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RESEARCH ARTICLE



# Opening up learning environments: liking school among students in reformed learning spaces

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## ABSTRACT

The present study focuses on views of Finnish basic education students on open and flexible learning environments and the extent to which these views are associated with students' liking of school. The data were based on an online questionnaire containing both structured ratings and open-ended questions filled out by primary school students ( $n = 684$ ; grades 2–6; between ages 8–13 years) attending reformed learning environments. Ethnographic field notes and photographs of the schools were collected to provide contextual information about the settings. Quantitative analyses indicated that students had mostly positive evaluations of their renewed learning environments. Students' perception of teacher support was significantly associated with their liking of school. The responses to open-ended questions, in contrast, indicated sources of dissatisfaction, and giving precedence to some aspects of traditional schools.

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## KEYWORDS

Open learning environment;  
school reform; liking school;  
student perceptions

## Introduction

Contemporary views on learning highlight the need for the renewal of pedagogy and learning environments and call for a move away from knowledge transmission toward active, creative knowledge construction and self-managed, peer, and personal learning, often mediated by technology (e.g. Daniels et al., 2019; Leat et al., 2012). Combined with this shift in pedagogical thinking, many countries undergo changes in how schools are designed (Bojer, 2019; Mahat et al., 2018; Wood, 2018). School redesign projects have often been initiated with the aim of transforming the traditional, walled-in classrooms with rows of desks into open and flexible learning environments better primed for individual and small-group instruction (Alterator & Deed, 2013; Carvalho et al., 2020; Mulcahy & Morrison, 2017; Wells et al., 2018). Although the movement advocating open school architecture has existed in various forms since the 1970s (Cooper, 1981; Cuban, 2004; Deed et al., 2014; George, 1975), the extent of public investment devoted to the accelerating pace of replacing traditional schools with

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more flexible school designs constitutes a new global trend (Carvalho et al., 2020). Very little research information has, however, been accumulated on students' views pertaining to their changed learning environments and on associations with their liking school.

The present study focuses on gaining understanding of the students' views on redesigned schools in the context of Finland where changes in school architecture align with the aims of the most recent national curriculum (National Board of Education, 2014) and the tenets of the literature on twenty-first-century learning skills. These emphasise self-directed, and personalised learning, collaboration with peers, utilisation of digital tools (Benade, 2015; OECD, 2017; Wells et al., 2018) and inquiry and phenomenon-based learning with integration across school subjects (Niemi, 2021; National Board of Education, 2014).

Primary schools in Finland have traditionally consisted of approximately same-sized closed classrooms accommodating a standard number of students, with one designated teacher. By comparison, all new or fully renovated compulsory schools in Finland (since 2016) incorporate open and flexible design principles, at least to some extent. While the new schools vary in terms of openness and flexibility of the physical layout, all of them share some common features: teachers plan and teach in teams in classrooms with more than the traditional 25–30 students, and employ different ways of grouping. These new learning environments typically incorporate multiple technology-enhanced spaces without designated student desks or teacher podiums. Larger spaces operate as adaptable working areas with movable furniture, and a variety of seating types, portable dividers, and acoustic curtains or movable walls which facilitate grouping. The spaces allow for more versatile physical activity and movement as students can occupy various positions in a variety of places (Blackmore et al., 2011). Depending on the pedagogical approach, the opening up of traditional classrooms can provide students with more choices regarding the use of space, time, working groups, and working arrangements while endowing them with increased autonomy. In open and flexible learning environments, students are typically afforded more opportunities for personalised learning and planning and for making decisions and taking responsibility for monitoring their own work (Bojer, 2019; Yeoman, 2018).

The underlying concept of open and flexible learning environments is the promise of transforming classroom learning (Dovey & Fisher, 2014; Imms, 2016) towards fostering higher student motivation and active engagement. However, rigorous scientific evidence and detailed understanding of whether this premise is realised is surprisingly scant. Moreover, there is very limited research pertaining to the impact of reformed learning environments on learning interaction practices and student perceptions. Previous studies in traditional schools on students' school satisfaction and liking school have indicated that they are essential for students' positive academic trajectories, school achievement, and overall wellbeing (Eggum-Wilkens et al., 2014; Mora, 2017). Students who report liking school often participate in classroom activities cooperatively, displaying compliance with school rules, responsible behaviour, and acceptance of teacher authority (Ladd et al., 2000). Moreover, emotional, behavioural, and cognitive engagement in the classroom have beneficial links with student learning and academic progress (Betts et al., 2012). Liking school is also associated with positive peer relationships and peer support (Erath et al., 2008; McGettigan & Gray, 2012), while conflicts with peers (or peer rejections) are correlated with not liking school (Boulton et al., 2011; Ladd et al., 2000). Generally,

students in lower grades report liking school more than the upper grades (Ding & Hall, 2007), with girls displaying stronger levels of liking (Borup & Holstein, 2006; Eggum-Wilkens et al., 2014).

