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*Playful learning during the reopening of Danish schools after COVID 19 closures*

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**Abstract**

This article is based on qualitative and quantitative data collected from teachers and pupils in Danish schools in June 2020, as schools reopened following closures in the spring due to the COVID-19 pandemic. It investigates the transformations in school life that took place in this period in response to strict official guidelines to prevent the spread of infection, transformations both in school learning environments and in teaching activities. Using factor and cluster analyses and logistic regression, it explores the relation between teaching environment and pupils' emotional, social, and academic wellbeing, identifying correlations between key factors in the environment and the three dimensions of wellbeing. The study contributes both to understanding and dealing with the crisis in which education systems in the Nordic countries have found themselves in and adds relevant knowledge on themes of importance for education in the future.

*Keywords:* School reopening, primary school, playful learning experiences, self-oriented learning activities, pupils' well-being

## Introduction

In response to conditions imposed by the spread of the COVID-19 virus, in the spring of 2020 schools all over the world closed and pupils were sent home. According to UNESCO, at the end of April, schools were closed in 191 countries, with 1.57 billion pupils estimated to be sitting at home. In some countries a controlled reopening was carried out in the early months of summer, while others had school closed much longer. Danish schools undertook a first controlled reopening for the youngest pupils (zero to fifth grade) in mid-April 2020 after five weeks of closure, with older pupils (sixth to tenth grade) following four weeks later. A Law on Emergency Education (BEK no. 242) obliged schools to organise ‘emergency education according to the needs of the individual pupil to the extent that this is practically possible in the extraordinary situation’ (§2, section 2), but did not specify how the teaching was to take place. As was the case in all other countries, physical and social restrictions in line with official health and hygiene regulations forced teachers to be creative – in facilitating outdoor learning and organising learning activities in smaller groups of pupils and in study courses that were not defined by traditional school subjects. While several studies have investigated the situation during school closures, only a few research contributions have addressed activities during reopening, and the great majority of these take a health-oriented focus on strategies for avoiding spread of COVID-19 (UK Department of Education 2020, US Department of Health and Human Services 2020; Bailey 2020). Some publications deal with schools’ experience of being ready for reopening, the challenges they face, and the guidance and support they needed (National Foundation for Educational Research 2020). A few studies deal with parents’ evolving concerns and experiences with COVID-19 (Bailey & Shaw, 2020; Timsit, 2020).

This article investigates the transformation of learning environments and teaching activities in Danish schools during the school reopening. It examines if the increased use of outdoor environments and organisation into small groups in study courses not defined by traditional school subjects

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would lend themselves to teaching using self-oriented learning activities as opposed to teacher-directed activities. Self-oriented learning activities has been linked with increase in pupils' well-being (Jeno, Adachi, Grytnes, Vandvik & Deci, 2019; Blau & Benolol, 2016; Keller, 2009; Kangas, 2010; Moreno & Mayer, 2007; Pintrich, 2003; Price, Rogers, Scaife, Stanton & Neale, 2003). This is interesting since many studies, besides focusing on the risk that students may be missing out on a substantial amount of their learning and thus may suffer educational losses (Burgess & Sievertsen, 2020; Smith & Colton 2020), are concerned about pupils' well-being after the time of school closures (Office for Civil Rights 2020a,b; Bender 2020; Gross 2020; Wang, Zhang, Zhao, Zhang, & Jiang 2020; Brooks, Webster, Smith, Woodland, Wessely, Greenberg & Rubin 2020). The Annie E. Casey Foundation (2020) writes that 'Undoubtedly, because of the Covid-19 pandemic, the world will remember 2020 as a year of fear, pain and loss for everyone' (p. 1). While the majority of the studies that have systematically investigated the students' health and well-being during the COVID-19 pandemic have been characterised by a disease-oriented perception of health, in which health and well-being are defined as the absence of illness, construed in terms of the absence of either COVID-19 (Office for Civil Rights, 2020; Bender, 2020) or mental health disorders such as anxiety (Gross, 2020), a number of studies recognise the need to broaden the perspective and focus on such aspects as pupils' connectedness to school and the quality of their relationships with adults and peers in school, in order to keep them academically engaged (Aspen Institute 2020; Clancy & Sentence 2020). Based on interviews with representatives of state agencies, Gill, Goyal, Hartog, Hotchkiss & DeLisle (2020) conclude that 'many respondents were concerned that social isolation, excessive screen time, and irregular schedules would present a major challenge for students in readjusting to school in the fall' (p. 19). Wistoft, Christensen & Qvortrup (2021) and Wistoft, Qvortrup, Qvortrup & Christensen (2021) show that during the school closures pupils were severely challenged in regard to their mental and social wellbeing, while Qvortrup, Christensen & Lomholt

