Physical Education Teachers and Coach Education

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Editorial

IJPE 1/2021 is the first issue in 2020 with the topic “Physical education teachers and coach education”. It contains one review article, one research article and one sport international article.

The review article by Dr Claude Scheuer (Luxembourg, Luxembourg) “A review of selected physical education teacher education publications in German (2019-2020)” gives a good overview on articles published in 2019 and 2020 in German related to physical education teachers’ professionalization as well as to instructional aspects in physical education.

The research article contributed by Dr Konstantin Kougioumtzis and Prof. Dr Göran Patriksson (Gothenburg, Sweden) aims to highlight students’ beliefs about physical education as well as to analyse the impact of the PE lesson frequency on those beliefs.

This issue is rounded off with a sport international article “Perceptions of the potential contribution of Active Video Games to school physical education in Hong Kong children and adolescents” by Prof. Dr Patrick W. C. Lau (Hong Kong, China) and his US and Chinese research colleagues examining the perception of eight to 15-year old Chinese pupils related to the contribution of Active Video Games (AVG) to school physical education.

In addition, IJPE issue 1/2021 contains news of the following six associations: AIESEP, ECSS, EUPEA, FIEP, ICSSPE and ISCA. The Upcoming Events section provides an outlook on scientific conferences until autumn 2021.

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Review Articles

A review of selected physical education teacher education publications in German (2019-2020)

C. Scheuer (Luxembourg, Luxembourg)

Abstract
This review article analyses research articles on the topic of physical education teacher education published in German-speaking scientific journals in the period between January 2019 and December 2020. In total, more than 60 journal issues of the journals Bewegung & Sport, German Journal of Exercise and Sport Research, Sportpädagogik, Sportunterricht, Zeitschrift für Sportpädagogische Forschung, and Zeitschrift für Sportpsychologie were reviewed. The reviewed articles are divided into two categories: physical education teachers’ professionalization, and articles focusing on instructional aspects in physical education. In the first category, 23 articles focusing on topics connected with physical education teacher education were analysed in two sections: (1) initial education of physical education teachers and (2) professionalization of physical education teachers. In the second category, 14 articles providing an overview of some current trends and orientations in physical education didactics relevant for physical education teacher education were analysed: (1) teaching and learning in physical education, (2) inclusive physical education and (3) diagnostic competence of physical education teachers. With 23 articles focusing directly on physical education teacher education, a considerable increase of publications on this topic in comparison to previous periods was identified. Most publications address issues related to initial physical education teacher education.

Key words: physical education teacher training, professionalization of physical education teachers, instructional aspects in physical education

1 Introduction
This review article is based on research articles in several scientific journals published in German over the past two years (January 2019 to December 2020). Short descriptions of the reviewed journals are provided in the review published in IJPE issue 1/2008 (Holzweg, & Budde, 2008) and are not repeated in this article. In total, more than 60 journal issues were reviewed: eight issues of Bewegung & Sport (previously known
under the title *Bewegungserziehung*), nine issues (including one special issue) of the *German Journal of Exercise and Sport Research* (previously known under the title *Sportwissenschaft*), ten issues (including two double issues) of *Sportpädagogik*, 24 issues of *Sportunterricht*, four issues of *Zeitschrift für Sportpädagogische Forschung*, as well as seven issues of *Zeitschrift für Sportpsychologie*. All articles published in the above journals in the respective period relating to physical education teacher education were taken into account in the present review article. The reviewed articles are divided into two categories: one focusing on physical education teachers’ professionalization, and the other focusing on instructional aspects in physical education. The content of the articles focusing on physical education teachers’ professionalization were analysed with respect to current topics in physical education teacher education and general aspects of the physical education teacher profession. The articles focusing on instructional aspects were analysed with respect to trends and research topics in physical education that are of particular importance to current discussions within the scientific community and thus also relevant for physical education teacher education.

2 Trends and orientations in articles focusing on physical education teachers’ professionalization

In this part of the article, 23 articles published in the journals *Bewegung & Sport*, *German Journal of Exercise and Sport Research*, *Sportunterricht*, and *Zeitschrift für Sportpädagogische Forschung* focusing on topics connected with physical education teacher professionalization are analysed in two sections: (1) initial education of physical education teachers and (2) professionalization of physical education teachers.

2.1 Initial education of physical education teachers

In a contribution to the journal *Sportunterricht*, Brandl-Bredenbeck, Kroll, Scholz, and Liebl (2020) focus on an overview of physical education teacher education at universities in Germany. Based on different levels of qualification which ought to enable teacher students to teach, the authors investigate structural guidelines for graduation requirements. The results reflect significant differences among the regarded locations in the German states as well as among the degrees for all qualification levels.

In a publication in the *German Journal of Exercise and Sport Research*, Schäfer, Pels, von Haaren-Mack, and Kleinert (2019) investigated the specific demands physical education teachers, physical education pre-service teachers and physical education student teachers are confronted with in their profession. The purpose of their study was to examine perceived stress and coping and their association in physical education teachers, physical education pre-service teachers and physical education student teachers in order to prepare (prospective) physical education teachers for handling such specific demands. Perceived stress was measured by the *Perceived Stress Questionnaire* and coping strategies (focus on positive coping, support coping, active coping and evasive coping) were assessed by the *Brief COPE Inventory*. Results show that physical education pre-service teachers have significantly higher values in perceived stress than physical education teachers and physical education student teachers. Moreover, evasive coping is positively associated with perceived stress, especially when physical education pre-service teachers use evasive coping strategies.

Assuming that reflections on teaching examples have positive effects on the professional development of pre-service teachers, Heemsoth (2019) investigated the performance of reflection of good and problematic teaching examples in an experimental study published in another contribution to the *German Journal of Exercise and Sport Research*. The results indicate that reflections on teaching examples lead to a better

3
planning for pre-service physical education teachers in general. Specifically, those who compared only good teaching examples outperformed those who compared problematic and good teaching examples. In his article, Heemsoth finally discusses the results with regard to implications on (physical education) teacher education.

During initial physical education teacher education, practical trainings are used to connect theory and practice and to offer initial teaching attempts along with reflections on lessons. Thereby the use of videotapes not only allows for the possibility to analyse specific scenes without pressure, but also to combine a student teacher’s own instructional sequences with those of other teachers. Based on this idea, Thissen, Scheid and Albert (2019) present a study in the journal *Sportunterricht* in which physical education teacher students reflect on their own lessons and those video-taped ones of others based on qualitative characteristics of good teaching. They used a process structure model allowing to analyse the contents of the teacher student’s reflections and to attribute them to different levels of reflection. Finally, the authors exemplarily present two cases to show the students different abilities to reflect.

In their paper on professionalism and professionalization of physical education teachers in physical education teacher education published in the journal *Zeitschrift für sportpädagogische Forschung*, Hapke and Cramer (2020) formulate the desideratum for a meta-theory that would allow the different profession-theoretical assumptions and empirical findings of both educational sciences and subject didactics to be related to one another and put into a congruent context, this with respect to each other and with respect to the domain-specific educational mandate. Thus, they present the professionalization approach of meta-reflexivity and discuss the added value and consequences of its domain-specific interpretation for the discourse on professionalization in the domain of both physical education and educational science.

Against the background of a recurring discourse on subjectively perceived differences between theory and practice in reflective discussions with student teachers in physical education teacher education, Zauner (2020), in an article in the journal *Bewegung & Sport*, characterizes a sports lesson conceived by student teacher groups and continuously adapted over the course of three cycles with reference to an action model for inclusive physical education. The implementation took place with integration classes of the primary and secondary level. Against this background, the relevance of a methodical and didactic discussion for the development of lessons, as well as the importance of reflecting on one’s own pedagogical action and one’s own understanding of the profession, were examined. In narrative interviews, student teachers described how awareness-raising and sensitization in dealing with diversity, the development of student-centred planning and associations between theory and practice were made possible by the format of the lesson study.

As there is a lack of research regarding the effects of long-term internships in teacher education programs in Germany on pre-service teachers’ actual teaching performance, Greve, Weber, Brandes, and Maier (2020), in a contribution to the *German Journal of Exercise and Sport Research*, investigated the performance development of eleven physical education pre-service teachers during a five-month internship by videotaping them in the same class: three times at the beginning and three times at the end of the internship during physical education lessons. All lessons were rated with the *Classroom Assessment Scoring System (CLASS)*, a highly inferential rating system for the analysis of classroom observations and classroom videos. The CLASS for primary schools (CLASS K-3) assesses ten dimensions of teacher-student interactions, which are summarized in three core domains: (1) emotional support, (2) classroom organization, and (3) instructional support. The development of teaching performance of pre-service
teachers in physical education showed no significant rise in the ten dimensions/three core domains measured over the course of the internship.

As there are still only a few concepts for the targeted preparation of prospective physical education teachers for inclusive physical education, Erhorn, Moeller and Langer (2020) systematically analysed and critically acknowledged higher education teaching formats for physical education teacher education in a contribution to the *German Journal of Exercise and Sport Research*. On the basis of this systemic analysis, they formulated proposals for the further development and evaluation of higher education teaching formats in these aspects.

With respect to current developments in the German school system to facilitate inclusion, Odipo, Schul, and Abel (2019) focus in an article in the journal *Sportunterricht* on the options for inclusion within the team sport basketball, which were developed in an instructional course at the German Sport University Cologne. Thereby, they emphasize the teacher students’ change in perspectives, as well as their experience with handicaps and in-depth phases of reflection. Based on theoretical foundations, the authors supply practical teaching designs resulting from the sport instructional seminar with student teachers, who reported on their personal experiences.

As there are no observation tools available to assess the quality of physical education teacher classroom management-related performances in a valid, reliable and objective manner, Baumgartner, Oesterhelt, and Reuker (2020), in a publication in the *German Journal of Exercise and Sport Research*, sought to identify the quality criteria which enable an appropriate assessment of physical education teacher classroom management-related performance in a study including several steps. Based on the results of this empirical evaluation, a model with nine latent variables was developed to which 27 items can be subsumed. The findings contribute to ensuring a valid, reliable and objective assessment of classroom management skills of physical education teachers.

In a contribution to the journal *Sportunterricht*, Wendeborn and Langer (2020) applied the problem of transitional processes requiring certain abilities from the user in order to survive in the digital world in initial physical education teacher education. Based on a structural content analysis of the curricula of all institutions educating physical education teachers in the Federal Republic of Germany, the authors investigated to what extent these documents include educational political strategies for developing digital competence. The analysed documents of these institutions hardly showed any strategic curricular content on the digital topic.

In a contribution to the journal *Zeitschrift für sportpädagogische Forschung*, Wibowo and Heemsoth (2019) deduce key points that allow justifying and testing content validity of tests for pedagogical content knowledge of physical education teachers. In their study, twenty-eight experts judged 40 items with satisfactory relevance and satisfactory plausibility and predominantly assigned the items in accordance with their theoretical construct specified by (a) eight movement-fields, (b) three knowledge facets, and (c) action related cognitive demands.

Assuming that pedagogical content knowledge (PCK) is a core component of professional competence that predicts both the quality of teaching and the achievement of teaching goals, Heemsoth and Wibowo (2020), in an article in the *German Journal of Exercise and Sport Research*, assessed PCK using 40 items comprising realistic teaching scenarios within one of eight movement fields and demanded of support learners to explain learning difficulties or to formulate appropriate instructions in a study with 290 physical education student teachers. Their findings indicate that PCK can be measured by the factors supporting learners, explaining learning difficulties and formulating learning instructions. Furthermore, the student teachers’ semester predicted
PCK, whereas the grade point average did not, which supports the qualification hypothesis.

In a contribution to the journal *Sportunterricht*, Wibowo and Krieger (2019) consider the connection between theory and practice as an ongoing task for physical education teacher students. They offer a way to ease the theory-practice relationship for teacher students and their advisors during job shadowing in schools. The authors present tasks offering those involved a high level of flexibility in content, time and space.

In a publication in the journal *Zeitschrift für sportpädagogische Forschung*, Liebl and Sygusch (2020) use a Delphi study to formulate basic competences related to teaching physical education in primary education by non-specialist physical education teachers. According to their consensus study, non-specialist physical education teachers should implement a safe and diverse physical education at primary schools and sensitize students to the importance of physical activity and movement in everyday life. However, in contrast to their colleagues with specialist qualifications, they do not have to be able to design their own physical education lesson plans. Furthermore, the ability to demonstrate movement sequences seems not to play an important role.