School redesign processes have been initiated in many countries such as Australia, New Zealand, Denmark, England and Iceland (Burke, 2013; Cardellino & Woolner, 2019; Carvalho et al., 2020; Daniels et al., 2019; Mulcahy & Morrison, 2017; Saltmarsh et al., 2015; Sigurðardóttir & Hjartarson, 2016; Wells et al., 2018). However, knowledge of how students respond to changes in their learning environments is only beginning to emerge. Thus far, research evidence has mainly included generalisations about the impact of changes to school buildings and their consequences on teachers' work. The findings pertaining to teachers' views indicate that teaching in the new spaces and associated changes in pedagogy have enabled new practices, such as teachers' sharing of responsibilities (Alterator & Deed, 2013). However, the newly designed schools have sometimes elicited unintended consequences, such as causing stress and concentration difficulties for both students and teachers when the spaces were occupied by several groups of students studying different topics or subjects at the same time (McPherson & Saltmarsh, 2017; Niemi, 2021).

There is even less information on student experiences of redesigned school spaces, as data on their views are only available indirectly from research focusing on teachers or leaders (Mulcahy & Morrison, 2017). This is a clear limitation because student views are critical for gaining an understanding of the qualities of learning environments that foster self-regulated learning and help students to thrive.

Evidence of the presumed benefits of open and flexible learning environments is inconsistent and sparse and often sceptical opinions are pre-eminent in the media. For example, Finland's national public broadcasting company (YLE, 2019) published a piece of news that highlights concerns regarding the learning achievements, peer interactions, and self-regulation skills of students in reformed learning environments. Increasing alarm has been voiced in relation to reports of sensory overload in open learning spaces, increased levels of stress, and attention problems among students in newly designed schools (see Jussila, 2019). Distractions and noise have in previous literature been reported to be linked with stress and attention difficulties among both students and teachers (Mealings et al., 2014). This Finnish discussion mirrors reactions expressed in other countries with respect to open design schools, both previously (Burke, 2013; Cuban, 1984) and more recently (Sigurðardóttir & Hjartarson, 2016).

In this study, online surveys were used to study the views of students regarding open and flexible learning environments. Theoretically, we view that learning environments are both socially constituted in interaction and constitutive of social interaction; and both the physical and material construction of spaces and their social construction shape learning interactions (Jucker et al., 2018). Methodologically, we apply a concurrent triangulation strategy, which integrates data during the interpretation phase allowing comparison of the results obtained from qualitative and quantitative data within a single study (Terrell, 2012). Thus, in addition to the quantitative approach of analysing structured questionnaire data, qualitative open-ended answers were also analysed to enrich the results and to form a more general understanding of student views on open and flexible learning environments.

## ***The current study***

The aim of the present study was to investigate the experiences and views of Finnish basic education students (aged 8–13 years) with regard to open and flexible learning environments. In particular, we were interested in how the newly designed learning environments and practices match the needs and interests of students. Students' views of both limitations and affordances of open learning environments are seen as relevant for school reforms implemented around the world (Carvalho et al., 2020; OECD, 2017; Sigurðardóttir & Hjartarson, 2016). First, we investigated students' views regarding the open learning environments in their school, in addition to their experiences of teacher support, peer support, safety at school, and the ease of schoolwork. Secondly, we examined the extent to which these views are associated with students' liking of school.

## **Methods**

### ***Procedure and participants***

The empirical study was conducted in five Finnish basic education schools that had been either purpose-built or totally renovated based on the concepts of open learning environments. The five schools were located in different regions of Finland, extending from the south to the north of the country. To ensure anonymity, the details of the schools are not made public. Each institution is a public school (as are 99% of Finnish comprehensive schools for grades 1–9), with students typically living in the neighbouring catchment area. The first modern open learning environment school was opened in 2016, meaning that children had had experience with open learning space schools for the maximum of 2–3 years. Students in the higher grades (4–6) had also experience of more traditional schools. The number of pupils in three of the schools ranged from 250 to 500, while two schools had an enrolment of over 500 pupils. The number of teachers in a school varied from 12 to 20. In addition, ethnographic field notes and photographs of the schools were collected to provide contextual information about the settings, like layout of the school.

The data were collected using an electronic student questionnaire that consisted of closed and four open-ended questions. The questionnaire was answered by 684 pupils from grades 2–6 (children aged 8–13 years). Participation was voluntary, and written consent for each participating student was obtained from parents via information letters and consent slips sent to all pupils. The children were informed that they could withdraw from the study at any point. All responses were anonymous, and the children were asked to complete the electronic online questionnaire using a computer, laptop, or other digital device as part of their daily school work in the presence of teaching staff. It was recommended that teachers should read the questions aloud (especially to younger students) if necessary.

The aim of the electronic questionnaire was to provide information on how students viewed their new learning spaces and educational practices. The structured questions focused on three main themes: the physical environment, learning activities, and group work (including the role of peers, classroom climate, and the role of teachers). The open-ended questions asked pupils to indicate what they liked and disliked about their schools and to express any thoughts they had with regard to possible improvements.

