the absence of references to digitalization. As a consequence, PE then is portrayed as a subject leaving young people alone with their learnings from digitized PA. Problematic imperatives, which stem from, for instance, social media use (Camacho-Miñano et al., 2021) then were not explicitly interrogated. Thus, there is tension between the critical function of *Bildung* and the claim for digital education. Even if the broader curriculum context of both curricula contains notions of learning with and about digital media, this reference remains unspecific. There is no link between the content specific and digital (media) learning areas of education within these curricula. Hence, the use of digital media in PE may be largely dependent on a teacher's individual awareness and understanding of digitalization, which can be seen as an invitation for multiple interpretations. Pointing to Bernstein (1990, 1996), absent references to digital media depict it as an issue of surprisingly little importance for teaching and learning. In turn, both German curricula (NRW, SN) refer to digital media in the course of teaching and learning PE, albeit with a different emphasis. Thus, the following discussion is based mostly on these documents.

In the curricula of both NRW and SN, making use of digital media strongly relates to one part of PE's dual mission, namely the notion of learning in PA, sports, and exercise, aimed at the development of competencies for such activities. Related to this, both curricula strongly emphasis a learning with media. Consequently, the curricula convey the notion that a learning with digital media fosters motor-learning and training principles. In this regard, digitalization can be seen as a toolbox (internet search, geocaching, movement analysis) for teaching and learning certain physical activities without critically reflecting on them; nor taking into account the notion of learning through PA. The focus is on motor-learning, fitness and obviously on maintaining or increasing individual physical performance. To some extent, this in line with findings from comparative studies within the UK, where there exists a dominant performance discourse in most curricula (Gray et al., 2022). With regard to Bernstein (2003, p. 77) this can be read as what counts as valid knowledge and as a constraint of possibilities in at least two dimensions: it narrows down the idea of learning with and about digital media und learning in and through PE. However, this finding may also be a coincidence of neoliberal ideals of marketization shaping today's education policy (Meier et al., 2022; Paveling et al., 2019), as physical fitness norms seem easier to measure and to integrate in a learning with digital media. The strong reference to learning with digital media stages a traditional view of sports.

In contrast, there is only limited mention of a learning about digital media in the curricula. Compared to the NRW curricula, the SN documents include a broad range of aspects explicitly relating to a learning about digital media. In particular, the SN curricula convey the imperative of critically reflecting health, body and fitness-related issues by pointing to the complex relation of norms and ideals. However, this is only mentioned in the context of some activities (gymnastics, aerobics, dance). One could therefore argue that the curricula partially indicate that critically navigating through digital contexts is a significant issue (Kirk, 2015). With reference to Bernstein (1990, 1996), a learning about digital media is of importance, but with only few references and more or less vague wording. Hence, there remains scepticism, if these words emphasize enough that empowering people to critique norms circulating in digitized PA/PE is of importance.

Furthermore, the ambivalences in learning with and about digital media point to the relevance of recontextualization by PE teachers. In this regard the question remains as to what extent PE-teacher cope with this task. From a critical perspective, the findings more often highlight a learning with digital media in terms of motor-learning and ambivalences than a learning about digital media. Thus, doubt remains as to what extent PE teachers read curricula and make use of digital tools, which perpetuate certain norms (Camacho-Miñano et al., 2021; Meier & Ruin, 2021; Rich, 2018; Rode, 2021). Ambivalences make it challenging for teachers to link the claim for digital education with PE's goals, thus leaving the reader with an unclear orientation of teaching and learning. Hence, PE lesson design may be largely dependent on a teacher's individual awareness of digitalization and PE and respective interpretations. On the one hand, one could argue this emphasizes teacher autonomy, converting the curriculum content into meaningful lessons (Altrichter, 2010; Eurydice, 2008). On the other hand, considering studies highlighting the intricate nature of production, recontextualization and reproduction processes (inter alia Poweleit, 2019, 2021a), there is doubt to what extent teachers are able to make use of this kind of "curricular freedom" (Herold, 2020; Mihajlovic & Meier, 2022). However, pointing to Bernstein, this again highlights the relevance of recontextualization processes and may be read in terms of teacher education as well. It seems reasonable, to foster a kind of "curricular competence" (Geßmann, 2007) during teacher education programs to enable teachers to critically read and analyze curricular standards in order to recontextualize them into their own teaching. This would also imply that teachers deal critically with their individual pedagogical understandings of teaching and thereby enhance these with regard to contemporary PE requirements. Comparative curriculum studies could serve to encourage PE-teachers to read curriculum more critically (Gray et al., 2022). In turn, curriculum designers should also critically reflect on to what extent the curriculum serves the function of guiding teaching. Finally, with regard to Penney (2013b), is the education philosophy of those in power to give "curricular freedom" to the teacher or is it a kind of (inadequate) framework within curricula, which is delegated to teachers?