Liebl (2020) summarizes 19 studies on out-of-field or basic qualified teachers teaching physical education and defines essentials for further investigation on this topic in a contribution to the journal *Sportunterricht*. In summary, he suggests fundamental areas of competence for basic qualified physical education teachers at primary schools. Based on the idea that project-oriented teaching and learning can be considered as a promising concept for the future of schools and universities, Fritschen, Kleine and Wastl (2019) describe the arrangement of study projects contained in the physical education teacher training in another contribution to the journal *Sportunterricht*. Based on the results of the research study “Sportfabik” (sports factory), the acquisition of sport scientific, didactical and educational competences within these project-oriented seminars and their sustainability for the profession of teaching at schools were analysed. Against the background of current educational political developments and evidence, Ottenheim and Wendeborn (2019), in a paper in the journal *Sportunterricht*, question traditional aspects of teachers’ training and argue that the teachers should not necessarily prepare their lessons but be prepared to teach. This readiness includes the flexibility for them to react to specific instructional situations applying adequate measures (like using the different tools of a pocketknife). The authors state this demand and metaphorically refer it to the competence of teaching.

In his article in the journal *Zeitschrift für sportpädagogische Forschung* discussing implicit knowledge of physical education student teachers, Laging (2020) focuses on a job-related theoretical understanding of subjective expertise in physical education and examines the influence of new study contents on subjective directing orientations in a qualitative study. He concludes that physical education teacher students refer to the physical dimension in the act of moving as an expression of their technical understanding and as a specificity compared to other subjects. The reflection of new study contents in the context of the teaching experience shows a dominance of school teaching logic opposite to the logic of academic orientation as a paradox between comprehension and feasibility.

In an article in the journal *Bewegung & Sport*, Mercer and Payer (2020) report on a project exploring the commonalities of teaching physical education and English language by prompting teacher students to critically reflect on the experience of teaching both subjects by highlighting five main areas of similarity: (1) Attitude of learning; (2) Team spirit; (3) Mastery goals and vision; (4) Effective communication; and (5) Life skills.
2.2 Professionalization of physical education teachers

In a contribution to the journal *Sportunterricht*, Möhwald and Okade (2020) introduce “lesson study” as a Japanese type of continuing education and adapt this method of training for physical education teachers. The conceptual idea is that teachers learn from and together with colleagues in order to mutually improve instruction and their own teaching skills. The authors explain the individual phases of “lesson study” in addition to presenting and discussing applications and the potential of the concept for the German context.

In another article in the journal *Sportunterricht*, Hapke and Kuhr (2019) address the question whether and to what extent the concept of multi-perspective physical education plays a significant role in physical education teachers’ in-service education. Therefore, they qualitatively analysed online published course descriptions for in-service education offered during one year in four different German states. They summarize that the content item concerning various perspectives was rarely found as a topic for teachers’ in-service education. In contrast, suggestions were quite common for approaching lessons from one specific perspective, namely concerning cooperative aspects. With respect to considering multi-perspectives in physical education, the authors conclude that the offers especially focus on potentially adequate contents, rather than on instructionally adequate designs.

In a further contribution to the journal *Sportunterricht*, Pögl and Scheid (2020) present an evaluation study on the border experience program “Moving Strong”, implemented from 2014 to 2017 by the IfSS (Institute for Social Sciences) at the University of Kassel. In this program, elementary school teachers were trained in order to subsequently run borderline projects with their classes. First, the authors adapt border experience programs to the contexts of school and teacher education. Then, they discuss the program’s effect on participating teachers with respect to their understanding of and attitude toward border experience projects.

As outlined in an article in the journal *Zeitschrift für sportpädagogische Forschung*, Oswald, Rubeli, Valkanover, Conzelmann, and Schmidt (2020) describe the implementation of a five-month teacher training for primary physical education teachers aiming to impact students’ self-concept. In summary, the findings reveal that the teacher training had meaningful effects on teacher behaviour: it was associated with an enhanced knowledge about self-concept promotion in physical education and an increased individual oriented and reflexive teaching style, but not with self-concept promoting feedback behaviour. Regarding students’ self-concept, the effectiveness of the training was considered to be small. It indicates a weak positive effect due to the teacher training on students’ perceived sports competence and there were no effects on global physical self-worth.

3 Trends and orientations in articles focusing on instructional aspects in physical education

With respect to this topic, three issues will be outlined in three sections bringing together 14 articles published in the journals *Bewegung & Sport, German Journal of Exercise and Sport Research, Sportunterricht,* and *Zeitschrift für Sportpädagogische Forschung.* In this way, we will provide an overview of some current trends and orientations in physical education didactics: (1) teaching and learning in physical education, (2) inclusive physical education and (3) diagnostic competence of physical education teachers.
3.1 Teaching and learning in physical education

In their contribution to the journal *Bewegung & Sport*, Niederkofler and Seiler (2019) describe a united model of three considerations on the quality of physical education: (1) the didactic coherence, (2) the didactic star, and (3) the systematics of quality dimensions or characteristics. They briefly explain what approaches are available to the quality of teaching, how they can be interpreted for the implementation of physical education lessons and how they are related to each other. Finally, they locate the considerations on quality presented in a didactic planning context and discuss the quality in relation to satisfaction with one's own teaching activities.

With reference to current teaching research and physical education didactics, Herrmann (2019) differentiates and describes central features of good physical education teaching in another article in the journal *Bewegung & Sport*. Based on this, he shows how the QUALLIS instrument can be used to judge the quality of teaching and learning in sport and assess it from several perspectives (teacher, student, observer). Specific instructions are given for the preparation, implementation, evaluation and interpretation of the QUALLIS instrument in physical education practice.

In another article in the journal *Bewegung & Sport*, Ratzmann, Rode, and Amesberger (2020) discuss the realization of tasks in physical education as a complex interaction between task formulation, teacher actions or student efforts and work out some essential aspects of this complex practice of setting tasks. By this, they intend to show differently positioned points of determination and orientation for a didactic reflection.

Lackner and Kröll (2019) present the development, testing and evaluation of competency grids for physical education in primary school in a further contribution to the journal *Bewegung & Sport*. Primary education student teachers with a focus on physical education familiarized themselves with the grids, tested them in school practice and evaluated them.

By bringing together three different case studies comparing the situation in Germany and North Carolina (USA), Bonnet, Byrne Bausell, Glazier, and Rosemann (2020) explore the effects of assessment and testing on student teachers as well as qualified teachers in a contribution to the journal *Zeitschrift für sportpädagogische Forschung*. The three studies point to similar tendencies in both countries: students are no longer viewed as individuals but as numbers, assessment becomes the omnipresent logic and there is a tendency towards closure. The three studies examine the mechanisms of the reproduction of this closure-oriented and assessment-driven system on three different stages of teachers’ careers.

In an article in the journal *Sportunterricht*, Rosner (2020) presents the results of a theoretical and a qualitative empirical study on social competence, respectively social aspects in physical education. In order to explore the investigated topic, the researcher led interviews with teachers focusing on the significance of competence as well as the characteristics, contents and goals of physical education oriented toward the social aspect.

Based on physical education instructional requirements for facilitating “social cooperation”, Hapke (2019) investigates physical education teachers’ teaching practices through both qualitative interviews and observation methods in an article in the journal *Sportunterricht*. Thereby the author identifies matching aspects on the one hand (e.g. improvement in the ability to cooperate within the operative domain; the physical education teacher as a social guidance counsellor) and differing aspects on the other (e.g. improvement in the ability to compete within the ability to reflect on the activity within the cognitive domain). The differences may be attributed to the structural antinomies of instruction (such as cognitive activity versus movement time), as well as
a lack of both professional knowledge and access to adequate options for further education.

Against the background of motor activity being supposed to be primarily replaced by or turn more and more into reflective practice in physical education, Neumann (2020) uses a qualitative interview study (N = 20) to investigate the physical education teachers’ answers and opinions with respect to the 2016 Baden-Württemberg curriculum in a contribution to the journal *Sportunterricht*. By this, he intends to find answers to questions such as how physical education teachers in service perceive these changes in the traditional realm of objectives within physical education instruction or how they understand the increase in and the extent of reflective educational objectives in physical education.

### 3.2 Inclusive physical education

As in the frame of a continuously improving state of research on inclusive physical education in Germany over the past years it has not yet been sufficiently clarified how non-inclusive and inclusive physical education differ in general and what professional challenges for physical education teachers are associated with handling the heterogeneity of inclusive learning groups. Rischke and Reuker (2019) present and discuss empirical findings related to these questions concerning the view of physical education teachers in an article in the journal *Sportunterricht*. Taking into account the importance of the attitude of teachers for successful inclusive physical education, Braksiek, Gröben, Rischke, and Heim (2019) reanalyse data gathered from a survey of 900 physical education teachers in North Rhine-Westphalia and Hesse, Germany, to assess the teachers’ subject-specific attitude toward inclusive physical education and to identify institution and person-related factors that may have influenced it. Their findings presented in an article in the *German Journal of Exercise and Sport Research* indicate that both factorial and convergent validity of the scale were good. They conclude that while amount of work experience, teaching conditions for (inclusive) physical education, and private experience with people with disabilities had a significant influence on the physical education teachers’ attitude toward inclusive physical education, (inclusion-related) collaboration among physical education teachers and occupational stress did not.

Against the background of schoolchildren’s fundamental interest in participation in physical education and social interaction, Meier and Ruin (2019) address “student orientation” as a possible quality dimension of inclusive teaching and present and examine in detail individual aspects of student-oriented inclusive teaching in a contribution to the journal *Bewegung & Sport*. Using examples from the context of Capoeira, they illustrate their practical implementation or feasibility and classify their considerations with regard to their transferability into further content areas.

### 3.3 Diagnostic competence of physical education teachers

In an article in the journal *Sportunterricht*, Heitzer and Leineweber (2020) discuss physical education teachers’ diagnostic competence to adequately evaluate their students’ characteristics as well as the significance they give to this competence for their professional actions and as a prerequisite to adequately instruct heterogeneous learning groups.

In another contribution to the journal *Sportunterricht*, Seyda and Langer (2020) intend to clarify the synchronization of diagnostic aspects in physical education with instruction in physical education by discussing both interdisciplinary competence as well as sport specific suggestions for teaching physical education.
Against the background of competence-oriented diagnostics in contrast to widespread psychometric diagnostic procedures mainly built on objectivity and thereby often excluding the variety of people or individual changes within a complex human-context-system, Ruin and Veber (2020), favouring a competence oriented diagnosis to enable all to participate in physical education classes, contrast the two concepts of deficits and competence orientation in order to portray and exemplify the basics of a diagnosis oriented toward competence in physical education. Thereby they clarify the concomitant chances and limits of the concept in their contribution to the journal Sportunterricht.

4 Discussion
Different to the four previous reviews of physical education teacher education texts published in German, it can be concluded that articles focusing directly on physical education teacher education (23 publications) predominate in the analysed period over texts dealing with general and specific instructional aspects in physical education (14 publications; Scheuer, 2013, 2015, 2017, 2019). The relatively new journal Zeitschrift für sportpädagogische Forschung continues to deliver relevant contributions on the topic of physical education teacher education, together with a considerable raise of similar contributions in the German Journal of Exercise and Sport Research, whereas the journal Sportunterricht published the highest number of relevant articles in total. In most of the journals, the analysed topics relating to the profession of physical education teaching dealt with initial physical education teacher education, addressing various topics, such as reflection in physical education teacher education or pedagogical content knowledge. The most relevant trends in instructional aspects of physical education were related to teaching and learning in general as well as to inclusive physical education and the diagnostic competence of physical education teachers.

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Students’ beliefs about physical education and the impact of lesson frequency

K. Kougioumtzis & G. Patriksson (Gothenburg, Sweden)

Abstract
This study aims to highlight students’ beliefs about physical education (PE). The specific objectives are a) to describe students’ behavioural, normative, and control beliefs; b) to establish patterns between the three belief domains; and c) to analyse the impact of the PE lesson frequency on beliefs. A nationwide random stratified sample of 1,736 ninth-grade students in Sweden completed the study’s questionnaire, while the high response rate and the low internal dropout rate support the generalizability of the findings. The data analysis focused on three student groups based on lesson frequency of one, two, and three or more times weekly. On average, students’ answers indicated overwhelmingly positive beliefs. A second-order model with very close fit indexes showed similarities among the three groups. However, testing for the equivalence of the latent mean structures indicated a group non-invariant solution. The study demonstrates interrelation patterns among behavioural, normative, and control beliefs and significant associations between lesson frequency and beliefs.