The four open questions were as follows: (1) What things are you satisfied with in your school? (2) What things would make your school even better? (3) Is there something you would like to change in your school? and (4) Do you have any thoughts or ideas related to your school/classroom?

Data from 636 pupils aged between 8 and 13 years (Grades 2–6) were used in the analyses of the present study, of which 50% were girls. The response rate averaged 32.3%, with a range across classrooms between 14.3% and 44.0%. Representation of students across the five grades were as follows: 12.3% from Grade 2, 25.3% from Grade 3, 23.6% from Grade 4, 29.1% from Grade 5, and 9.7% from Grade 6. Information on the backgrounds of immigrant families was not available. No gender difference was found between the five schools in terms of response rate ( $\chi^2(4) = 4.88, p = .299$ ). However, more students from Grades 2, 3, and 4 than students from Grades 5 and 6 participated in the survey in 3 of the 5 schools ( $\chi^2(16) = 199.13, p < .001$ ).

### Measures

Structured questions involved ratings using a five-point Likert scale (1 = completely/strongly disagree to 5 = completely/strongly agree), where higher scores reflected

**Table 1.** Summary for items in study variables.

1. Liking school	<i>I like being at my school</i>
2. School spaces	<i>It's easy to move from one place to another in my school</i> <i>I like my school</i> <i>I like the open space classrooms in my school</i> <i>I like the interior decoration of my school, such as the furniture and colours</i>
3. Working conditions	<i>I usually find a good working place for myself</i> <i>Every student has enough space on tables when needed</i> <i>The lighting is appropriate in my school</i> <i>The indoor air is healthy in my school</i> <i>My school is clean</i> <i>The furniture in my school is ergonomic</i>
4. Availability of teacher support	<i>It's easy to ask for help from the teacher</i> <i>The teacher/teachers has/have time to listen to me</i> <i>I can ask for help from every adult in the open classroom if I need to</i> <i>I can talk with my teacher(s) about difficult topics, too</i> <i>It is easy for me to hear the teacher</i> <i>My teacher trusts me</i>
5. Peer support	<i>It is easy for me to work in groups</i> <i>It's easy for me to find a pair/small group in which to work</i> <i>I have enough friends at school</i> <i>There is a good atmosphere in our class</i> <i>I feel that I belong in my class</i> <i>I know my classmates well</i>
6. Managing schoolwork	<i>It is easy to know what to do during the lesson</i> <i>I usually have enough time to finish the tasks</i> <i>I study carefully even when the teacher is not around</i> <i>It is easy for me to concentrate on my work and on the tasks set</i>
7. Feeling safe at school	<i>I feel safe at school</i>

higher quality. Other variables included gender and the grade in which the students were enrolled. A summary of items in the measures is presented in Table 2, and descriptive information, alpha coefficients, and intercorrelations are listed in Table 3.

### Liking school

Liking school was measured with a single item: “*I like being at my school*”. Of the respondents 39% completely agreed with the statement about liking their schools, while only 2.2% completely disagreed with the statement.

### School spaces and working conditions

Student views of the physical school spaces were measured with 12 items (such as “*I usually find a good working place for myself*”). As this was an exploratory study, we initially employed exploratory factor analysis (EFA) to examine the factorial structure of ratings concerning physical school spaces. The EFA supported a two-factor solution, but factor loading for one item (“*I wish I had a certain place of my own at school*”) did not have a significant loading at the 5% level. Next, we tested a measurement model via confirmatory factor analysis (CFA) for 12 items. The one-factor CFA had poor fit indices ( $\chi^2(54)$  352.77,  $p < .001$ ; CFI = .82; TLI = .79; RMSEA = .09; SRMR = .07), while low factor loadings were revealed for the same item as in the EFA and another item (“*I would like to have a school desk of my own*”). These two items with low factor loadings were removed from further analyses, meaning that the analyses continued using only 10 items.

The two-factor CFA for 10 items had good fit indices ( $\chi^2(34)$  86.55,  $p < .001$ ; CFI = .96; TLI = .95; RMSEA = .05; SRMR = .03) and fitted the data significantly better than the one-factor CFA according to the chi-square difference (Satorra-Bentler test,  $\chi^2(1)$  38.19,  $p < .001$ ). All the factor loadings in the two-factor CFA were significant ( $p < .001$ ): .60 to .82 for the first factor and .60 to .72 for the second factor. Thus, it was concluded that the 10 items measuring student views of school spaces formed a scale with two separate

