Exergaming at home and in formal education: How can it become (more) effective?

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INTRODUCTION
Exergames are video games that require physical activity and that can be used for several purposes, including recreation, health, and education (e.g., Benzing and Schmidt, 2018; Ennis, 2013). Exergaming has been found to elicit several physical and non-physical effects, including body weight reduction and enjoyment as well as engagement related to physical activity (e.g., Lee et al., 2017; Oliveira et al., 2020). Yet, according to meta-analytic findings, some exergaming groups did not outperform comparison groups and exergaming has been realized quite differently, for instance, in home and school environments (Gao et al., 2020). Here, we focus on recent work on exergaming at home (Rüth and Kaspar, 2021) and in formal education (Rüth and Kaspar, 2020) to discuss how exergaming can become (more) effective.

EXERGAMING AT HOME
Exergaming at home can be realized locally and online together with family, friends, and other groups of players. Such social exergaming experiences address the basic psychological need of engaging with other people (relatedness). Further, social support from family and friends can increase adherence to and effectiveness of exergaming. Playing different exergames with other people provides players with new challenges and experiences. Overall, exergaming can satisfy the need of relatedness, competence, autonomy, and novelty. According to self-determination theory, satisfaction of these basic psychological needs is key for learning and well-being (Standage and Ryan, 2020). In fact, other desirable effects are conceivable, provided that potential educational and social benefits of exergaming are fully realized (Rüth and Kaspar, 2021). Beyond playing exergames together, exergaming experiences can provide multiple starting points for discussions. For instance, conversations on features and functioning of exergames could promote several competencies such as game and media literacy. However, exergaming at home can take place in rather unstructured ways that seem to be less effective. Hence, exergaming at home could benefit from more structure and guidance, such as through community-based, family-based, and school-based programs.

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EXERGAMING IN FORMAL EDUCATION

In formal education, exergaming typically includes structure and guidance with regard to curricular guidelines and professional supervision by teachers. Considering curricular guidelines and basic psychological needs, we conducted a study in regular school teaching where students danced together in groups across four weeks (Rüth and Kaspar, 2020). In a practice phase, the groups danced in turns and received feedback from each other after each round. In a subsequent competition phase, the groups danced against each other for game scores. Based on game scores as well as student and teacher ratings, we found that the dance skills of students increased. In addition to reaching this primary educational objective, students experienced high dance and game enjoyment as well as high learning motivation, attraction to their dance group, and acceptance of video games in school teaching. Hence, in addition to the intended effects of exergaming on educational outcomes, several psychological outcomes corroborate that such interventions can provide students with effective and joyful learning experiences. Notably, unintended (detrimental) side effects such as students perceiving and reporting problems with their body image did not occur (see Rüth and Kaspar, 2020).

TOWARD (MORE) EFFECTIVE EXERGAMING

Exergaming in (in)formal learning contexts such as home and school environments seems promising. We showed how using a commercial exergame in formal education within a given curricular time frame can have positive educational, social, and motivational effects in terms of quantitative and qualitative measurements (Rüth and Kaspar, 2020). Besides using existing (commercial) exergames, the development of own exergames is another typical use scenario, particularly to consider individual needs and contextual factors (Beristain-Colorado et al., 2021). Still, several contextual factors can contribute to the effectiveness of exergaming, such as appropriate levels of (professional) supervision, structure, and social support, particularly in home environments. Indeed, core challenges of exergaming need to be addressed to realize (more) effective exergaming, including to meet user expectations as well as to provide appropriate levels of physical activity, enjoyment, and adherence (Rüth and Kaspar, 2021). In this regard, high adherence and motivation for exergaming could also lead to excessive exercising and gaming, which may have harmful effects on physical and mental health (Chekroud et al., 2018). Moreover, intended positive effects of exergaming might simply not occur, for instance, because enjoyment may not suffice to motivate for (repeated) exergaming (Berg et al., 2020). Hence, to better address the challenges of exergaming in different contexts of use, more sound guidelines and best practices are needed, for instance, in the form of theoretical frameworks, pedagogical recommendations, and evidence from science and practice.

In order to support advances in the field of exergaming, we summarized possible directions in terms of research approaches, measurements of dependent variables, and effects of exergaming elements (Rüth and Kaspar, 2021). Overall, future research and development projects could follow recommendations for the design of exergames (e.g., Vieira et al., 2021), weigh up possible advantages and disadvantages of exergaming (e.g., Benzing and Schmidt, 2018; Rüth and Kaspar, 2021), and consider general guidelines for the implementation of e-learning projects (e.g., Rüth and Kaspar, 2017). To conclude, exergaming could become a (more) effective and preferred activity in (in)formal learning contexts, yet evidence from further research and development projects is essential to better address individual (psychological) needs and to understand effects of exergaming in different contexts.

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