Key words: reasoned action approach, behavioural beliefs, normative beliefs, control beliefs

1 Introduction
Regular participation in physical activity (PA) is a prerequisite for a healthy lifestyle (Haerens et al., 2011). During the last decades, physical inactivity and obesity in youth have increased sharply, threatening children’s and adolescents’ wellness and perhaps their future health as adults (Sanchez et al., 2007; Tremblay et al., 2011). One of “the most effective means of providing youth with skills, attitudes, values, knowledge, and understanding for lifelong participation in society” (UNESCO, 2015, p. 6) and an ideal environment for the prevention of youth obesity is physical education (PE) at schools.
Chen et al., 2014; Dudley et al., 2011). However, PE’s time in schools is declining worldwide (Hardman, 2013; see also Bann et al., 2019). Several lines of evidence suggest that frequent PE lessons are associated with increased PA levels (Silva et al., 2019; Uddin et al., 2020), decreased prevalence of obesity (So et al., 2011), and benefits on cognitive development (Cochran, 2015). To our knowledge, previous studies have not demonstrated detailed association patterns between PE lesson frequency and student’s beliefs about PE.

A large body of research indicates the usefulness of a reasoned action approach (RAA) to analyse and change health behaviour (Murnaghan et al., 2010). According to an RAA, behavioural, normative, and control beliefs form attitudes, subjective norms, and perceived behavioural control, determining one’s intention to be or not to be physically active (Ajzen, 2005). Fishbein and Ajzen (2010) define beliefs as subjective probabilities. Behavioural beliefs concern the outcome expectancies of performing a particular behaviour and incorporate a cognitive (knowledge of the effects of the behaviour) and an affective (evaluative) component. Normative beliefs regard perceived social pressure (e.g. from significant others) related to one’s performance of a particular behaviour and integrate an injunctive dimension (perceptions of others’ approval) and a descriptive one (perceptions of others’ behaviour). Control beliefs refer to the subjective probability that certain control factors are present, while perceived capacity and perceived autonomy represent two aspects of this category of beliefs.

Patterns between behavioural beliefs and PE class participation have been argued previously (Mercier & Silverman, 2014; Vlachopoulos et al., 2013). The majority of children appreciate PE lessons, while the decline in their enjoyment seems to accelerate during teenage years (Whitehead & Biddle, 2008). Correlations between students’ dispositions and the PE teacher, lesson content, gender, age, and grade level have been studied previously with mixed findings (Biddle et al., 2011; Silverman & Subramaniam, 1999).

The development of positive beliefs about PE requires a capable pedagogy (Dudley et al., 2011). The class environment and the tasks are essential for students’ PE experience in general and enjoyment in specific (Bernstein et al., 2011). The impact of a caring and autonomous learning environment stands at the core of research efforts towards quality PE (Hashim et al., 2008; Hastie et al., 2013). Within this study, a caring environment concerns a function of normative beliefs, including students’ perceptions about the PE teacher. PE can be seen as a process mutually constructed between teacher, students, and a specific learning environment (Amade-Escot & O’Sullivan, 2007), while the teacher occupies a critical role in the process (Kyrغيرidis et al., 2014). Professional care ethics, the establishment of a caring climate, and teacher-generated excitement during PE lessons are accepted to be indicators of excellent teaching (Bernstein et al., 2011; Hashim et al., 2008). Within the present study, an autonomous learning environment is a function of control beliefs.

Utilizing an RAA, this study aims to highlight Swedish ninth-grade students’ PE beliefs. The specific objectives are:
1. To describe students’ behavioural, normative, and control beliefs
2. To establish patterns between the three belief domains
3. To analyse the impact of PE lesson frequency on beliefs

In Sweden, physical education and health (PEH) at schools focus on physical, social, and personal development regarding overall physical capacity, interpersonal skills, and belief in the pupils’ physical competence. Health stands at the core of the curriculum as PA is fundamental to people’s well-being. To receive the highest PEH marks, the students ought to design, justify, and carry out health-enhancing exercise sequences
The physical benefits of enhanced PEH lesson frequency within a Swedish context have been argued previously (Sollerhed & Ejlertsson, 2008). However, research on the impact of the available teaching time on students’ beliefs is sparse.

2 Method

2.1 Procedures
For this study, a nationwide stratified random sample of lower secondary school students in Sweden received the study’s questionnaire. After researchers had initial telephone contact with school principals and PEH teachers, a package containing information about the study with ethical considerations and an adequate number of questionnaires with parental consent forms and prepaid return envelopes were sent by ordinary mail. Informed consent was obtained from parents and assent from participants before data collection.

2.2 Participants
The sample consisted of 1,736 ninth-grade students (51.4% males, 48.6% females, 16 ± .2 years of age) from schools across Sweden, randomly selected employing Statistics Agency’s services. After two reminders, 51 of the 60 schools (85%) responded, sending back the completed questionnaires. The average response rate of students within each school was 90%. The study’s findings are generalizable considering the high response rate and the limited internal dropout (missing values between .4% and 2.3% per item). The data analysis focused on three student groups based on weekly lesson frequency: group A with one lesson/week (251 students, 14.5%, Gr-A), group B with two lessons/week (1273 students, 73.3%, Gr-B), and group C with three or more lessons/week (212 students, Gr-C, 12.2%).

2.3 Measures
Data was collected using a five-point Likert-type scaled questionnaire with twelve items in line with the Reasoned Action Questionnaire recommendations (Fishbein & Ajzen, 2010). The principal component analysis with Varimax rotation extracted three factors, explaining 61.8% of the total variance (Table 1). The behavioural, normative, and control belief components, comprised of four items each, show good to very good Cronbach’s alpha estimates of .84, .80, and .71, respectively.
Table 1

Factor loadings for Exploratory Factor Analysis with Varimax rotation

<table>
<thead>
<tr>
<th>Items</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Behavioural beliefs</td>
</tr>
<tr>
<td>1 BB1</td>
<td>0.83</td>
</tr>
<tr>
<td>2 BB2</td>
<td>0.77</td>
</tr>
<tr>
<td>3 BB3</td>
<td>0.78</td>
</tr>
<tr>
<td>4 BB4</td>
<td>0.80</td>
</tr>
<tr>
<td>5 NB1</td>
<td>0.24</td>
</tr>
<tr>
<td>6 NB2</td>
<td>0.25</td>
</tr>
<tr>
<td>7 NB3</td>
<td>0.11</td>
</tr>
<tr>
<td>8 NB4</td>
<td>0.06</td>
</tr>
<tr>
<td>9 CB1</td>
<td>0.15</td>
</tr>
<tr>
<td>10 CB2</td>
<td>0.07</td>
</tr>
<tr>
<td>11 CB3</td>
<td>0.27</td>
</tr>
<tr>
<td>12 CB4</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Note: Factor loadings greater than 0.45 are shown in boldface.

2.4 Data analysis
The first stage of data analysis considered analysis of variance (ANOVA), with multiple comparisons (Bonferroni when equal variances and Dunnett T3 when unequal) to study differences between the three groups (Gr-A, Gr-B, and Gr-C). The second stage refers to exploratory and confirmatory factor analysis, utilizing structural equation modelling techniques to establish a configural model on beliefs. The third stage regards testing for the equivalence of latent mean structures. The ANOVA with multiple comparisons focuses on statistically significant differences between Gr-A, Gr-B, and Gr-C concerning the observed variables (BB1 to CB4), while equivalence testing of latent mean structures targets group invariance between the means of the latent variables, which are behavioural (BB), normative (NB), and control beliefs (CB).

3 Results
3.1 Behavioural beliefs
The behavioural beliefs were obtained utilizing four questions (Table 1). The first two questions focused on students’ perceptions about PA in terms of an affective dimension (BB1, enjoyment) and a cognitive dimension (BB2, benefits). The other two questions regarded PE lessons and students’ perceived appreciation (BB3) and attractiveness (BB4).

The data analysis (Table 2) revealed statistically significant differences between the three groups, while the most positive answers were characteristic of Gr-C students in terms of enjoyment (BB1), $F(2,1726) = 41.6, p < .001$ (Dunnett T3); benefits (BB2), $F(2,1718) = 25.8, p < .001$ (Dunnett T3); appreciation (BB3), $F(2,1721) = \ldots$
37.9, \( p < .001 \) (Dunnett T3); and attractiveness (BB4), \( F(2,1722) = 27.1, p < .001 \) (Bonferroni).

Table 2

**Behavioural beliefs**

<table>
<thead>
<tr>
<th>Item</th>
<th>Gr-A</th>
<th>Gr-B</th>
<th>Gr-C</th>
<th>Mean</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>SRW</th>
<th>SRW</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB1</td>
<td>3.38 (1.20)</td>
<td>3.72 (1.11)</td>
<td>4.31 (.90)</td>
<td>3.74</td>
<td>-.54</td>
<td>-.57</td>
<td>.75</td>
<td>Chi-sq 1.12</td>
</tr>
<tr>
<td>BB2</td>
<td>3.19 (1.30)</td>
<td>3.42 (1.21)</td>
<td>3.99 (1.19)</td>
<td>3.46</td>
<td>-.50</td>
<td>-.70</td>
<td>.72</td>
<td>Df 2</td>
</tr>
<tr>
<td>BB3</td>
<td>3.56 (1.19)</td>
<td>4.00 (.97)</td>
<td>4.37 (.92)</td>
<td>3.98</td>
<td>-.98</td>
<td>.66</td>
<td>.80</td>
<td>GFI 1.00</td>
</tr>
<tr>
<td>BB4</td>
<td>2.66 (1.56)</td>
<td>2.97 (1.50)</td>
<td>3.68 (1.58)</td>
<td>3.01</td>
<td>-.04</td>
<td>-1.48</td>
<td>.77</td>
<td>RMSEA .00</td>
</tr>
</tbody>
</table>

*Note. GFI = Goodness of Fit Index, RMSEA = Root Mean Square Error of Approximation, Df = Degrees of freedom, SRW = Standardized Regression Weights.*

As shown in Table 2, a first-order model with exact fit establishes connections between enjoyment, benefits, appreciation, and attractiveness, while the appreciation item (BB3) shares the highest commonality with the latent variable, behavioural beliefs (BB).

### 3.2 Normative beliefs

Four questions measured normative beliefs (Table 1). The first two questions focused on the normative beliefs and a descriptive dimension, which consisted of students’ perceptions of their appraisal (NB1) and encouragement (NB2) from the PEH teacher. The other two questions sought to establish an injunctive dimension and the perceived support (NB3) and fair treatment (NB4) from the PEH teacher.

Table 3 illustrates the results of the normative beliefs sections. Gr-B and Gr-C students gave the most positive answers in relation to appraisal (NB1), \( F(2,1723) = 13.2, p < .001 \); encouragement (NB2), \( F(2,1697) = 16.7, p < .001 \); support (NB3), \( F(2,1711) = 5.5, p < .01 \); and fair treatment (NB4), \( F(2,1728) = 4.4, p < .01 \). The differences between Gr-C and Gr-A, as well as between Gr-B and Gr-A, were statistically significant (Dunnett T3). Concerning injunctive normative beliefs (NB3, NB4), group B students gave more positive answers than group C students. However, the differences were not statistically significant (Dunnet T3).
Table 3

Normative beliefs

<table>
<thead>
<tr>
<th>Student Group</th>
<th>First Order Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Means &amp; Standard Deviations</td>
</tr>
<tr>
<td></td>
<td>Gr-A</td>
</tr>
<tr>
<td>NB1</td>
<td>3.37 (1.14)</td>
</tr>
<tr>
<td>NB2</td>
<td>3.08 (1.25)</td>
</tr>
<tr>
<td>NB3</td>
<td>3.46 (1.19)</td>
</tr>
<tr>
<td>NB4</td>
<td>4.00 (1.02)</td>
</tr>
</tbody>
</table>

Note. GFI = Goodness of Fit Index, RMSEA = Root Mean Square Error of Approximation, Df = Degrees of freedom, SRW = Standardized Regression Weights.

According to data in Table 3, a first-order model with close fit establishes connections between appraisal, encouragement, support, and fair treatment. The PE teacher’s support shares the highest commonality with the latent variable of normative beliefs (NB).

3.3 Control beliefs

Control beliefs were judged based on four questions (Table 1). Three questions focused on control beliefs in terms of the perceived autonomy to suggest (CB1), organize (CB2), and demonstrate (CB3) exercises during PE lessons. The fourth question targeted perceptions of autonomy to carry out warm-up exercises (CB4).

According to the analysis of students’ answers (Table 4), there were no statistically significant differences between the three groups in carrying out warm-up exercises (CB4), $F(2,1703) = 1.0, p = .369$ (Bonferroni).

Table 4

Control beliefs

<table>
<thead>
<tr>
<th>Student Group</th>
<th>First-Order Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Means &amp; Standard Deviations</td>
</tr>
<tr>
<td></td>
<td>Gr-A</td>
</tr>
<tr>
<td>CB1</td>
<td>2.32 (1.06)</td>
</tr>
<tr>
<td>CB2</td>
<td>2.27 (1.10)</td>
</tr>
<tr>
<td>CB3</td>
<td>2.08 (1.02)</td>
</tr>
<tr>
<td>CB4</td>
<td>2.78 (.94)</td>
</tr>
</tbody>
</table>

Note. GFI = Goodness of Fit Index, RMSEA = Root Mean Square Error of Approximation, Df = Degrees of freedom, SRW = Standardized Regression Weights.