**Table 2.** Summary of intercorrelations, means, and standard deviations for the latent and observed variables.

Measure	1	2	3	4	5	6	7	8	9
1. Liking school	–								
2. School spaces	.62***	–							
3. Working conditions	.62***	.88***	–						
4. Availability of teacher support	.65***	.65***	.82***	–					
5. Peer support	.49***	.51***	.56***	.62***	–				
6. Managing schoolwork	.51***	.53***	.64***	.76***	.65***	–			
7. Feeling safe at school	.53***	.49***	.57***	.50***	.40***	.36***	–		
8. Gender	.19***	.05	.08	.05	–.01	.12*	.14**	–	
9. Grade	–.11**	–.27***	–.29***	–.19***	–.06	–.17***	–.03	–.03	–
<i>M</i>	4.09	4.15	4.18	4.15	4.30	4.08	4.45	–	2.99
<i>SD</i>	.96	.81	.67	.69	.68	.71	.88	–	1.19
<i>Skewness</i>	–1.13	–1.15	–1.24	–1.03	–1.59	–.93	–1.87	–	–.07
<i>Kurtosis</i>	–1.12	.93	1.81	.89	3.17	1.26	3.59	–	–1.00
<i>Cronbach's alpha</i>	–	.78	.81	.79	.81	.75	–	–	–

Note: Means and standard deviations based on observed and mean variables. Correlations based on latent factors (variables 2–5) and observed measures (variables 1, 6–7). Gender: boys = 0, girls = 1. Grade: 1–5.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , two-tailed.



dimensions, which were named based on their most prominent content, as follows: *school spaces* and *working conditions*. The internal consistency of both dimensions was good (Cronbach's alphas of .78 and .81, respectively).

The physical *school spaces* dimension consisted of four items (see Table 1). On average, students' views on their new school spaces were positive, with 51.1% fully agreeing that they liked their school spaces and only four students (0.6%) not liking their school spaces at all. The *working conditions* dimension consisted of six items (see Table 1), which covered different aspects of the usability of school spaces regarding studying. Here, 37.9% of students completely agreed that the working conditions in their schools were adequate, with only one student not agreeing at all.

### **Availability of teacher support**

The *availability of teacher support* was measured using seven items that covered different aspects of teacher support, such as the availability of teacher support and the levels of trust between students and teachers. The EFA supported a one-factor solution with all items loaded on the same factor. Here, one-factor CFA achieved an excellent fit ( $\chi^2(14)$  20.57,  $p < .001$ ; CFI = .99; TLI = .99; RMSEA = .03; SRMR = .02), and all standardised factor loadings were significant ( $p < .001$ ). However, the factor loading for one item was considered too low (.40), as the CFA explained only 16% of the variance in that item. Thus, this one item "*I feel I can concentrate better when the teacher is around*" was dropped from the analyses and the CFA was rerun with the remaining six items ( $\chi^2(9)$  5.03,  $p = .83$ ; CFI = 1.00; TLI = 1.00; RMSEA = .00; SRMR = .01). The items for *availability of teacher support* are presented in Table 1. The standardised factor loadings were all significant ( $p < .001$ ), ranging from .51 to .73, and internal consistency was also adequate (Cronbach's alpha = .79). Importantly, 41.8% of students fully agreed that teacher support was available for them, and none of the students reported no teacher support.

### **Peer support**

*Peer support* was measured with six items covering the students' views in terms of receiving different aspects of support. These items included the atmosphere in class, working in peer groups and a sense of belonging to the group. The EFA supported a one-factor solution (with all items having significant factor loadings), while the two-factor solution had no convergence. The one-factor CFA exhibited excellent fit ( $\chi^2(9)$  15.11,  $p = .09$ ; CFI = .99; TLI = .98; RMSEA = .03; SRMR = .02), and all standardised factor loadings were significant ( $p < .001$ ), ranging from .61 to .73. The internal consistency of the scale was good (Cronbach's alpha = .81). The items for *peer support* are listed in Table 1. Of the respondents, 54.1% fully agreed that they received peer support, and only three students reported experiencing very low peer support.

### **Managing schoolwork**

*Managing schoolwork* was measured with four items covering different aspects of managing schoolwork during lessons. Here, one-factor CFA exhibited excellent fit indices ( $\chi^2(2)$  1.97,  $p = .37$ ; CFI = 1.00; TLI = 1.00; RMSEA = .00; SRMR = .01), and all standardised factor loadings were significant ( $p < .001$ ), ranging from .61 to .73. The internal consistency was adequate (Cronbach's alpha = .75). The items for *managing schoolwork* are presented

in Table 1. Of the students, 38.8% fully agreed that managing schoolwork was easy for them, with only three students completely disagreeing with the statements.

### **Control variables**

The *control variables* included gender (coded as follows: boys = 0, girls = 1), grade (grades 2–6), and feeling safe at school, which was measured with one item (rated on a scale of 1–5): “*I feel safe at school*”. This same measure was used in the Health Behaviour in School-Aged Children (HBSC) survey, with a slightly reduced scale (Brooks et al., 2015). Here, 62.9% of students totally agreed that they felt safe at school (a value of 5), and only 1.9% disagreed completely with the statement (a value of 1). These three control variables were included in the structural equation modelling (SEM), as they have all been proven to have associations with school liking in earlier research. Girls and younger students have usually been found to like school more than boys and older students (Eggum-Wilkens et al., 2014; Metsämuuronen et al., 2012). Moreover, feeling safe at school has been shown to be associated with liking school (Samdal et al., 1998).