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(2020) show that a subset of these pupils was also challenged in regard to their perceived coping. AASA (2020) points to the need to incorporate social and emotional learning into school teaching programmes so that pupil emotions can be recognised and managed, and to focus on pupils' social and interpersonal skills and competencies (including learners' ability to read social cues, to prepare them for navigating social situations). Thus, besides investigating the transformation of learning environments and teaching activities during the school reopening, the article investigates the extent to which learning environment and teaching activities influence the pupils' emotional, social, and academic wellbeing.

The research question is: What characterises learning environments and activities in schools during the reopening from COVID-19 closures, and how do these influence the pupils' emotional, social, and academic wellbeing?

The article is based on qualitative interview data collected from teachers/pedagogical staff members and school principals and quantitative survey data collected from pupils and teachers/pedagogical staff members from nine schools in four Danish municipalities in June 2020, when Danish schools reopened. The data was collected as part of a research project 'Socio-emotional conditions of children during the reopening of kindergarten and schools after the Covid-19 lockdown'. The article contributes with knowledge about the transformations of learning environments that took place during the reopening of schools after COVID-19, as well as with knowledge about whether these learning environments contributed to strengthening the pupils' well-being. Furthermore, the relevance of the knowledge about the impact of self-oriented learning activities on pupils' well-being also extends beyond COVID-19 by encouraging future work in educational practice and research.

### **Playful learning**

There are different approaches to examine whether the transformations of the learning environments led to an increase in self-oriented learning activities as opposed to teacher-directed

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activities. Interest in learner-sensitive approaches in general and self-oriented learning activities in particular has grown very substantially in recent years, something that can be seen as part of a broad international trend in the education system, moving away from traditional teacher-directed approaches of transmitting and memorising information towards ‘constructivist approaches that are more learner centered and inquiry-based’ (Zhao, 2015, p. iv). In their article ‘Making Determinations of Quality in Teaching’, Fenstermacher & Richardson (2005) suggest that ‘Good teaching is learner sensitive, while successful teaching is learning dependent’ (p. 194). Harlen (2013) suggests that ‘When learning is seen as something that students do, not something that is done to them, the teacher’s role is to design environments in which students can be actively engaged in constructing their understanding and developing competences’ (p. 35). In Denmark specifically, there is also increased interest in self-oriented learning and inquiry-based teaching, along with a focus on teaching methods that strengthen relevance and meaning in a differentiated environment with challenges for all (Albrechtsen & Qvortrup 2018).

In this article, we investigate whether there is an increase in self-oriented learning activities by using Parker & Thomsen's (2019) concept of playful learning as a lens. Parker & Thomsen (2019) have identified five characteristics that make a learning environment playful. A playful learning environment (1) gives pupils the opportunity to explore and investigate or experiment with the learning process through trying, failing, and trying again and thus 2) motivates pupils to the processes of learning, by committing them to activities and giving them the feeling that they can rely on and support other learners. By doing this, it 3) enhances meaning, by guiding pupils from what is known to what is unknown, 4) fosters pupils’ social involvement and interaction, expanding their social networks and dissolving barriers between individuals and groups, and 5) provides an experience of learning as joyful, by supporting the learners’ enthusiasm for the teaching they experience and so that they enjoy the activities (Parker & Thomsen 2019). In addition to accentuating the self-oriented

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aspects of playful learning, the five characteristics point to the hypothesised correlation between self-oriented learning activities and pupils' well-being. As mentioned above, this correlation is found in a several studies (Jeno, Adachi, Grytnes, Vandvik & Deci, 2019; Blau & Benolol 2016; Kangas, 2010; Moreno & Mayer, 2007, Pintrich, 2003; Price, Rogers, Scaife, Stanton & Neale, 2003). For Hofer (2007), a self-oriented approach stimulates the desire for learning to ensure all the participants' wellbeing and the fulfilment of not only academic, but non-academic goals (Hofer, 2007).