The most positive answers came from group C and concerned suggesting (CB1), $F(2,1693) = 8.5, p < .001$, organizing (CB2), $F(2,1701) = 6.5, p < .001$, and demonstrating (CB3), $F(2,1705) = 10.43, p < .001$, exercises during PE lessons.
However, group differences between Gr-A and Gr-B were not statistically significant (Dunnett T3).

A first-order model with the exact or close fit (considering GFI and RMSEA, respectively) reveals patterns between suggesting, organizing, and demonstrating exercises and carrying out warm-ups. Suggesting activities showed the highest commonality with the latent variable, control beliefs (BB).

### 3.4 A configural model on beliefs

The analysis of students’ answers brought to light differences as well as similarities between the three groups. Establishing an overall belief index connected to the twelve items reveals a significant first-order model solution with a modest fit (Table 5). However, a second-order model (Fig. 1) represents a better solution as several fit indexes meet higher requirement standards (Byrne, 2010).

Table 5

**Beliefs: Exploratory analysis**

<table>
<thead>
<tr>
<th>Model</th>
<th>$x^2$</th>
<th>Df</th>
<th>$x^2 / \text{Df}$</th>
<th>RMSEA</th>
<th>GFI</th>
<th>AGFI</th>
<th>TLI</th>
<th>CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. First order</td>
<td>2222.7***</td>
<td>54</td>
<td>41.2</td>
<td>.15</td>
<td>.77</td>
<td>.69</td>
<td>.62</td>
<td>.69</td>
</tr>
<tr>
<td>II. Second order</td>
<td>303.1***</td>
<td>51</td>
<td>5.9</td>
<td>.05</td>
<td>.97</td>
<td>.96</td>
<td>.95</td>
<td>.96</td>
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</tbody>
</table>

Difference between I & II

<table>
<thead>
<tr>
<th>$x^2$</th>
<th>Df</th>
<th>$x^2 / \text{Df}$</th>
<th>RMSEA</th>
<th>GFI</th>
<th>AGFI</th>
<th>TLI</th>
<th>CFI</th>
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<tbody>
<tr>
<td>1919.6</td>
<td>3</td>
<td>35.3</td>
<td>.10</td>
<td>.20</td>
<td>.30</td>
<td>.33</td>
<td>.27</td>
</tr>
</tbody>
</table>

*** $p < .001$

*Note. Df = Degrees of freedom, GFI = Goodness of Fit Index, AGFI = Adjusted GFI, RMSEA = Root Mean Square Error of Approximation, TLI = Tucker-Lewis Index, CFI = Comparative Fit Index, PNFI = Parsimonious Normed Fit Index.*

As shown in Table 5, the fit indexes of the second-order model indicate a close fit as the value of RMSEA is .05 and the estimates of GFI, AGFI, TLI, CFI, and PNFI are between .95 and .97 (see Appendix for Variance-Covariance Matrix).
In line with Table 6, the second-order model represents a group-invariant close fit structural solution. It can be applied to the whole sample and each group, supporting that the specific questionnaire operates equivalently across different groups.

The configural second-order model (Figure 1) shows very good indexes (Table 6).
Table 6

Beliefs: Confirmatory Analysis

<table>
<thead>
<tr>
<th></th>
<th>BB1</th>
<th>BB2</th>
<th>BB3</th>
<th>BB4</th>
<th>NB1</th>
<th>NB2</th>
<th>NB3</th>
<th>NB4</th>
<th>CB1</th>
<th>CB2</th>
<th>CB3</th>
<th>CB4</th>
<th>BB</th>
<th>NB</th>
<th>CB</th>
<th>$\chi^2$</th>
<th>GFI</th>
<th>RMSEA</th>
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</thead>
<tbody>
<tr>
<td>TOT</td>
<td>.73</td>
<td>.72</td>
<td>.82</td>
<td>.77</td>
<td>.73</td>
<td>.74</td>
<td>.75</td>
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<td>.75</td>
<td>.71</td>
<td>.64</td>
<td>303.1***</td>
<td>.97</td>
<td>.05</td>
</tr>
<tr>
<td>A</td>
<td>.70</td>
<td>.71</td>
<td>.83</td>
<td>.79</td>
<td>.77</td>
<td>.82</td>
<td>.81</td>
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<td>.76</td>
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<td>.82</td>
<td>.67</td>
<td>.66</td>
<td>121.9***</td>
<td>.93</td>
<td>.07</td>
</tr>
<tr>
<td>B</td>
<td>.73</td>
<td>.71</td>
<td>.82</td>
<td>.75</td>
<td>.71</td>
<td>.70</td>
<td>.73</td>
<td>.58</td>
<td>.66</td>
<td>.51</td>
<td>.69</td>
<td>.51</td>
<td>.70</td>
<td>.75</td>
<td>.67</td>
<td>184.6***</td>
<td>.98</td>
<td>.05</td>
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<tr>
<td>C</td>
<td>.70</td>
<td>.72</td>
<td>.68</td>
<td>.77</td>
<td>.75</td>
<td>.81</td>
<td>.77</td>
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<td>.87</td>
<td>.62</td>
<td>.47</td>
<td>117.8***</td>
<td>.92</td>
<td>.07</td>
</tr>
<tr>
<td>DA</td>
<td>.70</td>
<td>.71</td>
<td>.83</td>
<td>.79</td>
<td>.77</td>
<td>.82</td>
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<td>.82</td>
<td>.67</td>
<td>.66</td>
<td>424.8***</td>
<td>.96</td>
<td>.03</td>
</tr>
<tr>
<td>DB</td>
<td>.73</td>
<td>.71</td>
<td>.82</td>
<td>.75</td>
<td>.71</td>
<td>.70</td>
<td>.73</td>
<td>.58</td>
<td>.66</td>
<td>.51</td>
<td>.69</td>
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<td>.70</td>
<td>.75</td>
<td>.67</td>
<td>424.8***</td>
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<td>.03</td>
</tr>
<tr>
<td>DC</td>
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<td>.72</td>
<td>.68</td>
<td>.77</td>
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<td>.77</td>
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<td>.52</td>
<td>.84</td>
<td>.55</td>
<td>.87</td>
<td>.62</td>
<td>.47</td>
<td>424.8***</td>
<td>.96</td>
<td>.03</td>
</tr>
</tbody>
</table>

*** $p < .001$

Note. GFI = Goodness of Fit Index, RMSEA = Root Mean Square Error of Approximation, TOT = the total sample, A = Gr-A, B = Gr-B, C = Gr-C, D = configural models, $D_A$ = Gr-A, $D_B$ = Gr-B, $D_C$ = Gr-C.
4 Mean structures of behavioural, normative, and control beliefs

The ANOVA with post-hoc comparisons revealed statistically significant differences between Gr-A, Gr-B, and Gr-C concerning each of the twelve observed variables (BB1 to CB4), while the analysis of mean structures focused on the means of the latent variables, BB, NB, and CB. Testing for the latent mean structures’ equivalence followed established guidelines and procedures (Byrne, 2010). As shown in Table 7, the latent mean values of behavioural, normative, and control beliefs are different for the three groups.

Table 7

Beliefs: Invariance of Latent Mean Structures

<table>
<thead>
<tr>
<th>Belief</th>
<th>Group B – Group A</th>
<th>Group C – Group B</th>
<th>Group C – Group A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diff. B-A</td>
<td>SE</td>
<td>Sig.</td>
</tr>
<tr>
<td>BB</td>
<td>-.31</td>
<td>.06</td>
<td><em>p &lt; .001</em></td>
</tr>
<tr>
<td>NB</td>
<td>-.30</td>
<td>.06</td>
<td><em>p &lt; .001</em></td>
</tr>
<tr>
<td>CB</td>
<td>-.03</td>
<td>.05</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

*Note: Diff = Difference, SE = Standard Error, BB = Behavioural Beliefs, NB = Normative Beliefs, CB = Control Beliefs.*

According to Table 7, Group C students reported the most positive behavioural, normative, and control beliefs. However, differences between Group C and Group B were not significant regarding normative beliefs. Behavioural and normative beliefs were more positive in Group B than Group A, while there were no significant differences between the two groups concerning control beliefs.

5 Discussion

The present study examined ninth-grade students’ behavioural, normative, and control beliefs, which constitute the cornerstones of attitudes, subjective norms, and perceived behavioural control, therefore indirectly determining individuals’ intentions towards certain behaviours. Descriptive analysis revealed overwhelmingly positive PE beliefs. These results are congruent with previous studies with students of the same or similar ages (Mercier & Silverman, 2014; Pihu, Hein, Koka, & Hagger, 2008; Vlachopoulos et al., 2013). More specifically, Hashim et al. (2008) reported mean values of 3.90 (.89) and 3.66 (.89) in five-scaled questions concerning the appreciation of PE and the perceived support from the PE teacher, respectively (Table 2 & Table 3). These results are almost identical with the present study’s corresponding values of 3.98 (1.02) and 3.66 (1.07). Moreover, Papaioannou (1998) reported mean values between 3.12 and 4.02 in four autonomy-related questions (seven-scaled), which corresponds to the means between 2.19 and 2.74 in the four items on control beliefs (five-scaled) within this study (Table 4).

Within this study, students’ normative belief-focused perceptions correlated to a caring environment from the PEH teacher and a pedagogical function. Control beliefs targeted perceptions of autonomy during PEH classes and a didactical function, while the analysis revealed significant structural relationships between behavioural, normative, and control beliefs. In other words, the results support a group-invariant pattern between behavioural beliefs and selected aspects of pedagogy and didactics. The strong
association between behavioural beliefs and pedagogical issues has been argued previously (Hashim et al., 2008; Mercier & Silverman, 2014). Earlier accounts support the relationships between behavioural dispositions and didactical matters (Chen et al., 2014; Wallhead, Garn, & Vidoni, 2014). Pihu et al. (2008) found similar patterns between attitudes, perceived behavioural control, and positive feedback from the PE teacher. However, it is not easy to compare the strength of associations due to design differences.

The study instrument operates equivalently across the three student groups, representing a group-invariant measurement model. The factorial structure is also equivalent among groups, indicating good construct validity with invariant specified paths. However, a metric invariance is evident, signified by the variation in loadings. The latent means of the behavioural, normative, and control belief constructs differ in a statistically significant manner (Table 7). Increased weekly PE lesson frequency is associated with upgraded beliefs. For students with one weekly lesson, an extra hour of PE is associated with more positive behavioural and normative beliefs, while two or more extra hours signify even upgraded control beliefs. Considering students with two hours of weekly PE provision, adding one or more extra PE hours is connected to more positive behavioural and control beliefs. Teacher behaviour, subject matters, and instructional models, as well as gender, age, grade, and skill level, have been previously pointed out as determinants for students’ PE dispositions (Silverman & Subramaniam, 1999; Wallhead et al., 2014). Furthermore, Ajzen (2005) portrayed three broad categories with an impact on behavioural beliefs: “(1) situational circumstances surrounding the performance of the behaviour; (2) characteristics of the individual; and (3) secondary characteristics of the disposition (p. 42)” While staying beyond the control of teachers and students, lesson frequency or curricular time allocated for PE, as a matter of the third category, impacts behavioural beliefs.

References


Appendix

*Variance-Covariance Matrix (the whole sample)*

<table>
<thead>
<tr>
<th></th>
<th>BB1</th>
<th>BB2</th>
<th>BB3</th>
<th>BB4</th>
<th>NB1</th>
<th>NB2</th>
<th>NB3</th>
<th>NB4</th>
<th>CB1</th>
<th>CB2</th>
<th>CB3</th>
<th>CB4</th>
</tr>
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<tbody>
<tr>
<td>BB1</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BB2</td>
<td>.76</td>
<td>1.53</td>
<td></td>
<td></td>
<td></td>
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<td>1.05</td>
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<td></td>
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</tr>
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<td>.28</td>
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</table>
Perceptions of the potential contribution of Active Video Games to school physical education in Hong Kong children and adolescents

P. W. C. Lau1, L. Ransdell2, G. Wang1, J.-J. Wang3 (1Hong Kong, China; 2Flagstaff, USA; 3Beijing, China)

Abstract
To explore children’s perception of the contribution of Active Video Games (AVG) to school PE, 360 Chinese children (8-15 yrs old) were recruited from a shopping mall. Questionnaires were administered to investigate children’s (1) perceptions of AVG, (2) attitudes toward AVG if adopted in school PE, (3) perceptions of the association between AVG and PE objectives, and (4) age and gender differences. Children perceived that AVG are enjoyable and could increase their physical fitness, energy expenditure, and improve sport skills and knowledge. They rated AVG high in social-psychological and learning values. The correlation between children’s perception between AVG and school PE objectives was moderate. Compared to secondary students, primary students reported more positive attitudes toward AVG and higher self-reported PA levels.