### **Statistical analyses**

Our first research question addressed students’ views of school spaces, working conditions, teacher and peer support, and managing schoolwork. Differences in these views between boys and girls and between students from different grades were also examined. As most of the measures were developed specifically for this study, we first evaluated the validity and reliability of the new scales. EFA, and CFA were used to confirm the structural pattern and to ascertain whether the latent variables formed separate constructs. As all the measures were skewed (see skewness and kurtosis in Table 2), parameters were estimated using maximum likelihood estimation with robust standard errors to consider the effect of non-normality in the variables using the Mplus 8.4 programme (MLR estimator; Muthén & Muthén, 1998–2017). The internal consistency of the measures was assessed using Cronbach’s alphas, which were found to be adequate (see DeVellis, 2017, p. 145). Mean variables were calculated for the latent factors for descriptive purposes and for comparison between boys and girls (using the Mann–Whitney test) and between grades (using the Kruskal–Wallis test).

Our second research question concerned school liking and the extent to which student views on school spaces, working conditions, teacher and peer support, and managing schoolwork were associated with liking school. The four composite variables were treated as latent factors in the SEM, while school liking (based on 1 item) and the control variables (gender, grade, and feeling safe at school) were treated as observed variables. The correlations between the latent factors and observed variables were analysed before the SEM.

The EFA, CFA, and SEM were conducted using the Mplus 8.4 programme (Muthén & Muthén, 1998–2017). The fit of the CFA and SEM were assessed using the following: chi-square values ( $\chi^2$ ), comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR). The cutoff values were .95 for CFI and TLI, .06 for RMSEA, and .08 for SRMR (Hu & Bentler, 1999; Marsh et al., 2004). In the model comparisons, chi-square difference

testing was employed using the Satorra–Bentler scaled chi-square (Satorra & Bentler, 2010). There were no missing values for any variables except for gender (4.6%). The full information maximum likelihood procedure (FIML; see Muthén & Muthén, 1998–2017) was applied for handling these missing values in the SEM. Descriptive statistics and Cronbach's alpha values were calculated using the IBM SPSS version 26.

## Results

### *Comparisons between boys and girls and between grades*

We found statistically significant differences between boys and girls in terms of school liking (Mann–Whitney  $U = 54189.00$ ,  $p < .001$ ), managing schoolwork ( $U = 51321.50$ ,  $p < .05$ ), and feeling safe at school ( $U = 50341.50$ ,  $p < .05$ ). Girls liked school more, perceived managing their schoolwork better, and felt safer in school compared to boys. By comparison, there were no gender differences with respect to students' views on school spaces, working conditions, or teacher and peer support.

Significant differences were found between the students in different grades. According to the Kruskal–Wallis test students in Grade 2 reported liking school more ( $Mdn = 5$ ) than students in other grades ( $Mdn = 4$ ; test estimate = 13.11,  $p < .05$ ). Furthermore, students in Grades 2, 3, and 4 reported more liking of school spaces (medians for all three grades were 4.50) compared to students in the higher grades ( $Mdn_{5th\ grade} = 4.25$ ;  $Mdn_{6th\ grade} = 3.75$ ; test estimate = 37.25,  $p < .001$ ). In addition, students in Grades 2, 3, and 4 reported more positive ratings of working conditions (medians for all three grades were 4.43) compared to students in the higher grades ( $Mdn_{5th\ grade} = 4.14$ ;  $Mdn_{6th\ grade} = 4.07$ ; test estimate = 33.45,  $p < .001$ ). More teacher support was reported among students in the lower grades compared to those in the higher grades ( $Mdn_{2nd\ grade} = 4.50$ ;  $Mdn_{3rd\ grade} = 4.33$ ;  $Mdn_{4th\ grade} = 4.33$ ;  $Mdn_{5th\ grade} = 4.17$ ;  $Mdn_{6th\ grade} = 4.00$ ; test estimate = 21.07,  $p < .001$ ). Furthermore, students in the lower grades reported more schoolwork management compared to students in the higher grades ( $Mdn_{2nd\ grade} = 4.50$ ;  $Mdn_{3rd\ grade} = 4.25$ ;  $Mdn_{4th\ grade} = 4.25$ ;  $Mdn_{5th\ grade} = 4.00$ ;  $Mdn_{6th\ grade} = 3.75$ ; test estimate = 16.39,  $p < .01$ ). No differences were found between grades for peer support or feeling safe at school.

### *Measurement models*

Measurement models using CFA with 1–5 factors indicated that students' views on school spaces, working conditions, teacher and peer support, and managing schoolwork formed separate constructs in the study, as the model with five factors had the best fit ( $\chi^2(286) = 484.48$ ,  $p < .001$ ; CFI = .95; TLI = .95; RMSEA = .03; SRMR = .04). Three modifications (comprising covariances between items) were retained in the final CFA five-factor model. However, even without these modifications, the model fitted the data significantly better than any other model (such as the model with four factors, where school spaces and working conditions formed a joint single factor) according to the chi-square difference ( $p < .001$ ) and other fit indices. The fit indices for CFAs with 1–4 factors are available from the authors upon request. All the standardised factor loadings were significant ( $p < .001$ ), ranging from .52 to .77.