Our research project 'Socio-emotional conditions of children during the reopening of kindergarten and schools after the Covid-19 lockdown' builds on Parker & Thomsen's work (2019) and differentiates between six types of activities that meet the conditions for playful learning environments and thus can be gathered under a 'learning through play' category. These six types of learning environment are characterised below:

- **Cooperative learning and collaborative learning** are instructional activities designed to make the most of positive peer social interactions by grouping learners together to complete an assignment or task. Learners work together and help each other (Parker & Thomsen's work 2019).
- **Experiential learning** is an umbrella term covering a range of activities which share common principles about the value of experience both within and beyond the classroom for meaningful learning. Essentially, engaging experiences perpetuate learning and move learners beyond their known boundaries, fuelled by their interest and motivation (ibid.).
- According to Parker & Thomsen's work, **discovery learning** is frequently attributed to Jerome Bruner. According to Parker & Thomsen (2019), Bruner did not restrict discovery to the act of finding out something that was unknown to mankind, but rather include all forms of obtaining knowledge for oneself by the use of one's own mind'.



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- **Guided, assisted, or enriched discovery learning** occurs when teachers provide a range of support – such as hints, guidance, coaching, feedback, worked examples, scaffolding, or elicited explanations. These activities offer learners the best opportunity to adopt a discovery mindset: that is, to expect and be prepared to discover knowledge for themselves (ibid.).
- In **inquiry-based learning** activities a unit of work is organised around relevant, authentic, and open-ended questions. They are characterised by emphasis on process, questioning, student voice, building on prior knowledge, active learner involvement, the involvement of internal and external school community resources, iterative or recursive learning, reflection and deep thinking, ongoing assessment, and learning leading to action (ibid.).
- **Problem-based learning** involves working through and reflecting on problems with guidance from teachers in the role of facilitators. In problem-based learning, the context for learning is set by a real-world problem with multiple dimensions around which a unit of work is planned (ibid.).
- In **project-oriented learning** the central idea around which learning is planned and structured is the output: a project (ibid.). Projects involve learners in constructive investigations which challenge them to generate new understanding and skills rather than only using existing knowledge and skills. They are realistic rather than ‘school-like’ in that the roles learners play, their collaborators, the products, audience, and the performance or assessment criteria feel authentic to learners (ibid.).

When it comes to pupils’ well-being, the project distinguishes between emotional, social and academic well-being. This distinction is consistent with the potential described by researchers in the field of playful learning (cf. above). It is inspired by Aspelin (2019), who identify well-being as associated with relational actions and attitudes in ongoing communicative processes. Also, Shah and Marks (2004) suggest that ‘Well-being is more than just happiness. As well as feeling satisfied and

happy, well-being means developing as a person, being fulfilled, and making a contribution to the community' (p. 2). With a similar focus, Schapira and Aram (2020) divide well-being into an emotional aspect, which includes emotions, understanding and empathy, and a social aspect, which is related to an individual's social interactions in a variety of contexts. With reference to Hochschild's (1990) concept of 'emotion work', where individuals manage emotions related to their professional roles, we suggest distinguishing between the social contexts and the more academic contexts of schools and classrooms. As part of emotional well-being, we include feelings such as joy, happiness and good mood, as part of social well-being we include feelings of fitting in, being treated fairly, been heard and understood and as part of academic wellbeing we include motivation, enthusiasm for teaching, desire for learning, meaningfulness and experiences of insight or success.

### **Methods and data**

#### **Design**

The article draws on data collected from nine schools in three Danish municipalities. Data collection was based on a mixed-methods approach, with surveys of pupils conducted soon after interviews with teachers and school principals. The mixed method approach is characterised by 'diversity of views' or 'perspective change' and 'complementation', cf. Green's and Bryman's taxonomies for mixed methods design (Greene et al. 1989, Greene 2007, Bryman 2006). Regarding the shift in perspectives, the intention is to increase both the breadth and depth of understanding of the transformations of learning environments during reopening of schools after COVID-19, by analysing from different perspectives. In terms of complementarity, we seek to broaden our perspective by combining different data sources.