Key words: exergames, physical activity, Chinese children, Chinese adolescents

1 Introduction
Children’s physical activity (PA) levels, which include active commuting and outdoor play, have been declining over the past decade (Bassett, John, Conger, Fitzhugh, & Coe, 2015; Booth, Rowlands, & Dollman, 2015). The 2018 Hong Kong Report Card on physical activity for children and youth indicated that Hong Kong children and adolescents have a very sedentary lifestyle. The ratings included: overall PA (C-) organized sport participation (C), and sedentary behaviors (C-) (Huang et al., 2019).
Although insufficient PA can be attributed to multiple factors, prolonged exposure to screen-based activities (i.e., TV viewing and video games play) has been proposed as a major contributor to inactivity (Sanders et al., 2012). In fact, Hong Kong children (6-10 years old) average four hours of screen time a day (Busch, Manders, & de Leeuw, 2013). Children who play video games often spend long periods of time in total concentration when they engage in these activities. The screen time related to video game play has been linked to a sedentary lifestyle (Sanders et al., 2012). As time spent on screen-based activities increases, time that children could spend on other activities- including PA- may be reduced (Boone, Gordon-Larsen, Adair, & Popkin, 2007). In addition to increasing sedentary behavior, screen time has also been associated with health risks such as unhealthy eating habits, psycho-social problems and being overweight (Granic, Lobel, & M. E. Engels, 2014).

Efforts to decrease screen-time have been challenging (Foley & Maddison, 2010) - especially since video games are already ingrained in different aspects of children’s daily lives (Hwang & Lu, 2018). Video games are not only an increasingly important part of most children’s leisure time, but also a vital part of contemporary culture and society. In 2019, the Entertainment Software Association reported that 75% of American households own a device for playing video games, and 70% of American children (51.1 million) are video game players. Individuals play video games in a number of settings including after school or work (51%), during breaks or school recess (26%), or during their commute (16%). Playing video games evokes a range of emotion, as players reported that game playing can bring joy (57%), and facilitate relaxation (79%). Almost 2/3 of survey respondents (63%) felt that video games can nurture problem solving ability, including a large percentage (73%) of parents (Entertainment Software Association (ESA), 2019). To support the aforementioned findings, a meta-analysis that examined opinions about the effects of video game play on information processing (Powers, Brooks, Aldrich, Palladino, & Alfieri, 2013) concluded that parents and teachers believe that computer game play can facilitate the development of essential cognitive skills such as planning, communication, strategic thinking, negotiation, group decision-making, and data and number handling. Given that such a large percentage of individuals own devices for playing games, gain enjoyment from playing, feel like there may be some benefit from playing, and engage in many hours per day of screen time, it is important to examine how video games can be used to facilitate increased physical activity instead of sedentary behavior.

AVG from older models like Nintendo Wii (Nintendo, Company Ltd.), and PlayStation3 (Sony Computer Entertainment), and newer models like Nintendo Switch, combine the elements of video game technology and physical exertion. Since 1998 (notably after the release of Konami’s Dance Dance Revolution (DDR), AVG have been examined for their potential impact on an individual’s energy expenditure, exercise intensity, exercise motivation, physical activity and health. Several researchers indicated that AVG increased energy expenditure (EE) (Foley & Maddison, 2010; Z. Gao, Chen, Pasco, & Pope, 2015; Lyons et al., 2011), physical activity and physical fitness (Foley & Maddison, 2010; Z. Gao et al., 2015; Maddison et al., 2012). Time spent on certain AVG can contribute to the daily amount of exercise recommended by the American College of Sport Medicine (ACSM), American Heart Association (AHA) (Miyachi, Yamamoto, Ohkawara, & Tanaka, 2009) or the Centers for Disease Control. McDougall and Duncan indicated that even a small amount of AVG play may contribute to recommended daily PA for children and adolescents (McDougall, Duncan, & Development, 2008). Thus, advancing AVG use, rather than repelling screen-based activities, may enhance PA promotion and participation (Hillier & Science, 2008).
A handful of systematic reviews and meta-analyses have examined the benefits of AVG. In one of the largest studies to date, LeBlanc and colleagues (LeBlanc et al., 2013) reviewed 51 studies in children (3-17 y) from 8 countries and concluded that AVG facilitate increased light-to-moderate energy expenditure, but effects on habitual PA are not clear. In addition, they specify that AVG show promise with rehabilitation and other special populations (e.g., overweight children or children recovering from cancer). A systematic review of 18 studies by Biddiss and Irwin (Biddiss & Irwin, 2010) concluded that activity levels while playing AVG were highly variable, with increases in light-to-moderate energy expenditure (222 + 100%) and heart rate (64 + 20%). Energy expenditure during AVG was highest for activities that used both upper and lower body movements (e.g., boxing), followed by lower body focused activities (e.g., DDR), and upper body focused activities (e.g., bowling and tennis). Evidence suggests that AVG play may decrease sedentary time and increase PA, but methodological limitations and possible confounding variables indicate that additional research is needed. Gao and colleagues (Z. Gao et al., 2015) completed a meta-analysis of 35 studies to examine the impact of AVG on health outcomes in children and adolescents. They concluded that compared to sedentary behaviours, AVG have a large effect on health outcomes, and that these beneficial outcomes are similar to those obtained using laboratory- or field-based activities; they believe AVG are an acceptable alternative to sedentary behavior and should be considered as an adjunct to traditional PA and sports for children and adolescents (Z. Gao et al., 2015).

In addition to the physical benefits of increasing PA and energy expenditure, AVG may have positive psychological effects that contribute to exercise adherence. Specifically, researchers have reported that compared to conventional exercise modes, AVG may be more appealing, interesting, enjoyable, motivational, and more effective for promoting exercise and sport for the following reasons (Papastergiou, 2009): (1) AVG supports multi-sensory, interactive, experimental, and problem-based learning; (2) AVG pushes players to use learned knowledge to advance into higher levels of play; (3) AVG gives instant feedback to players about their previous decisions or behaviors, which allows for self-monitoring and self-reflection; (4) AVG acts as an efficient self-assessment; and (5) AVG constitutes a popular social environment among peers and within their social world.

Although there are benefits to embracing technology so engrained in our society, AVG have rarely been used or studied in the school physical education (PE) curriculum (Krause, O'Neil, & Jones, 2020). According to Maher and colleagues (Maher et al., 2014), the ultimate goals for PE are maximal retention, student engagement and sustaining long-term active behavior. Ennis (2013) purports that there are three ways in which AVG may be able to contribute to PE goals. First, AVG promote exercise participation and enjoyment, especially for low skilled and reluctant students. Students with less skill may be less intimidated participating against an avatar than against skilled classmates, and they may prefer to participate in these activities without others watching. This is known as the “recreation approach.” Second, AVG can increase PA and provide health benefits such as increased energy expenditure and physical exertion. This is known as the “public health approach.” Third, AVG can facilitate student learning through PE. This style, known as the “educational approach,” consists of developing the physical, cognitive, affective and social domains of learning. Ideally, AVG can contribute to all aspects of education, addressing PE’s comprehensive goals and producing a well-rounded person (Entertainment Software Association (ESA), 2019).

These three approaches suggested by Ennis demonstrate three different layers of the PE objectives (Ennis, 2013). Each approach serves a different purpose along the life
development of an individual’s health and education. It is evident that these three approaches are responsible for different needs, and that each is a prerequisite for another. Logically, without PA/exercise participation for enjoyment (recreation approach), health benefits from the public health approach and educational learning (physical, cognitive, affective and social domains) would not be possible. Using this logic, AVG may be able to contribute to all three PE approaches.

In addition to numerous PE scholars calling for adding technology to PE (Ennis, 2013; Gawrisch, Richards, & Killian, 2020; Krause et al., 2020), the International Society for Technology in Education (International Society for Technology in Education (ISTE), 2020) established standards for teachers to “foster and enable students to become empowered learners, digital citizens and global collaborators.” The National Education Association (NEA) in the USA has guided educators to prepare to incorporate AVG into the classroom (Long, 2007). To address these goals in PE, previous studies suggested that video games are an inherently valuable new resource to support learning and education in the information age (Granic et al., 2014; Heeter et al., 2003). Krause and colleagues (Krause et al., 2020) stated that technology in PE can help: (a) individualize the experience, (b) shrink gaps relative to information access, and (c) increase demand for technology skills. In addition, teacher role-modeling may play a role in student, parent, teacher, and administration acceptance of technology within the PE curricula.

To help AVG succeed in the PE curricula, Heeter and colleagues listed sixteen necessary components that comprised a fun experience for serious gamers (Heeter et al., 2003). These include: beauty, immersion, intellectual problem-solving, competition, social interaction, comedy, thrill of danger, physical activity, love, creation, power, discovery, advancement and completion, application of an ability, altruism, and learning. Another key to integrating technology into a PE curriculum includes “gamifying” elements of successful PA behavior change such as self-monitoring, goal setting, feedback, automation, and personalization (Tong, Coiera, & Laranjo, 2018). AVG may cover some of the aforementioned aspects and produce certain educational effects for school children through active technological gameplay. It is also possible that AVG can facilitate motivation and improve classroom dynamics (Rosas et al., 2003), and it can enhance level of concentration. AVG facilitates fast, active and exploratory tasks with the player having a sustained level of engagement (Rosas et al., 2003).

Some schools in the USA have incorporated AVG, notably DDR, into PE lessons (Quinn, 2013; Trout & Christie, 2007). One suburban town on the East Coast incorporated DDR into all schools as a way to increase PA by making it fun, and obesity rates decreased in middle school students (Quinn, 2013). At the high school level high, DDR was integrated into PE lessons for more than a year, and fit children exercised more and those who were inactive became more active (Kreimer, 2004). One study reported that integrating DDR into PE lessons facilitated the development of teamwork, cooperation, fair play, and the understanding of rhythm (Hansen, & Watterson, 2010). A review by Norris, Hame and Stamatakis (Norris, Hamer, & Stamatakis, 2016) concluded that although AVG has been effective for increasing PA and/or physical fitness in many studies, there is still insufficient evidence to suggest that AVG are efficacious health interventions within schools. Furthermore, AVG have mainly been used in educational settings in Western countries. There are no studies that have investigated how Chinese school children perceive AVG, and if AVG is considered an option to add to school children’s PE lessons. AVG as part of a PE curriculum may be a welcome addition for Hong Kong due to high population density, a lack of indoor and outdoor activity space, and poor air quality (Mason, Schooling, Chan, & Tian, 2019). In addition, the COVID-19 pandemic has lessened opportunities for playing games and interacting with other school children directly, so AVG may provide a welcome
alternative for PA in the schools. Given the potential for using AVG in PE curricula, and the fact that this topic has not been systematically studied in Hong Kong, the purposes of this study were to investigate:

1. Attitudes of Chinese children towards AVG
2. Attitudes of Chinese children about AVG if adopted in school PE lessons,
3. Chinese Children’s perception of the association between AVG and school PE objectives,
4. If there are age and gender differences related to the perceived educational use of AVG in school PE.

2. Materials and methods

2.1 Participants

The study was conducted on a weekend from 9am to 6pm in a busy urban shopping mall within a major school district of Hong Kong. A total of 300 (160 boys (53.3%); 140 girls (46.7%) Chinese children, aged 8 to 15 years old (M=11.3, SD=2.4) were randomly recruited. The Mall attracted visitors from diverse background including age, gender, and socio-economic status (SES) (lower to upper middle SES), and is likely representative of much of Hong Kong society. Among the sample, 155 children (51.6%) were 8-11 years old (children in primary school), and 145 (48.4%) were 12-15 years old (adolescents in secondary school). The inclusion criteria were: 1) without any physical or psychological illness, 2) did not own the selected active video games (because regular players who possess optimal competency likely have more positive bias towards the games) (Choi & Kim, 2004). All study procedures were approved by the Committee on the Use of Human and Animal Subjects in Teaching and Research of Hong Kong Baptist University. Participants and their parents or guardians were properly informed of the experimental risks and nature of the study, respectively. Demographic information, including age, gender, height, weight and time spent on sedentary entertainment, was collected.

2.1 Measures and procedures

PlayStation® Move (Sony Computer Entertainment) was employed in the present study. All participants played one of the three AVG one time: Table Tennis, Beach Volleyball or Golf. They then were asked to complete the questionnaire (described below) to ascertain their attitudes toward AVG.