Limitations

While the scope of the documents under consideration focuses on the German-speaking context, our analysis provides incentive for further consideration and research, as it focuses on recent international claims in educational policy – digital education (European Commission, 2021). Firstly, our results provide evidence to clearly address issues of digitalization and/or to coordinate the conceptual frameworks of curricular documents to avoid contradictory and confusing messages, as well as limit possibilities for multiple readings. Secondly, with regard to Germany, the analysis is limited to two exemplary federal states representing powerful traditions of curriculum development (Stibbe & Aschebrock, 2007), which is why the findings cannot be generalized to the entire Federal Republic, thus further research is needed. Furthermore, the agenda for digital education is an international one and further comparative perspectives on curricula are needed, taking into account different countries, contexts and traditions and their way of meeting this agenda.

Conclusion

The aim of the present research is to portray how digitalization is interpreted for official curriculum texts in and across current curricula in three German speaking countries. It becomes salient that the Austrian and Swiss documents hardly make any reference to issues of digitalization, whereas such issues are addressed in the German curricula. Pointing to Bernstein (1990, 1996), whether a learning with and/or about digital media in PE curricula "counts as valid knowledge" (Bernstein, 2003, p. 77) or not depends on the country observed. Surprisingly, there is a difference between the three German-speaking countries about what is valued in terms of digitalization (Penney, 2013b). Even if national and international stakeholders call for dig-

ital education at all school levels (European Commission, 2021), only the curricula in Germany comprise of knowledge regarding how adolescents could be equipped to critically navigate sport and movement-related questions in digital realms. Although there were few notions of learning about digital media in PE, the analysis reveals that a learning with digital media often refers to motor-learning, thus narrowing down pedagogic possibilities. In relation to Bernstein, the rhetoric of digitalization in the curricula investigated is at best a reductionist understanding of PE's dual mission (Naul & Scheuer, 2020) and of learning with and about digital media (Bastian, 2017), which is certainly problematic. Digital media appear with a predominantly functional character where media are primarily used as tools, for example, for movement analyzes aiming at improving sports skills. In addition, the critical reflection regarding the medial effects of, for example, fitness trends and body ideals transported in media, is only rarely addressed. It would be much more important to empower students navigating through sport and movement in the digital realm to critically engage with reduced ideas of health incorporated in tracking watches for example (Goodyear et al., 2019b; Lupton, 2022; Rich & Miah, 2017).

In this regard, there is need for further comparative curriculum analyzes, which systematically examine the ideas and concepts of learning with and about digital media in PE. In recent years, only a few comparative curriculum studies have been published (Forest et al., 2018; Kilborn et al., 2016; Stibbe, 2016). In line with Gray et al. (2022) we argue, that carrying out comparative work could serve to initiate cross-border dialogue and learning, thereby increasing PE-teachers capacity to critically read curricula and to contribute to future PE curriculum reforms. Further research is needed to expand on the specific possibilities and constraints of digitalization in PE curricula across the three countries and beyond as well as to systematically examine how teachers cope with the ambivalences observed within the curricula.

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Data availability statement

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