Both interviews and surveys focused on physical and structural restrictions, institutional strategies and resources, teaching contexts, social frameworks and restrictions, and forms of activities. They also included a range of questions about the social and emotional wellbeing of both

pupils and teachers. In the interviews, the interviewees were further encouraged to share any additional perspectives or opinions they might have. University of Southern Denmark is responsible for data and ensures that the processing of personal data takes place in accordance with the rules on data protection. The legal basis for the processing is found in the Danish Data Protection Act §10.

### **Respondents**

The qualitative interview data consists of interviews with two school principals and two to three teachers in each municipality, giving a total of eleven teacher interviews and seven school principal interviews. Interviews were undertaken by phone or, when possible, video conference software, with audio recorded.

The quantitative survey data consists of responses from 1,222 pupils aged nine to fifteen at eleven schools in four municipalities in Denmark. 578 pupils (49%) were boys, and 609 (51%) were girls. The survey was distributed in June 2020 and were closed for responses on 26 June, just before the summer vacation of 2020.

### **Analytical methods**

#### *Qualitative data analysis*

The complete set of audio data was analysed by two members of the project research team, using memos (Peterson 2017, pp. 7–8) to identify and validate patterns. The interviews were collected primarily to develop and inform the survey (Bryman 2006, p. 105). During the analysis, we revisited the qualitative data set, studying and discussing the themes closely (Peterson, 2017) to achieve complementarity (Bryman 2006, p. 105). As we revisited the qualitative data, additional nuances were identified through the comparison of analytical memos (Peterson 2017, pp. 7–8) across the research team.

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### *Cluster analysis*

As a basis for assessing the experiences of learning activities as either teacher-directed or self-oriented, cluster analysis was used to construct a multinomial indicator variable as means of differentiating between groups of students, based on similarities in their experiences with learning environments during the reopening. The cluster analysis was based on the variables shown in Table 1). We used Ward's method to conduct a hierarchical cluster analysis and Tukey's method for multiple comparisons was used as part of the post-analysis diagnostics to test cluster differences.

### *Confirmatory factor analysis*

To further gauge pupils' experiences of self-oriented learning environments, the pupils were surveyed about the frequency of the six types of learning activities identified in section three as compatible with playful learning environments. The learning activities were operationalised into measurable constructs consisting of 24 teaching practices. Guided discovery learning, for instance, was measured as: 'The teacher uses examples to make us better understand what we are learning,' 'The teacher shows us how what we learn is connected to something that we have learned previously,' and 'The teacher shows me how what we learn can be used in everyday life' (Qvortrup, Lundtofte, Lomholt, Christensen & Nielsen 2020).

Confirmatory factor analysis (CFA) was used to test if a factor structure of the six general learning activities related to playful learning environments could be fitted to the data and then to predict standardised weighted factor score variables for use in subsequent analysis. The model of six latent factors could not be fitted to the data, but a valid model was found by examining the parameter estimates of several competing models (Table 2 and 3). Indicator reliability of the factors was examined estimating Raykov's factor reliability coefficient ( $\rho$ ) (Raykov, 1997). The final model, which passed diagnostics and met theoretical assumptions, was a four-factor model with: (1) project-oriented learning ( $N = 1222$ ,  $SD = 0.38$ ,  $\rho = .62$ ), (2) guided discovery learning ( $N =$

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1222,  $SD = 0.43$ ,  $\rho = .70$ ), (3) inquiry-based learning ( $N = 1222$ ,  $SD = 0.52$ ,  $\rho = .69$ ), and (4) problem-based learning ( $N = 1222$ ,  $SD = 0.47$ ,  $\rho = .68$ ).

### *Exploratory factor analysis*

Standardized, weighted factor score variables for emotional, social, and academic wellbeing were constructed by conducting an exploratory factor structure analysis (EFA) (table 4). The factor extraction method was iterated principal factor analysis, and we used a combination of parallel analysis with 1,000 iterations (Matsunaga, 2010) and a scree-test to prevent over- and under-extraction of factors (O'Brien et al., 2017) while preserving theoretical sensitivity. The EFA identified three latent factors in the data and Cronbach's  $\alpha$ -statistic ( $\alpha$ ) was calculated to assess the internal reliability of the factors. The first factor was identified as emotional wellbeing ( $N = 1167$ ,  $SD = 0.90$ ,  $\alpha = .78$ ), the second as social wellbeing ( $N = 1162$ ,  $SD = 0.89$ ,  $\alpha = .74$ ), and the third as academic wellbeing ( $N = 1165$ ,  $SD = 0.87$ ,  $\alpha = .70$ ). The consistency of the factor structure was confirmed by cross-validation, as proposed by de Vet, Ader, Terwee, and Pouwer (2005).