Researchers drafted the questionnaire based upon the literature related to how children perceive the AVG they played, their attitude towards AVG if adopted in school PE lessons, and how they perceive the association between AVG and PE objectives. The Delphi method was used among the authors to construct and refine the content of the questionnaire. This process allowed us to modify the self-constructed questionnaire content based upon the literature search. The goal was to reach consensus by surveying the experts after each round of revisions. Comments and revisions were collected and circulated based upon each round of feedback. The revised questionnaire was circulated until all experts reached consensus about the final draft. The questionnaire included five sections: 1) children’s demographic information including age, gender, self-reported weight & height, and AVG playing experience, 2) a 12-item scale on children’s perceptions when playing AVG (Cronbach α =0.74). Sample questions included the stem, “When I play AVG…”: (a) I have a higher sense of self-control, or (b) I feel bored”, 3) a 21-item scale on children’s attitudes towards AVG if adopted in school PE (AVG & PE) (Cronbach α = 0.89). There were seven categories and each category included three items. The seven categories included: physical fitness, health behavior promotion, sports skills & knowledge, energy expenditure, social-psychological value,
teaching & learning value, and negative impacts. Sample questions included the stem: “If AVG is adopted in school PE lessons...”: (a) it will improve my sport skills (sports skills & knowledge), (b) it will increase my self-confidence in playing sports (social-psychological value), or it will damage the PE lessons (negative impacts), 4) a 7-item scale to measure children’s perceptions/views on the objectives of PE (Cronbach α = 0.89). Sample items included: “PE can improve my physical fitness,” or “PE can help with character building.” For all of the aforementioned statements, participants were instructed to rate their agreement/disagreement with the statements (1 = strongly disagree, 5 = strongly agree). The negatively worded statements were reverse-coded for scoring (e.g. When I play AVG, I feel bored). A higher total score in sections 2-4 indicated a more positive perception of students towards AVG play and the use of AVG in school PE lessons.

Physical activity level was assessed using a 2-item scale to measure seven-day self-reported PA level (Cronbach α = 0.69). The two questions were: “Which sentence best describes your physical activity during leisure time in the past 7 days?” from a 5-point scale (1 “zero time/week” to 5 “7 or more times/week”), and “In regular PE lessons, how often are you very active and sweating a lot?” from a 5-point scale (1 “never” to 5 “very often”). Questionnaires were completed in approximately 20 minutes.

2.3 Data analysis
Means and standard deviations are presented for children and adolescent’s perception of AVG and their rating of AVG if adopted as part of school PE lessons. Pearson correlation analysis was employed to examine the relationships among children and adolescent’s perceptions of AVG, their attitudes towards AVG if adopted in school PE (AVG & PE), perceived association between AVG and PE objectives, and their self-reported PA level. T-Tests were used to examine whether there were gender and age differences among the variables. When conducting the age group comparison analysis, participants were divided into two groups: 8-11 years old (children in elementary school) and 12-15 years old (adolescents in middle and secondary school). P-value adopted for the study was < 0.05.

3 Results
The summary statistics for children’s perceptions of AVG, from highest to lowest score, are shown in Table 1. Children had the highest scores on the following questions: “When I play AVG, I feel” “Interested,” “Eager to continue for a long time,” “Encouraged to be more active,” and “Challenged.” Interestingly, scores denoting that “AVG is similar to real sports (table tennis/ beach volleyball/golf)” were among the highest scores, as were scores stating that children had higher self-esteem after playing. Children had lower scores on “bored” denoting that AVG was not boring, and on “learn nothing” indicating that they felt they could learn from playing AVG. Anecdotally, children were eager to play AVG for longer than 1 game.
Table 1

*Descriptive statistics for the children’s rating of AVG, from highest to lowest scores*

<table>
<thead>
<tr>
<th>Description (When I play AVG (Table Tennis/ Beach Volleyball/Golf, I feel))</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interested</td>
<td>4.24</td>
<td>0.89</td>
</tr>
<tr>
<td>Eager to continue for a longer time</td>
<td>4.24</td>
<td>0.92</td>
</tr>
<tr>
<td>It encouraged me to be more active</td>
<td>4.00</td>
<td>0.97</td>
</tr>
<tr>
<td>Challenged</td>
<td>3.96</td>
<td>1.10</td>
</tr>
<tr>
<td>It is similar to real sports (table tennis/beach volleyball/golf)</td>
<td>3.88</td>
<td>1.06</td>
</tr>
<tr>
<td>I have higher self esteem</td>
<td>3.78</td>
<td>1.11</td>
</tr>
<tr>
<td>I have a higher sense of self-control</td>
<td>3.16</td>
<td>1.39</td>
</tr>
<tr>
<td>It is difficult to handle</td>
<td>3.07</td>
<td>1.42</td>
</tr>
<tr>
<td>Not active enough</td>
<td>2.90</td>
<td>1.29</td>
</tr>
<tr>
<td>It makes me sweat</td>
<td>2.65</td>
<td>1.33</td>
</tr>
<tr>
<td>I learn nothing-- including sport-related information</td>
<td>2.62</td>
<td>1.34</td>
</tr>
</tbody>
</table>

AVG: active video games

Table 2 illustrates scores of Chinese children and adolescent perceptions related to adopting AVG in schools. All mean scores from the 6 positive domains were above 3.33, which is positive, and the negative domain averaged 2.41, which indicated that Chinese children did not feel excessively negatively about AVG. The highest average scores were from the teaching and learning domain and indicated that Chinese children and adolescents felt that AVG would help them have more fun and incorporate innovation and variety into PE. They also strongly agreed that it would help lesser skilled students develop skills. Within the sports skills and knowledge domain, the highest scores indicated that Chinese students felt AVG would help improve their sport knowledge in individual sports and develop basic movement skills. The third highest average scores indicated that Chinese children felt AVG would provide social-psychological value, specifically that it would strengthen peer relationships and self-confidence playing sports.
### Table 2

**Descriptive statistics for the children’s rating of AVG if adopted in school PE lessons**

<table>
<thead>
<tr>
<th>Description (If AVG are adopted in school PE lessons, I think…)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FITNESS</strong>&lt;br&gt;It will improve my muscular strength &amp; endurance</td>
<td>3.28</td>
<td>1.16</td>
</tr>
<tr>
<td>It will strengthen Cardiorespiratory Fitness (CRF)</td>
<td>3.31</td>
<td>1.14</td>
</tr>
<tr>
<td>It will improve my overall fitness</td>
<td>3.39</td>
<td>1.14</td>
</tr>
<tr>
<td><strong>HEALTH BEHAVIOR PROMOTION</strong></td>
<td><strong>3.63</strong></td>
<td></td>
</tr>
<tr>
<td>It will activate me to start exercise</td>
<td>3.56</td>
<td>1.14</td>
</tr>
<tr>
<td>It will encourage me to be more active</td>
<td>3.73</td>
<td>1.10</td>
</tr>
<tr>
<td>It will reduce my sedentary behaviors like surfing the net &amp; watching TV</td>
<td>3.59</td>
<td>1.22</td>
</tr>
<tr>
<td><strong>SPORT SKILLS &amp; KNOWLEDGE</strong></td>
<td><strong>3.83</strong></td>
<td></td>
</tr>
<tr>
<td>It will improve my sport skills</td>
<td>3.70</td>
<td>1.12</td>
</tr>
<tr>
<td>It will improve my sport knowledge in individual sports</td>
<td>3.98</td>
<td>1.03</td>
</tr>
<tr>
<td>It will help me develop basic movement skills</td>
<td>3.82</td>
<td>1.12</td>
</tr>
<tr>
<td><strong>ENERGY EXPENDITURE</strong></td>
<td><strong>3.45</strong></td>
<td></td>
</tr>
<tr>
<td>It will supplement my daily physical activity level</td>
<td>3.55</td>
<td>1.15</td>
</tr>
<tr>
<td>It can enhance a student’s physical life in school for students</td>
<td>3.42</td>
<td>1.20</td>
</tr>
<tr>
<td>It can increase my total energy expenditure</td>
<td>3.39</td>
<td>1.15</td>
</tr>
<tr>
<td><strong>SOCIAL-PSYCHOLOGICAL VALUE</strong></td>
<td><strong>3.78</strong></td>
<td></td>
</tr>
<tr>
<td>It will increase my self-confidence in playing sports</td>
<td>3.86</td>
<td>1.05</td>
</tr>
<tr>
<td>It will strengthen peer relationships</td>
<td>3.89</td>
<td>1.02</td>
</tr>
<tr>
<td>It is character building</td>
<td>3.59</td>
<td>1.09</td>
</tr>
<tr>
<td><strong>TEACHING &amp; LEARNING VALUE</strong></td>
<td><strong>4.04</strong></td>
<td></td>
</tr>
<tr>
<td>It will add more fun in PE</td>
<td>4.11</td>
<td>1.07</td>
</tr>
<tr>
<td>It will add more innovation &amp; variety to PE lessons</td>
<td>4.10</td>
<td>1.01</td>
</tr>
<tr>
<td>It is more appropriate for those students who are not very skillful or competent in real sports</td>
<td>3.92</td>
<td>1.15</td>
</tr>
<tr>
<td><strong>NEGATIVE IMPACTS</strong></td>
<td><strong>2.41</strong></td>
<td></td>
</tr>
<tr>
<td>It is not relevant to sport/physical education</td>
<td>2.46</td>
<td>1.32</td>
</tr>
<tr>
<td>AVG &amp; PE lessons are a wrong combination</td>
<td>2.36</td>
<td>1.29</td>
</tr>
<tr>
<td>AVG will damage physical education lessons</td>
<td>2.40</td>
<td>1.34</td>
</tr>
</tbody>
</table>

AVG: active video games; PE: physical education

Table 3 presents a correlation analysis between perception of AVG, AVG & PE, AVG & PE Objectives, and PA levels.
Table 3

Correlation analysis among perception of AVG, AVG & PE, PE objectives and children's PA level

<table>
<thead>
<tr>
<th></th>
<th>Perception in AVG</th>
<th>AVG&amp;PE</th>
<th>PE objectives</th>
<th>PA Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception in AVG</td>
<td></td>
<td>0.56***</td>
<td>0.33***</td>
<td>0.22***</td>
</tr>
<tr>
<td>AVG&amp;PE</td>
<td></td>
<td>0.64***</td>
<td></td>
<td>0.19**</td>
</tr>
<tr>
<td>PE objectives</td>
<td></td>
<td></td>
<td>0.21***</td>
<td></td>
</tr>
</tbody>
</table>

AVG: active video games; PA, physical activity; PE, physical education; AVG&PE, children's attitudes toward AVG adopted in school PE. **p<0.01; ***p<0.001.

All of the correlations were significant, indicating that perceptions of AVG were related to perceptions of AVG in PE and PE objectives; in addition PA level was significantly correlated to attitudes about AVG.

Table 4 presents t-test results delineating age differences between children and adolescents on AVG questionnaire aggregate scores.

Table 4

T-Test in 8-11 and 12-15 years old children

<table>
<thead>
<tr>
<th>Variables</th>
<th>8-11 years old</th>
<th>12-15 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception of AVG</td>
<td>3.80 (0.53)***</td>
<td>3.45 (0.61)</td>
</tr>
<tr>
<td>AVG can improve fitness</td>
<td>3.58 (1.04)***</td>
<td>3.05 (0.91)</td>
</tr>
<tr>
<td>AVG can promote health behaviour</td>
<td>3.81 (0.95)***</td>
<td>3.43 (0.89)</td>
</tr>
<tr>
<td>AVG can teach me sports skills&amp; knowledge</td>
<td>3.98 (0.91)***</td>
<td>3.68 (0.91)</td>
</tr>
<tr>
<td>AVG increase energy expenditure</td>
<td>3.72 (0.97)***</td>
<td>3.17 (1.00)</td>
</tr>
<tr>
<td>Social-psychological value of AVG</td>
<td>3.86 (0.88)</td>
<td>3.69 (0.81)</td>
</tr>
<tr>
<td>Teaching &amp; learning value of AVG</td>
<td>4.08 (0.85)</td>
<td>4.00 (0.92)</td>
</tr>
<tr>
<td>Negative impacts of AVG</td>
<td>2.19 (1.16)***</td>
<td>2.64 (1.13)</td>
</tr>
<tr>
<td>Children’s PA</td>
<td>3.51 (0.77)***</td>
<td>3.19 (0.88)</td>
</tr>
</tbody>
</table>

AVG: active video games; PA, physical activity.