Table 2 presents the correlations between latent factors and the observed variables. The highest correlation was found between school spaces and working conditions

( $r = .88$ ,  $p < .001$ ). This suggests that these two factors could also have been treated as a single factor. However, including them separately in the model was deemed better, as the factors were distinguishable both empirically and in terms of their content (see Measures).

### Results for the SEM explaining liking school

The SEM results demonstrated that the availability of teacher support, school spaces, feeling safe at school, and gender were significantly associated with students' liking of school (see Model 1, Table 3). Furthermore, the availability of teacher support and students' views of school spaces had the greatest associations with school liking ( $b^* = .49$ ,  $b^* = .53$ , respectively, both  $p < .01$ ). This implies that the stronger the support from teachers and the more positively the school spaces were perceived, the more the students indicated liking school. Moreover, feeling safer at school was related to higher school liking among the students. Although the significance of teachers' support with respect to students' liking school and feeling safe has previously been revealed in traditional school spaces (Hallinan, 2008; Zhang et al., 2016), this is the first study to demonstrate that the significance of teacher support and a safe school environment for young students is as relevant and shows a strong association in new and open school contexts.

According to the results, girls liked school more than boys. Students' perceptions of working conditions, peer support, and managing schoolwork were not, however, associated with school liking. The model fit for these analyses was good ( $\chi^2(369) = 670.55$ ,  $p < .001$ ; CFI = .94; TLI = .93; RMSEA = .04; SRMR = .04), but as the number of parameters (126) was high compared to the sample size, this could decrease the trustworthiness of the results (Kline, 2011, p. 12). Accordingly, we ran another model (Model 2), in which the non-significant independent variables were omitted, and Model 2 confirmed the results from Model 1 (see Table 2), and its fit was excellent ( $\chi^2(56) = 102.10$ ,  $p < .001$ ; CFI = .98; TLI = .97; RMSEA = .04; SRMR = .03).

### Student responses to the open-ended questions

The student questionnaire included four open-ended questions to gain additional information on participants' perceptions of their changed learning environments. As the

**Table 3.** Explaining the variance in liking school.

Variables	Model 1		Model 2 <sup>b</sup>	
	$b^*$	SE	$b^*$	SE
School spaces	.49**	.02	.28***	.06
Working conditions	-.39	.31		
Availability of teacher support	.53**	.18	.37***	.06
Peer support	.07	.06		
Managing schoolwork	-.04	.08		
Feeling safe at school	.22***	.06	.19***	.05
Gender	.15***	.04	.13***	.03
Grade	.02	.04		
$R^2$	.56		.54	

Note:  $b^*$  = standardised regression coefficient and SE = standard error. <sup>b</sup>Model 2 was estimated by only including those variables from Model 1 that accounted for statistically significant variance in the dependent variable.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , two-tailed.

responses were typically single words (or short answers), the analysis consisted of a simple tallying of words and themes that the students used when answering these questions. Student responses to the question on factors related to school satisfaction typically focused on the following: physical and material school conditions, social relationships with peers, relationships with teachers, and school subjects.

The physical aspects of school were described using words such as beautiful, comfortable, and clean, beautiful colours, nice seating options, and furniture. Some of the responses indicated satisfaction with open spaces because they provided opportunities for individual choices regarding the use of such spaces (*"I am happy that I can choose my space"*). Many also appreciated the presence of private spaces and the possibility of escaping (or avoiding) noise, crowded spaces, and the frequent movement of people in the spaces. (*"I can find my own peaceful and quiet areas in my school where people are not walking through my space"*). The schoolyard and the materials that could be used at recess were mentioned by many as factors that provided satisfaction (*"I'm happy that we have a large schoolyard and various equipment to play with at recess"*). Students also expressed a desire for a bigger schoolyard and more play facilities.

For the students, the physical conditions of their learning environments seemed to be a concrete manifestation of the important features of a social learning environment. Social relationships, a good atmosphere, and few mentions (*"not much"*) of school bullying were major contributors to students' school satisfaction. The students most frequently mentioned teachers and peers as factors having an effect on their liking school. Students described their teachers with positive attributes (such as *"nice"*, *"positive"*, and *"good"*), or simply mentioned that they liked their teachers. In many responses, the children expressed a wish to learn with their teachers and often mentioned enjoying being with (and receiving support from) their peers. Friends at school provided the constituents for good teams or classes, a good atmosphere, while also helping to engender a sense of belonging. Many students mentioned that they were happy that their schools were safe, although they did not mention exactly what they meant by this comment.