### *Specification of regression models*

Theoretical sensitivity was supplemented with joint linear hypotheses tests (Wald tests) to test the explanatory power of the regression coefficients. The final regression models were specified omitting variables that according to the Wald test had no explanatory power. Linear regression diagnostics included Cook (1977) and Breusch and Pagan (1979) test for heteroskedasticity, which showed the need for statistical correction by estimation of robust standard errors to correct for school effect (Snijders & Bosker, 2012). Thus, the models were clustered on institutional ID to overcome problems with heteroskedasticity. DFBETA influence statistics was calculated and revealed a few outliers. Units with a larger value of 2 were dropped from the estimation sample. Standardized beta coefficient is obtained as measure of effects size.

## **Results**

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Our presentation of results follows three steps. Step one presents the results of the cluster analysis of different experiences of learning activities among pupils. Step two presents the pupils' assessment of change in the use of project-based, guided discovery learning, inquiry-based learning, and problem-based learning activities after the reopening compared to school before COVID-19. Step three explores whether the learning environment during reopening meets the criteria for a playful learning environment. This final step includes a multiple linear regression analysis exploring the relationship between different experiences of learning activities among pupils and emotional, social, and academic wellbeing. Furthermore, it includes bivariate analysis of the relationship between the use of different learning activities and explained variance of emotional, social, and academic wellbeing.

### **Step 1: Clusters of teacher-directed and self-oriented learning experiences**

Four clusters of pupils were identified and given the following labels: (1) supported self-oriented learning (experience of frequent use of both student- and teacher-directed learning), (2) self-oriented learning, (3) teacher-directed learning, and (4) no clear direction (experience of infrequent use of self-oriented and teacher-directed learning activities) (Table 5). The largest cluster of pupils in the sample, cluster 4 (30%), consists of pupils experiencing no clear orientation. The second largest, cluster 1 (27%), consists of pupils experiencing that the learning environment contained activities that were both self-oriented and teacher-directed. Our definition of this category is supported self-oriented learning. Pupils in the third largest cluster, cluster 3 (19%), experienced that the learning environment contained activities that were mostly teacher-directed. The smallest cluster of pupils is cluster 2 (14%), consisting of pupils who experienced their learning environment as mostly self-oriented.

The teachers in the interviews highlighted the possibilities for pupil-orientation as something extraordinary about the situation. One teacher, reflecting on the situation, suggested that 'The

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boys felt they could make themselves heard much more than usual.’ Another teacher explained that social restrictions made it necessary to divide students into smaller groups:

I had the opportunity to get around each pupil [...]. We had the opportunity to spend the time that each individual pupil really needs when there is something that is difficult. Then you could better go in and do the things that were actually part of our plan. It’s a little harder when they have 23 children [...]. It was just very interesting to see how much more they got out of it when they were not so many.

A first grade teacher remarked that:

A lot of them [the pupils] have blossomed during this period. Suddenly, we’ve discovered new things about some of them because some of those who were previously reluctant to speak have become much more open and participatory in class.

Yet another teacher explained that, for this teacher at least, the outdoor environment provided good opportunities for differentiation. She seemed very confident in her case as she concluded that the pupils were all learning what they were supposed to.

At the moment, we have been focusing on nouns, verbs and adjectives, and I’ve chosen to work with this because it’s something I can find in nature. Some of them [the pupils] are quick to find the logic behind verb conjugation, but for others it is difficult when we’re on our excursion and have to work with it orally instead of writing them [words] down. But, from an academic perspective, they understand the underlying concepts – just on different terms.

### **Step 2: Pupils’ assessment of change in the use of playful learning activities compared to before COVID-19**

We then investigated the pupils’ experience of whether the four types of activities related to playful learning environments – project-oriented learning, guided discovery learning, inquiry-based learning, and problem-based learning – had formed a greater part of the school day during reopening than before the COVID-19 closures. Experienced frequency of guided discovery learning was significantly above, and project-oriented learning was significantly below 3 “no change” on the summated rating scale ( $p < .01$ ) on a response scale from 1 “a lot less than before covid-19” to 5 “a

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lot more before covid-19”. Experienced frequency of problem-based and inquiry-based learning compared to before covid-19 were not significantly above or below 3 “no change”. Summary statistics of the summated rating scales can be found in table 6.