*** indicates differences between children aged 8-11 years and 12-15 years (p ≤ 0.001)

Children were significantly more active than adolescents, and their perceptions about AVG were significantly more favorable overall. Specific areas where children rated AVG significantly higher than adolescents included perception that it can improve fitness, promote health behaviour, teach sports skills and knowledge, and increase energy expenditure. Children also perceived AVG significantly less negatively than their adolescent counterparts. Interestingly, the social-psychological, and teaching and learning values of AVG were not statistically different between these groups. No gender difference was observed on any measure except in self-reported PA level (p<0.01); boys (M=3.51) reported being more physically active than girls (M=3.18).
4 Discussion

4.1 Perception of AVG by Chinese children and adolescents

In general, the present findings demonstrate that Chinese children and adolescents have positive perceptions of AVG. In a qualitative study of children’s perceptions of AVG (Dixon et al., 2010), children perceived that AVG provides an opportunity for them to improve their PA and physical fitness. This finding is further supported by De Vet, Simons and Wesselman, who worked with primary school children, and Marti et al with children and adolescents, who reported that their samples had positive attitudes and were satisfied to use AVG to reduce their sedentary time, promote health benefits, and develop enhanced social relationships (Cebolla i Martí, Álvarez-Pitti, Guixeres Provinciale, Lisón, & Baños Rivera, 2014; De Vet, Simons, & Wesselman, 2014). Barnett and colleagues found that children considered AVG a learning tool for movement skills, and considered that skill acquisition was highly transferable to real games and activities (Barnett, Ridgers, Hanna, Salmon, & Health, 2014). Gao and Xiang reported that children expressed positive feelings about DDR and used “good” “fun” and “cool” to describe their experience (Z. J. J. o. P. A. Gao & Health, 2012). Quinn reported that the AVG applied in PE lessons may enhance students’ enjoyment compared to a traditional PE program, and it benefits both physical and psychological components (Quinn, 2013).

Although these are indirect observations and quotes from the teachers, their descriptors support the perceptions from the students and echo the present findings of the Chinese students.

4.2 Attitudes towards AVG if adopted in school PE lessons

In the present study, Chinese children believed that it is beneficial to adopt AVG in school PE lessons. A qualitative study by Hansen and Sanders found that students enjoyed participating in AVG in school PE lessons (Hansen & Sanders, 2010). Students demonstrated stronger desire to engage in more active PA after 8-week AVG with PE lessons. Hansen and Sanders employed Play theory and Flow theory to explain these findings (Hansen & Sanders, 2010). This study demonstrated that children and adolescents felt that adopting AVG in PE lessons is an effective way to sustain student interest in PA participation, and they suggested that AVG can be used in a 21st century PE program to enhance student’s PA level.

With regards to enjoyment, Danielle and colleagues found that primary students enjoyed participating in AVG and 89% of them would choose AVG as an option in PE (Danielle, Sheri, Colleen, & Leah, 2014). Gao explained that the successful experience gained in AVG played a significant role in students’ PA motivation during PE lessons (Z. J. J. o. P. A. Gao & Health, 2012). Quinn reported that the AVG applied in PE lessons may enhance students’ enjoyment compared to a traditional PE program, and it benefits both physical and psychological components (Quinn, 2013).

The present study demonstrated that AVG was well appreciated and accepted by children and adolescents in PE lessons. It also found that students can recognize the social-psychological and teaching & learning values of AVG. Their perception of AVG adopted in PE lessons has a moderate correlation with the objectives of PE. This illustrates that AVG may help fulfil the learning objectives of PE in school. As researchers have stated, promoting PA/exercise/sport as enjoyable and beneficial has been and remains a major focus of physical educators (Gasperetti, Milford, & Blanchard, 2010; Santos Silva et al., 2018). Although PE programs may vary in what is
taught to children, a common denominator for most PE program’s value is that enjoyment is one of the most important characteristics of quality PE (Latorre-Román, Mora-López, & García-Pinillos, 2018). This is significant because research suggests that when children enjoy activities in PE, they are more likely to participate and learn new motor skills (Lemos, Avigo, & Barela, 2012; Vernadakis, Papatsergiou, Zetou, & Antoniou, 2015). The present study also supports that AVG is perceived an attractive tool for educators who want to enhance the “fun factor” in PE lessons.

4.3 Children’s perception of the association between AVG and school PE objectives

The correlation between children’s perception of the association between AVG and school PE objectives is moderate in the present study. Fogel and colleagues found that AVG produced more time spent in PA during children’s PE lessons than a traditional PE program (Fogel, Miltenberger, Graves, & Koehler, 2010). In the Special Issue on Exergaming in Physical Education, Chen stated that AVG experiences could provide significant educational benefits to students if offered through PE (Chen, 2013). Although PA levels may not rise to a vigorous level among students in AVG interventions, higher enjoyment, interest-based and competency-based motivation, self-efficacy and less sedentary time is meaningful and may lead to increased participation in and appreciation for PA. This notion is further supported and illustrated by Ennis who espoused that AVG provides a situationally interesting (Ennis, 2013), technologically advanced and innovative environment in PE—which is not always delivered in a traditional PE program. AVG can promote enhanced participation in PA, improved physical fitness, motivation, and engagement, which may lead to lifelong PA participation, especially for low-skilled and non-skilled students. In addition to the socially interactive nature of AVG, overweight or obese students, who may be reluctant to participate in mainstream sports which require reasonably good sport competence, may be more likely to engage and participate. The fact that AVG offers different levels of game difficulty should provide an optimal PA experience to attract some populations to initiate participation in PA, exercise and sport. Finally, Ennis pointed out that AVG could provide an alternative teaching tool and situated learning environment for the existing PE program and help contribute to the PE goals in school (Ennis, 2013). Zhang employed the self-determination theory and expectancy-value model as theoretical frameworks to construct and integrate AVG into current school PE programs (Zhang, Moore, Gu, Chu, & Gao, 2016). They suggested that the optimal use of game-based stories, interactivity, fantasy, behavioural change technology, competition, peer-based learning, and game activity rotation could better demonstrate AVG’s impact among the multi-faceted approach when reducing children’s sedentary time and enhancing their PA level. Several scholars (Gawrisch et al., 2020; Krause et al., 2020; Zhang et al., 2016) and professional associations (International Society for Technology in Education (ISTE), 2020) have recently stated that helping PE professionals better understand the role and function that AVG play, could help school districts and teachers gain more support in the delivery of school PE goals.

4.4 Gender and age differences in the perceived educational use of AVG in school PE

In the present study, although males had more self-reported PA than females, no other gender differences were observed on the perceived educational use of AVG in school PE. From the observation and interviews of six primary school children, Danielle did not find any gender differences when they played AVG in PE lessons (Danielle et al., 2014). This finding is also supported by primary school PE teachers’ observations that
no gender differences emerged when implementing AVG with their students (Zan Gao & Xiang, 2014). The present finding demonstrated that there are no gender differences in preference for AVG, which may indicate that AVG can be an effective tool applied in PE lessons to increase PA for both girls and boys.

Compared to their adolescent counterparts, elementary school children in this study reported more positive perceptions toward AVG. Peng, Lin and Crouse suggested that younger children are more likely to play AVG than teenagers (Peng, Lin, & Crouse, 2011). According to a study by Dixon and colleagues, younger children reported longer term engagement with AVG compared to older children (Dixon et al., 2010). Lwin and Malik found that when AVG was incorporated into PE lessons, a more prominent effect was found in younger children compared to their older counterparts (Lwin & Malik, 2012). This phenomenon could be explained by the fact that older children may prefer more outdoor and social activities (Norris et al., 2016). Furthermore, younger children may stay at home more than older children, due to parenting, so younger children may play more indoor activities, including AVG.

4.5 Study limitations and future directions

Whereas several unique and important findings were reported, this study is not without limitations. First, the sample was drawn at a shopping mall, so results might be different from a random sample drawn in a school setting. Second, administering questionnaires to younger children can present challenges in terms of comprehension, attention span, etc. Therefore, caution is urged relative to generalizing these findings to other parts of the world, and with other age groups. Third, participants played video games prior to completing the questionnaire. This likely gave them a better sense than most about AVG and how AVG could contribute to physical activity behavior. This may be a strength of the study, because students could accurately assess the strengths/weaknesses of the games. Alternatively, it may also be a limitation in that students may have been biased toward enjoying the activity since they completed the questionnaire right after playing the AVG.

Given the lack of research in Hong Kong children and adolescents relative to AVG, this study set the foundation for future research. Now that student attitudes about AVG are more clearly identified, it is important to test whether these student perceptions are true (i.e., will AVG improve sport skills, benefit teaching and learning, and provide benefits to lower skilled students?). Specifically, can we design studies that examine the link between AVG and attainment of various goals of PE programs (e.g., motor skill development, cooperation, teamwork, strategies, skill-related fitness, etc.) -- to further establish the value of AVG as an addition to the PE curricula?

It is also important to continue to query students as to how to best incorporate AVG into a PE curriculum to ensure fidelity and motivation to participate. Information about helpful features, or features that contribute to long-term motivation to participate in PA would be beneficial. Since the present study used table tennis, beach volleyball and golf, it would be interesting to continue to examine physical and psychological benefits of using AVG that use other activities, i.e., those that vigorously use different or unique body mechanics. In addition, researchers should survey teachers, parents and school administrators to determine their attitudes, and perceived strengths and weaknesses (including feasibility) of the AVG approach. Ideas for integrating AVG into the PE curricula, given sociopolitical challenges, and purchasing and maintaining equipment, cleaning equipment, etc. will be valuable. Finally, in the age of COVID-19, we should study the benefits of AVG, when children and adolescents may not be able to interact normally or regularly with their peers.
5 Conclusion

Chinese children reported that AVG is attractive to them and provides potential value to school PE to increase their PA level and health and fitness (Chen & Sun, 2017; Zhang et al., 2016). AVG may be an effective and alternative activity for both girls and boys to promote their PA behaviour and displace their sedentary time, especially for children in elementary schools, who demonstrated more positive attitudes toward AVG than their adolescent peers. Given these findings, it is imperative to further examine AVG feasibility in real school settings before it can be implemented. More opinions and concerns of key stakeholders including students, teachers, school administrators and parents, should be collected. Until then, adopting AVG in school settings may be effective to teach children how to use electronic games in a healthy and active way. More research is needed to investigate how to apply AVG in PE, such that this novel tool embraces the use of technology in PE curricula, displaces sedentary behavior, increases PA behavior (notably in elementary students), and offers an alternative pathway to physical proficiency and success in those who struggle with traditional PE.

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Conflicts of Interest: The authors declare no conflict of interest.

References


AIESEP News
www.aiesep.org / f.chambers@ucc.ie

Compiled by Fiona C. Chambers¹ (Cork, Ireland)

AIESEP Strategy Development 2019-22
The AIESEP Board continue to develop the AIESEP strategy looking at (a) Leadership, (b) Inclusion and Diversity and (c) Quality Research. We will be sharing the outputs of our work at our international virtual conference in Banff in June 2021.

AIESEP International Scientific Conference Banff 2021 (Virtual Conference)
The 2021 AIESEP International Scientific Conference is jointly hosted by the University of Alberta, McGill University and in collaboration with Ever Active Schools. It will run from the 7th to 10th June 2021. It will be a virtual event (both live and on-demand). The theme of the conference is Descending the Mountain: Exploring the Impact of Research on Pedagogy and Practice. Please see here for details on how to submit an abstract and how to register: https://sites.google.com/ualberta.ca/aiesep2021/home

#AIESEPConnect Programme [2020 – 22]
Since last April, AIESEP has had seven #AIESEPConnect events (on the last Friday of each month). Please follow us on social media (@AIESEP) to find out when the next event is happening. It has fast become a unique way to share high quality research in a convivial environment. The next #AIESEPConnect is on Friday 29th January at 12noon CET – The topic is The trends of Physical Education Teacher Education in East Asia. The discussion will be led by Okseon LEE (Department of Physical Education, Seoul National University), Sotaro HONDA (Faculty of Health and Physical Education, Fukuoka University of Education) and Chingwei CHANG (Department of Physical Education and Sport Sciences, National Taiwan Normal University)

AIESEP Symposium 2020 - University of Liège, Belgium (25th February 2020)
On 25th February 2020, AIESEP hosted a Specialist Symposium to ‘redesign pedagogies of physical literacy’ This symposium followed on from our Physical Literacy roundtable in AIESEP 2019 (Adelphi) giving us the opportunity to continue this important conversation. There were 92 participants who self-selected to experience the symposium and were from across 12 time zones. The output from this workshop is discussed in this recently published book and forthcoming journal article:
- Chambers, F.C. (in press). Redesigning the Pedagogies of Physical Literacy: Using design thinking as an innovation approach. eJRIEPS

For further information please contact:
Association Internationale des Ecoles Supérieures d’Education Physique (AIESEP)
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¹ Dr Fiona C. Chambers is Head of the School of Education at University College Cork (Ireland) and AIESEP General Secretary.
We’re delighted to announce the 26th Annual Congress of the European College of Sport Science: ECSS 2021 – Sport Science in a Virtual World.

