

*Else Margrethe Lefdal*  
*Oslo Metropolitan University*

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## User participation in the planning of Art and crafts studios in new school buildings in Norway

### **Abstract**

This article addresses users' opportunities to participate in the design of physical learning environments. The research questions are as follows: How do teachers experience user participation in a planning process for the Art and crafts studios in a new school building, and in what way do choices at the level of details affect teaching and learning conditions? In this case study, studios for Art and crafts in one Norwegian school have been studied, and four Art and crafts teachers were interviewed about their involvement and experiences in the planning process. The findings show that disregarding users' specific suggestions may negatively affect pupils' learning.

The mindset of the design disciplines, in which solutions are adapted to users and their experiences and not vice versa, is valuable and transferable to planning processes for school buildings. The process of gaining insight into and documenting users' knowledge and experiences should be systematic and structured to provide improved solutions. Art and crafts studios' potentials to function as intended and as effective learning environments can be exploited more easily through an assessed, systematic and creative process that focuses on users. The article suggests that service designers should be invited to operate and bridge the gap between school owners, architects, and users.

Keywords: Art and crafts studios, physical learning environments, school buildings, user involvement, service design

## Brukermedvirkning ved planlegging av kunst og håndverksrom i nye skolebygg

### **Sammendrag**

Artikkelen tar for seg brukernes muligheter for å medvirke i utformingen av fysiske læringsmiljøer. Forskningsspørsmålet er todelt: Hvordan opplever lærere brukermidvirkning ved utforming av kunst og håndverksrommene i planprosessen for et nytt skolebygg, og på hvilke måter kan valg på detaljnivå ha innvirkning på undervisning og læring? I denne casestudien er spesialrom for kunst og håndverk ved én norsk skole studert, og fire kunst og håndverkslærere er intervjuet om sin deltagelse i og erfaringer med planprosessen. Funnene viser at det å ignorere brukernes konkrete forslag kan ha negativ innvirkning på elevenes læring i faget. Valg på detaljnivå kan vanskeliggjøre

lærernes arbeidsforhold, hvilket kan tenkes å føre til et svekket læringsutbytte for elevene.

Innen tjenstedesign og ved designtenkning vektlegges det at løsningene er tilpasset brukerne og deres erfaringer og ikke omvendt. Et tilsvarende fokus er tjenlig og overførbart til planprosesser for skolebygg. Prosessen med å få innsikt i og å dokumentere brukernes kunnskaper og erfaringer, bør foregå systematisk og strukturert for å gi forbedrede løsninger. Det er ønskelig med kunst og håndverksrom som fungerer hensiktsmessig og effektivt som læringsmiljø på fagets premisser. Det kan enklere oppnå gjennom en vurdert, systematisk og kreativ prosess som har fokus på brukerne. Artikkelen foreslår at tjenstedesignere engasjeres inn i skolebyggprosjekter for å bistå i brukerprosessene og bidra med å «bygge bro» mellom skoleeiere, arkitekter og brukere.

Nøkkelord: kunst og håndverksrom, fysiske læringsmiljøer, skolebygg, brukermedvirkning, tjenstedesign

## Introduction

When public buildings are planned in Norway, it is assumed that users will participate in the process. Users' rights to obtain information and participate in the planning process are stipulated in Norwegian laws and regulations (Regjeringen.no, 2014). In other words, those who are affected by a decision have the right to be involved in the decision-making process. Despite this right, several scholars in Norway have argued that users' viewpoints in general are not taken into consideration or that users have little say in these issues (Arge, 2008; Bye, 2008; Meland, 2011; Tvedt, 2018; Vinje, 2014). This is in line with earlier international studies (Cronberg, 1976; Kernohan et al., 1992; Taylor, 1993). "Currently there is a widespread awareness of the importance of consulting users and of attempting to understand the educational use of a school" (Woolner et al., 2007a).