Many students expressed satisfaction with their schools because they were seen as places where they could learn about things and gain new knowledge. Students wanted to learn in the presence of teaching staff, as teachers were perceived as facilitators (or partners) of learning rather than distant authorities. Some school subjects (mostly physical education and handicrafts) were mentioned as aspects that student in particular liked about school. Increased opportunities for using digital technology were mentioned several times as contributing positively to learning interactions, but some respondents also appreciated the opportunity to use schoolbooks. Some students wished that there was more time for engaging with technology, increased permission to use mobile phones, or further opportunities to play digital games.

In accordance with the data gained from the structured ratings, students seemed satisfied with their physical learning environments (layout and spatial affordances) in their present state. Social relationships, the classroom climate, teacher and peer support, and affordances of digital technology in learning environments were seen as strong contributors to student experiences of school liking.

The final three open-ended questions concerned issues that students would have liked to improve or change in their school, thus, they provided students with an opportunity to express any dissatisfaction. These responses revealed some discontent with the physical

school spaces and the ways in which the redesign of the schools had changed learning practices. Surprisingly many responses (114 of 636) indicated that the modern open school layout was not what all students desired; instead, some preferred more conventional classrooms and schools. This was illustrated in comments such as *"[I wish] it could be a real school not a modern one"* and *"My school is too modern"*. Some of the students appeared to desire more traditional walled-in classrooms and conventional materials, furniture, or equipment such as chalkboards, desks, doors, walls, and tables. This was exemplified by the following statements: *"I would like to have closed classrooms"*, *"I wish we had a door and walls in our class"*, *"closed classroom and the same teacher"*, *"proper classrooms and desks back!"* and *"walls instead of curtains"*.

Noise and distractions were sometimes mentioned (68 of 636 responses) as factors that caused stress or difficulties when trying to concentrate on learning tasks. Students commented that *"I feel tired after a school day as there is a lot of noise in our school"* and *"[I wish for] ... fewer voices when working when all students are present"*. Some students expressed a wish for more conventional instructional teacher roles through comments such as wishing for *"a teacher who teaches"*, *"that teachers would come and teach me without doing any tasks on the computer"*, and *"I would like that we could learn together with our teacher"*. Thus, it would appear that for some students, the changes that were intended to be improvements also had unintended negative consequences. Many students who wished their school was more traditional, however, responded liking their school in the structured questions.

## Concluding discussion

The present study aimed to increase understanding of students' views on open and flexible learning environments, including working conditions, teacher and peer support, and managing schoolwork in renewed school spaces. Data were collected using an online questionnaire which contained both structured ratings and open-ended questions. This goal was to examine the extent to which children's perceptions of their open, flexible school environments and their affordances were associated with school liking. In addition, we investigated whether there were any differences between the views expressed by boys and girls and by children from different primary school grades.

Our quantitative analyses of the ratings indicated that students had mostly positive evaluations of their newly designed learning environments. The majority of students reported a strong liking regarding their school spaces, with only a few participants reporting a strong dislike. Most children also reported receiving high levels of support from their teachers and peers. In accordance with previous research (Haapasalo et al., 2010; Klem & Connell, 2004), the perception of teacher support was significantly associated with students' liking school. In the present study, students' perceptions of availability of teacher support and views of school spaces had the greatest associations with liking school (i.e. the stronger the support from teachers and the more pleasant the school spaces were rated, the more the students indicated school liking). In addition, feeling safe at school was also related to students' liking of school.

The analysis of gender differences indicated that girls reported managing schoolwork better and felt safer in school compared to boys. However, no gender differences emerged for student ratings of school spaces, working conditions, or teacher and peer

support. Students in lower grades reported higher levels of liking school spaces, and more positive ratings of working conditions, the availability of teacher support, and managing schoolwork in contrast to students in higher grades. This finding is in line with previous studies (Eggum-Wilkens et al., 2014; Metsämuuronen et al., 2012), where younger students displayed a higher liking for school. It should be noted that students in the lower grades had started school in the newly designed facilities; hence, they did not have direct first-hand experience with more traditional schools (unlike students in higher grades). Accordingly, we were unable to make direct comparisons between newly designed and more traditional schools.

The overwhelming majority of students' responses to the structured ratings were positively framed. However, student responses to the open-ended questions revealed some mismatches between student wishes (or ideals) concerning their schools and the concrete physical features and practices of their newly designed schools. In their open-ended responses, many students, albeit not a majority stated a preference for schools with walled-in classrooms, classrooms with desks, and having one teacher rather than having open school spaces. Moreover, some students criticised their schools for being *"too modern"* or *"too open"*. Some students also seemed to expect *"teaching from a teacher"* or to have a designated teacher. This may imply that at least some students preferred more conventional teaching practices and pedagogy, which has been reported to be challenging in open learning environments (Benade, 2015). By contrast, the positively perceived affordances of the new spaces included greater freedom of movement and increased opportunities to obtain privacy within certain spaces, which are not readily accessible in traditional schools and classrooms.