In 2020, ECSS made the decision to host a virtual congress due to the impact of COVID-19. In 2021, ECSS will offer a virtual congress once again, so that our community can continue to participate safely. The congress will have a multi-/interdisciplinary approach including the following general fields:
- Biomechanics & Motor Control
- Physiology & Nutrition
- Psychology, Social Sciences & Humanities
- Sports & Exercise Medicine & Health
- Applied Sports Sciences

We welcome members of the IJPE community to submit an abstract and/or join us at this virtual event! Here are a few good reasons why you should submit your abstract:
- be part of the largest multi and interdisciplinary congress in sport science
- earn international recognition for your work
- boost your career by participating in the ECSS Young Investigators Award
- receive feedback that helps you progress
- make important professional connections

More information about the congress is available via our website sport-science.org.

Also launching this year are ECSS Webinars! These one-off scientific events will also be launched via our website (sport-science.org). Please stay tuned and send us any ideas or suggestions you have for a webinar (office@sport-science.org).

Thank you for supporting the European College of Sport Science

For further information please visit:
European College of Sport Science (ECSS)
www.sport-science.org / https://sport-science.org/index.php/congress/ecss-2021 / @E_C_S_S
31st EUPEA Forum Meeting 2020 in Esch-sur-Alzette (Luxembourg)
EUPEA and the University of Luxembourg organised the 31st EUPEA Forum Meeting in Esch-sur-Alzette (Luxembourg) from Friday, November 27th, to Saturday, November 29th 2021 in a hybrid format. The Forum included the usual constitutional agenda, as well as the elections of the Board of EUPEA.

During the elections, the Executive Committee of EUPEA was confirmed and elected for another mandate of three years: Claude Scheuer (Luxembourg, President), Marcos Onofre (Portugal, Vice-President), Chris Murphy (England, General Secretary), Martin Holzweg (Germany, Project/Scientific Adviser), Lucas Janemalm (Sweden, Treasurer), Bruno Cremonesi (France, Person responsible for fundraising and development) and Rose-Marie Repond (Switzerland, Past-President).

The new EUPEA Board is composed by the following members:
North representatives: Kasper Salin (Finland), Olegas Batutis (Lithuania)
Central representatives: Susan Marron (Ireland); Elinor Steel (Scotland)
South representatives: Viviana Zito (Italy); Joao Costa (Portugal)
East representatives: Jana Vasickova (Czech Republic); Petr Vlcek (Czech Republic)
South East representatives: Yiannis Gryparis (Greece), Biljana Popeska (North-Macedonia)
Institution representatives: Tamas Csanyi (Hungary, HSSF); Sandra Heck (Luxembourg, University of Luxembourg)
Additional Board members: Garrett Coyle (Ireland); Avelino Acevedo (Portugal)

This new elected EUPEA Board is working during the next three years on the implementation of their new action plan for the period 2021-2023, including the following five topics: (1) Communication, information and members; (2) Cooperation; (3) Advocacy; (4) Projects; and (5) Research and publications.

The main objective based on EUPEA’s mission continues to be the promotion of and the advocacy for physical education in Europe, based on EUPEA’s slogan: NO EDUCATION WITHOUT PHYSICAL EDUCATION

Finally, the EUPEA Forum adopted unanimously a new constitution, moving its seat from Switzerland to Luxembourg at the address of the University of Luxembourg, Campus Belval

EUPEA Meetings in 2021
- March 11th-14th 2021: Board Meeting #1 in Esch-sur-Alzette (Luxembourg, in hybrid format)
- June 10th-13th 2021: Board Meeting #2 in Dublin (Ireland)
- November 25th-28th 2021: 32nd EUPEA Forum Meeting in Zaragoza (Spain)

For further information please contact:
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Tel.: +41 55 640 75 46    www.eupea.com / info@eupea.com

2 Dr Claude Scheuer is researcher at the University of Luxembourg and EUPEA President.
The 16th FIEP European Congress and 18th Annual Scientific Conference of Montenegrin Sports Academy “Sport, Physical Education, Physical Activity and Health: Contemporary Perspectives” will be held in Cavtat near Dubrovnik, Croatia from 8-11 April 2021. The event is organised by the Montenegrin Sports Academy, the Faculty for Sport and Physical Education at University of Montenegro, FIEP Europe with the patronage of traditional partners. The conference will focus on very current themes from all areas of sports science and include invited speeches, workshops, training sessions, oral and poster presentations in the fields of biological and medical sciences, health sciences, behavioural and social sciences, humanities and arts and social research, policy, and practice related to contemporary perspectives of sport, physical activity and health. A special focus will be placed on physical education development during and after the Corona pandemic.

Key Dates
1 December 2020, 24:00 CET
Abstract submission deadline
15 January 2021, 24:00 CET
Notification to authors about acceptance
1 February 2021, 24:00 CET
Deadline for early-bird registration for presenting authors
15 February 2021, 24:00 CET
Deadline for late registration for presenting authors

MSA Office
Montenegrin Sports Academy
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Phone: +382 40 235 207, +382 67 527 393; Fax: +382 40 235 200
(phone availability after 31 August 2020: Mon-Fri: 10:00 - 12:00 CET
E-mail: conference@csakademija.me

Registration desk on-site opening hours
Thursday: 18:00 to 20:00
Friday: 9:00 to 15:30
Saturday: 9:00 to 15:30

Full information: http://csakademija.me/conference/index.html

We look forward to seeing you in spring 2021.

For further information on FIEP please contact:
Fédération Internationale d’Education physique (FIEP)
www.fiepeurope.eu  antala@fsport.uniba.sk

3 Dr Branislav Antala is professor at the Comenius University in Bratislava (Slovenia) and FIEP Europe President.
Education and Sport in the Pandemic

Year Two of the pandemic has started and no one can be sure that it is the last year with such severe restrictions in our lives. Apart from the wish of many of us to return to whatever we tend to call „normality“, physical education teachers and educationalists have started to respond to the limitations caused by the requirement of social distancing as a new policy. The world is upside down. Only last year, ICSSPE, together with UNESCO, WADA, the Olympic Foundation for Culture and Heritage, the International Paralympic Committee, and the International Fair Play Committee launched a toolkit, which emphasises the social dimension of teaching and learning.

Some of the proposed activities may be transferred from a face-to-face-setting to online teaching, but this will not work for all teaching objectives. Physical education teachers share that teaching according to the planned curriculum is not possible, if teaching the subject is possible at all. Children do not have the necessary equipment at home, nor the space, nor the necessary hands-on assistance, which is more important to prevent children from injuries than in any other school subject. As a result, physical education classes often focus on stretching exercises and on conversations around hygiene and the importance of physical fitness. How are we going to change this? The world is still far away from replacing the physical educator with new systems including sport simulators and an instructor in a virtual three-dimensional setting.

The pandemic demonstrates the above-average limitations that physical education faces compared to other school subjects. Teaching children with a disability faces additional challenges as personal assistance from teachers and classmates or assistive devices is what enables children to participate.

Many physical education teachers and policy makers are aware of the need for quality physical education to lay the foundation for lifelong physical activity, and thus reduce the risk of a life-shortening sedentary lifestyle. However, knowing how to swim is important today; it is the only way to protect children from drowning! We can easily think of several additional life-saving competences and skills that are taught through physical education. Physical education teachers, educationalists, curriculum designer and policy makers have a huge task ahead of them, namely to develop a framework, which helps children develop physically, cognitively and emotionally in a safe setting.

This would have helped them in previous times but it may become even more important in the “New Normal”, where pandemics and isolation in lockdowns require creative and sustainable responses. Necessary changes may include all levels of teaching, including content, objectives and teaching concepts. But this can only be one kind of response; as we have observed that physical education was the first subject to be dropped and often the last subject to be taught again, we need to launch a new information campaign about the importance of physical education for the individual child and for society.

For further information please contact:
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4 Detlef Dumon is ICSSPE’s Executive Director.
Our advocacy efforts helped shape the new WHO Guidelines on Physical Activity

In November 2020, the World Health Organization (WHO) published its first updated Guidelines on Physical Activity and Sedentary Behaviour in 10 years – an exciting development for our sector, as it presents key facts and figures that underline the value of what we do. The Guidelines are now ours to share and use to convince a variety of stakeholders to support our work. They’re also ours because our collective advocacy efforts helped to create them.

Dr Fiona Bull, Head of the WHO Physical Activity Unit, reminded viewers of the launch webinar (where over 5000 people registered to take part) that the guidelines were developed not only by the WHO’s Physical Activity Unit and a large number of researchers, but also “by those who work in the field and practice using the evidence to promote physical activity [who responded to public calls for feedback on the drafts]. All that collective work underpins and informs these guidelines.”

ISCA contributed to the guidelines by gathering feedback from our members and partners, and ISCA President Mogens Kirkeby was one of five panellists invited as guest speakers in the online launch. We now have an even bigger role to play in amplifying the messages presented in the guidelines and ensuring that they create more opportunities for people to be active in communities around the world.

Every move counts

The new WHO Guidelines on Physical Activity and Sedentary Behaviour seemed almost designed for the reality of 2020. The main message, rather than prescribing a numerical benchmark for our daily or weekly physical activity levels, offers a gentler nudge towards a more active lifestyle: Every Move Counts.

The figures of 150-300 minutes of moderate intensity physical activity or 75-100 minutes of vigorous physical activity per week are still the recommendations, but the emphasis is now on balancing sedentary time with physical activity and appreciating that any movement is better than none.

Find your move

There are many ways you can use the new Guidelines to boost your advocacy efforts – we list all of the resources available and how to use them in our feature story on the ISCA website: https://bit.ly/3bx34QL

But three opportunities stand out to us as a place to start: Translate and publish in your own language; Promote the message to your network; and Think beyond sport when it comes to adding physical activity to people’s daily lives.

For further information on ISCA please contact:
International Sport and Culture Association (ISCA)
Phone: +45 (0)2 9485551
www.isca-web.org info@isca-web.org

Rachel Payne is ISCA’s Communications Manager.
The International Journal of Physical Education (IJPE) is concerned with research and scholarship in the social sciences and humanities that focus upon different aspects of physical education, including the eight IJPE review topics ‘instructional theory of sport’, ‘health foundations’, ‘sports curriculum theory’, ‘historical and philosophical foundations’, ‘physical education teachers and coach education’, ‘psychological and sociological foundations’, ‘comparative sports pedagogy’ and ‘conceptual and empirical sports pedagogy’.

All work submitted should be original, unpublished work, not under consideration elsewhere. All papers submitted for the sections ‘research articles’ as well as ‘sport international’ undergo a thorough double-blind peer-review process. Accepted papers come under the copyright of the Journal.

Manuscripts (up to a maximum of 5500 words, including tables, figures and references) should include an abstract of 150-200 words on a separate sheet, and have three to five keywords placed at the beginning of the article. Should the manuscript contain tables and/or figures the amount of words is respectively less.

The format of the article (including tables, figures and references) should conform to the American Psychological Association format (see APA Publication Manual, 2020, 7th Edition).

As far as possible, any information that would lead to identification of the authors should be removed from the manuscript itself.

A second file should be provided as a title page which includes the names of all authors in the appropriate order for publication and with details of their institutional affiliation(s). The lead or corresponding author must be clearly identified with full contact details.

Articles not conforming to the above specifications will be returned to the authors for correction prior to the reviews.

The editors retain the right to make limited editorial changes to manuscripts that have successfully completed the initial review process. Such changes will be returned to the author for approval prior to publication.

Submissions should:
1. be headed attention: International Journal of Physical Education in the e-mail’s subject line
2. have attachments clearly labelled as a) title page b) manuscript, both with the name of the lead author
3. be e-mailed directly to: holzweg@dslv.de
Upcoming Events

Compiled by M. Holzweg (Berlin/Germany)

AERA 2021 Annual Meeting
‘Accepting Educational Responsibility’
virtual
9-12 April 2021
www.aera.net/events-meetings/annual-meeting

International Conference on Sports, Health, and Physical Education
‘Transformation on Sports, Health, and Physical Education Facing the Global Pandemic’
28-29 April 2021
virtual
https://seminar.unnes.ac.id/event-ismina2021

Research to practice 2021
virtual
6-8 May 2021
www.researchtopractice2021.com.au

AIESEP International Conference 2021
‘Exploring the impact of research on pedagogy and practice’
virtual
9-12 June 2021
https://sites.google.com/ualberta.ca/aiesep2021/home

7th International Conference of Ministers and Senior Officials Responsible for Physical Education and Sport (MINEPS VII)
virtual
14-17 June 2021

26th ECSS Congress Sevilla 2021
Sevilla, Spain
1-3 September 2021
www.ecss-congress.eu/2021

ECER 2021
‘Education and Society: expectations, prescriptions, reconciliations’
virtual
9 September 2021
www.eera-ecer.de/ecer-2021-geneva

27th TAFISA World Congress
6-10 October 2021
Portorož, Slovenia
www.tafisa.org/node/266