Looking into the interviews and observations, there is no doubt that outdoor teaching, small group size and longer courses with the same teachers were experienced as crucial to the opportunities to launch activities aligning with at least two of the characteristics of a playful learning environment – an exploratory and investigative nature, and pupils’ social involvement and interaction. A head of department said:

We had not previously spent so much time catching small creatures in water. Nature and technology classes have had good conditions. Our pupils went out and caught the small creatures, and they went investigative and exploratory questioning what they were called and so on. This was very good. So, our fishing nets have never been used so much [laughing].

A teacher in first grade explained how pupils were palpably enthusiastic about being outside more and doing new activities. He stated with some certainty his own experience that the activities have impacted positively on pupils’ motivation and commitment to the processes of learning:

When I talk to the pupils, they tell me that they’ve really enjoyed being outside, and doing things that have been different. We’ve been going for a lot of walks outside studying birds or making small ‘nature diaries.’ We’ve been doing different activities outside, and they’ve enjoyed that quite a lot.

Another head of department remarked that teachers seemed to have realised that learning in this way would require more time. He talked about ‘slow learning.’ It is also clear that the possibilities in relation to the learning environments varied according to student age and teacher experiences and interests. Teachers with the youngest classes made clear that they were consciously doing their best to establish a recognisable structure for the day, which meant a schedule with changing subjects and activities and strict teacher-led presentation of content and activities – a schedule, in fact,



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that looked like what the pupils knew from before the closure. This seems to counteract the idea of playful learning. Several teachers from older classes appreciated the new conditions for teaching, pointing out that they facilitated a better flow in the pupils' learning activities during the school day:

It's been an advantage to be able to stay with one class for the entire day, because I've been able to create... That I'm not out the door after the next break, but I can actually continue... And so they haven't had to face three different adults in one day, and instead I've been the anchor person.

This was supported by another teacher, who was relieved not to have to steer teaching by way of annual and weekly-based lesson plans. She found this stimulating and engaging for the pupils.

Thus, a picture emerges that teachers have had to invent new approaches during reopening, but also that these approaches repeatedly had to be rethought, reinvented, and refined. One school principal explained: 'Without doubt, Covid-19 has changed the teachers' thinking about teaching. They have recognised the opportunities in outdoor teaching.'

### **Step 3: Playful learning environments after the reopening**

In section two above, we presented Parker & Thomsen's (2019) five conditions that a learning environment should fulfil to be characterised as playful and suggested that playful learning activities support pupils' emotional, social, and academic wellbeing. In this step, we use regression analysis to investigate whether the learning environment in the reopening phase was significantly correlated with the pupils' average expected emotional, social, and academic wellbeing (Table 7). The regression analysis was theory-driven in so far as it investigated predetermined theoretical knowledge interests using pre-constructed labelling of social phenomena (such as the analytical categories of playful learning environments or experiences of learning environments) as self-oriented or teacher-directed. The regression analysis controlled for the effects of perceived coping, gender,

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and grade. Perceived coping in the current situation after reopening is known to be a strong significant predictor of academic wellbeing (Qvortrup, Christensen & Lomholt 2020), and therefore an important control variable to include analytically.

### *Emotional wellbeing*

Fitting the final model of emotional wellbeing as function of the independent variables, a significant regression equation was found  $F(8.1117) = 97.84, p = .000$  with an  $R^{2\text{-adj}}$  of .41. Social wellbeing is positively correlated with average expected emotional wellbeing. Emotional wellbeing increases by 0.53 standard deviation (SD) for each SD increase in social wellbeing. Perceived coping, gender, and grade are also significantly correlated with average expected emotional wellbeing, but with very small effect sizes. Academic wellbeing was not significantly correlated with emotional wellbeing.

### *Social wellbeing*

Fitting the final model of social wellbeing as a function of the independent variables, a significant regression equation was found  $F(10.1107) = 86.75, p = .000$ , with an  $R^{2\text{-adj}}$  of .43. Emotional wellbeing was positively correlated with average expected social wellbeing and social wellbeing increased by 0.48 SD for each SD increase in emotional wellbeing. Perceived coping was positively correlated with average expected social wellbeing. Average social wellbeing increased by 0.44 SD for each SD increase in perceived coping. Experience in learning activities and grade were positively correlated with social wellbeing, but with very small effect sizes. Academic wellbeing was not significantly correlated with social wellbeing.