Although the children mainly reported liking their new learning environments (when asked to give a simple rating), their responses to the open-ended questions indicated some concerns or sources of dissatisfaction related to the new open school spaces. Open learning environments had mostly aspects that gave pleasure to students, however, traditional classrooms remained the optimum choice at least for many of the older students who had experienced both traditional and reformed designs. Reasons for this contrast could be considered to emanate from problems of maintaining attention and distractibility in open spaces (due to increased sensory stimuli), which were mentioned in many student responses. We argue that children's wishes regarding the need for enclosed spaces and spaces with less noise and distraction are views that architects and school leaders should consider when designing school layouts. Many students expressed wishes which suggested longing for some features of the traditional school, such as conventional instructional methods, desks, closed classrooms and the presence of only one designated *"own"* teacher. However, this could also imply that students had not been helped to adjust to changes in physical school spaces and new kinds of learning practices or that new working modes had not yet evolved.

It should be noted that changing and developing new working modes take time. Educational change is known to represent a challenge for both students and teachers (Burke & Grosvenor, 2003; Saltmarsh et al., 2015). Thus, students are also entitled to a familiarisation phase which facilitates benefiting from the new spaces and altered pedagogy, especially when they have had experience of more conventional classrooms. Transforming teaching in ways that fit with those that have been successful in traditional classrooms, might help students to make most of the open classrooms and utilise the



opportunity to have agency in influencing the adaptation of the space to learners' needs. In the present study, surprisingly few students mentioned the new opportunities provided by new school spaces, which raises questions regarding the extent to which the new schools have reached their full potential in terms of being optimally aligned for purpose.

We believe that our research could have implications for school reforms in Finland and other countries, where learning context changes are being introduced to meet the needs of learners in the twenty-first century (Daniels et al., 2019; OECD, 2017). First, this study suggests that when transforming children's learning environments, it is important to consider children's wishes, and expectations of their schools and schooldays. Students often report liking versatile and functional schoolyard facilities, bright colours, soft furnishings, and technology-rich learning areas in open-space classrooms and schools. However, social relationships with peers and teachers and peaceful working conditions seem to be the most important factors for most students in the learning environment. These are key components for producing school satisfaction and ensuring it remains stable over time. The teacher's role in terms of providing sensitive support and timely guidance for learning is of critical importance. Notwithstanding the emphasis of the new curricula on student autonomy and self-regulated learning, students also want to be supported and guided by their teachers. It may be argued that self-regulated learning and autonomy are skills that students want – and need – to practise with their teachers.

Second, the present study provides insights which suggest that end users (such as students and teachers) should be involved in the phases and processes of designing and implementing new learning environments. Students' awareness of and interest in designing, shaping, and evaluating their learning environments should be fostered. Students can also be engaged as co-researchers with regard to their learning environments (see Burke & Grosvenor, 2003). One way to accommodate these needs is to utilise the research field of children's geographies which pays attention to the role of space and place in their lives (Kraftl, 2020).

Third, our findings suggest that when designing new learning environments, it is important to go beyond the "innovative learning environment" discourse and surpass opinions concerning the binary opposites of modern vs. traditional spaces and formal vs. informal learning, which are polarised strongly for or against the change. Instead, a deep understanding of the intricate relationships between space, learning, and students' different learning needs is required, especially in the current times when more diversity in student populations and their needs is being observed also in Finnish schools. Needed are also more sophisticated theoretical and analytical methods to gain knowledge of the key features of learning environments and an understanding of how designed environments shape interactions as well as tools for evaluating learning environments (Carvalho & Goodyear, 2014). Discussion and critical debate on how opening up learning environments works for different learners with versatile learning needs should continue. We believe that multimethod studies using documentation such as video data and photographs may optimally reveal how different profiles or subgroups of students inhibit and interact in different spaces and the conditions and reasons behind interaction. Fourth, we emphasise that architects need to better understand the everyday life of students in school, and teachers and students need support on how to use new and reformed school spaces and materiality (Burke, 2013; Sigurðardóttir & Hjartarson, 2016).



## Strengths and limitations

The strengths of this study are that it investigates a fresh research topic and uses unique data from young students in five reformed schools. This is important given that there has been little quantitative research into young students' well-being (here liking school), and on open learning environments, and school transformations. Some limitations of the study include a restricted age range where young students were represented to a higher extent than older students, and small respondent rates. It should also be noted that the measures were mostly developed for this study, and more studies are needed to validate them and use them also to study student views of traditional schools. The novel focus on physical school spaces and working conditions can also be considered an asset. Further limitations are that measurement error could not be controlled for the one-item indicator of school liking, and as the study was based on self-reporting by students the shared-method variance could have an effect on the associations. Comparing student views of physical school spaces and working conditions in open learning environments and traditionally organised schools would be needed in the future. Finally, any conclusions regarding causality could not be made due to the cross-sectional design, and longitudinal designs would be highly relevant for gaining knowledge of students' and teachers' adaptation to the open school spaces over time.

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