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### *Academic wellbeing*

Fitting the final model of academic wellbeing as a function of the independent variables, a significant regression equation was found  $F(11.1111) = 40.85, p = .000$ , with an  $R^{2\text{-adj}}$  of .28. Perceived coping was positively correlated with average expected academic wellbeing and academic wellbeing increased by 0.67 SD for each SD increase in perceived coping. Experience with learning activities as having a direction is positively correlated with average expected academic wellbeing and academic wellbeing increases by 0.45 SD if the learning environment is experienced as mostly supported self-oriented, and 0.25 SD if the learning environments is experienced as self-oriented. Social wellbeing, emotional wellbeing, and grader are also significantly correlated with academic wellbeing, but with small effects sizes.

The interviews nuance the picture of how learning environments affected student wellbeing. One teacher explained how the shorter school day added to school-tired pupils' experience of not having to do anything. He described these pupils' attitude as:

I'm not making an effort [... ] and I don't have to do anything – I've actually had a holiday [... ]. So it's very much their attitude to school that has been... and especially those school-tired boys, so they just think it's cool with these short days and they can sit at home. So it is not unequivocal that it has been super positive.

A teacher in ninth grade (the final grade in Danish school) told about a project-oriented approach, which gave pupils the opportunity to improve their final grade:

We call them 'mini projects,' and we have conceptualised them in such a way that they were not like the traditional final exams. (...) I had to spend a lot of time reassuring them that this was an opportunity to have a positive experience, because some of the girls were crying over this, and some indicated that they weren't up to it. So it's been a matter of striking a delicate balance.

### *Bivariate regression results of academic wellbeing*

All dimensions of playful learning were positively correlated with academic wellbeing, except that project oriented and inquiry-based learning were not significantly correlated with emotional wellbeing (Table 8). Experience of these teaching activities in the learning environment had the strongest correlations and accounted for most variance in average expected academic wellbeing.

### **Conclusion**

This article has attempted to understand how learning environments and activities transformed during the reopening of schools after closures due to COVID-19, and how these transformations affected the well-being of pupils as they came back into school after the closure. We have identified four clusters of pupils with differing experiences with learning environments as either teacher-directed or self-oriented: (1) supported self-oriented learning (experience of frequent use of both student-and teacher-directed learning, (2) self-oriented learning, (3) teacher-directed learning, and (4) having no clear direction (experience of infrequent use of both self-oriented and teacher-directed learning activities). The largest cluster of pupils in the sample is cluster 4 (30%), the second largest is cluster 1 (27%), the third largest cluster 3 (19%), and the smallest cluster 2 (14%). When it comes to learning activities, the article finds that project-based learning was experienced as significantly less frequent in teaching during reopening than it was before closure. Guided discovery learning was experienced as significantly more frequent part of teaching, while inquiry-based learning and problem-based learning had not or hardly not changed frequency.

Multiple regression analysis shows that the emotional and social wellbeing were significantly correlated with each other with a large effect size. Academic wellbeing was significantly correlated with perceived coping with a medium effect size. Regarding learning orientation, the experience with learning environment as having a direction (either supported self-oriented learning, self-oriented learning or teacher-directed learning) was significantly positively correlated with social

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and academic wellbeing. However, only the correlation between supported self-oriented learning, with reference to ‘no clear direction’, and academic well-being had a reasonable effect size. Gender was significantly negatively correlated with emotional well-being, with girls predicted lower emotional well-being than boys. Grade was significantly negatively correlated with academic well-being. Increase in grade predicted decrease in academic well-being.

Finally, bivariate analysis of the correlations between emotional, social, and academic well-being and the playful learning activities – project-oriented learning, guided discovery learning, inquiry-based learning, and problem-based learning – shows that all these activities are significantly positively correlated with pupils’ academic and social wellbeing. Guided discovery learning and problem-based learning were also positively correlated with emotional wellbeing. However, the activities account for very little variance when it comes to emotional and social well-being. With academic well-being, more variance was explained.

### **Discussion**

COVID-19 has posed huge challenges for society at large as well as the educational sector in and beyond Denmark. Overcoming these challenges has required great efforts from everyone involved in the school. As described in the article's introduction, the situation, despite these efforts, has had consequences for the pupils, both regarding learning and regarding well-being. In the article, we focus on three dimensions of well-being, which can supplement previous studies. The majority of previous COVID-19 studies have been characterised by a disease-oriented perception of health (Office for Civil Rights, 2020; Bender, 2020; Gross, 2020), but studies recognise the need to broaden the perspective (Krumsvik, 2020). Zeidner (2020) and O’Brian (2016) regret that well-being constructs in modern research is mainly aligned with the individualistic and self-oriented nature of Western cultures, at the expense of others in society. From this perspective it seems reasonable to add the social and academic dimensions of well-being. This is further accentuated by Zeidner’s

(2020), point that there often is a trade-off between well-being constructs in school and societal issues such as social sustainability. With this accentuation, it becomes very important to reflect various well-being constructs from an ethical standpoint (ibid.). As the pandemic has been a threat to social sustainability, it seems important to broaden the focus to focus not only on individualistic and self-oriented constructs.

Adding to the above reason for focusing on three dimensions of well-being, another reason is that the three dimensions align with the Nordic model of education's three value fields: caring, democracy and competence (Einarsdóttir, et al., 2015), which according to both Krumsvik (2020) and Braund (2021) has been contested during the pandemic. Thus a focus on the three dimensions of well-being may be important to alleviate existential sufferings in both the individual and the education system in a broader sense. One could add that a differentiated understanding of well-being will continue to be important after the current COVID-19 crisis.

The challenges attached to COVID-19 led to transformations of the learning environments during both school closures and re-openings. As suggested by Mutch (2020), the COVID-19, besides being a societal and educational crisis, can be understood as a natural experiment, where “a natural experiment describes an event or intervention not under the control of a researcher” (p. 135). Thus, it is an opportunity to gain knowledge about new kinds of learning environments. In this article, we have focused on learning orientation and playful learning activities. This focus is chosen based on the assumption that the COVID-19 restrictions and regulations led to an increase in such activities but also because of the increasing interest in learner centered and inquiry-based teaching activities. From the article we gain new and relevant knowledge about these activities, but also about how to investigate such activities in the future. This is important. While we are good at determining the impact of given, endogenous, or non-malleable factors such as previous educational results, admission criteria, housing situation, etc., we are less good at determining the impact of

malleable factors of schooling such as teaching activities (Scheerens, 2017), and the article's way of investigating learner centered and inquiry-based teaching activities may contribute to strengthen our ability to do this (Qvortrup & Lykkegaard 2021). This is important for progress in the research area on the importance of teachers and teaching for student achievement (Scheerens, 2017). Besides contributing to methodological aspects, with its approach, the article with the cluster analysis challenges the classical distinction between teacher-centered and student-oriented activities, which, cf. the article's section on playful learning, characterizes the literature in the field. The article's analyses result in a distinction between four forms of the balance between the two extremes and show that three of these are significant positively correlated with social and academic wellbeing. In addition, the article contributes with knowledge about four types of activities that we managed to identify as significantly different.

### **Limitations**

One of the limitations of this study is the lack of possibility to make inference about the population of pupils, which is due to the lack of a systematic sampling design because of harsh data collection conditions and possibilities due to the time sensitivity of the situation of closing and then reopening schools during the COVID-19 pandemic in Denmark. Another limitation is the study's reliance on self-reported experiences and feelings. Furthermore, it can be argued that the possibility of inference is also inhibited by the special and futile circumstances related to the whole situation associated with Covid-19, which is one of emergency teaching at schools during the reopening in Denmark. Finally, it is important to be aware that experiences and feelings are subject and context dependent. Thus, on the one hand, it is important to gain insight into different student's experiences in order to understand student reactions and to be able to avert any future mental health disorders. On the other hand, it is important not to make any hasty conclusions about students' well-being based on data collected so early in the pandemic. At this point of time, the long-term consequences are

still too uncertain to make any definitive conclusions. Therefore, it is important to continue to follow the changes in students' well-being. Adding to this, it is important to be aware of the impact that can in itself result from the great attention paid to well-being. As noted by Trevors and Duffy (2020), media coverage of the pandemic has in itself led to negative emotional reactions and polarisation. This may also be the case for studies and research articles such as the present one.

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