This article is based on a study of the physical learning environment, more specifically the studio conditions for the school subject Art and crafts (*Kunst og håndverk* in Norwegian) in one combined primary and lower secondary school (age 6–16). This study may be of interest to Art and crafts teachers, educational institutions, architects, school leaders and other educational policymakers, and service designers.

The article is organised as follows: The first section outlines the theoretical framework and the next provides a short background of the subject. This is followed by a presentation of relevant previous research on the issue. After presenting the methods and findings, a discussion divided into two parts follows, before the conclusion of the paper.

## Previous research on school buildings as workplaces for teachers and pupils

How the school's physical environment affects users and influences teaching and learning has, in recent years, received increased attention in the Nordic countries (Björklid, 2005; Gitz-Johansen et al., 2001; Kirkeby, 2003; Kjeldgaard Stoltz, 2019; Meland, 2015; Ulleberg, 2006; Vinje, 2014). When designing a new school building, various factors must be considered to create an environment suited for learning. Some are well documented, such as air quality (ventilation systems), temperature, acoustics, daylight, and area per pupil (Kjeldgaard Stoltz, 2019). Gislason (2010) points out that research in this area often focuses on basic building conditions:

There have been some studies of the impact of heating, lighting and other physical factors on academic performance, but these focus on basic building attributes and do not address wider issues such as the relationship between classroom layout and educational practice. (Gislason, 2010, p. 128)

What affects pupils' learning and academic results is difficult to measure because there are so many factors that come into play. Other research confirms that it is worth investing in well-designed classrooms (RIBA [Royal Institute of British Architects], 2016). The physical framework may seem stimulating or limiting for teachers' and pupils' work at schools (Ulleberg, 2006; Zachariassen, 2004). School buildings with a good design have a significant positive influence on a pupil's school day, behaviour, dedication, well-being, and learning; "good design [...] supports good outcomes for both teachers and pupils" (RIBA, 2016). Cheryan et al. (2014) state the following:

[...] scientific evidence suggests that student learning and achievement is deeply affected by the environment in which this learning occurs. Improving student learning, achievement, and motivation requires attending to both the structural and symbolic features in the classroom. (Cheryan et al., 2014, p. 10)

The participation of those who work in schools is important in designing school buildings with practical and appropriate solutions. Based on my previous research, I conclude that a school building's design can be the result of compromises and decisions reached by the school's owners, teachers, and architects and, at the same time, originate from the experiences gained in previous construction processes and the resulting physical learning environments (Lefdal, 2016). Planning processes entail an asymmetric competence relationship between the architect and the teachers. According to Kjeldgaard Stoltz (2019), there is too little focus on function in terms of translating pedagogical and didactical visions and agendas into bricks and interior design, which may stem from a lack of academic knowledge about learning among architects.

However, teachers are among those with the most experience in the actual use of the school space. Knowledge and understanding of one another's point of view

are critical. Teachers may lack knowledge about the planning and building process or fall short when making aesthetic decisions. Professional architects or school planners may not understand users' needs. Teachers' competence levels in teaching and experiences with the practical use of school buildings are important. They have an in-depth knowledge of the school and how the building functions as a workplace. Nonetheless, teachers often claim that they have not been heard during the planning and building processes (Flisnes, 2010; Meland, 2011; Nilsen, 2009; Tessem, 2010; Vinje, 2014). Andreas Schleicher, director of the *Directorate for Education and Skills (OECD)*, has also drawn attention to users' opportunities to contribute to school building design:

When visiting schools all over the world, I've witnessed many instances of students and teachers re-arranging their physical environment – both inside and outside school buildings – to suit their learning objectives and teaching practices. In some cases, the school building and its grounds had clearly been designed to be responsive to changing user requirements. Too often, though, it was apparent that the needs of students, teachers, staff and school leaders were simply an afterthought. (Schleicher, 2018)

Decision makers often listen to architects more than lay people; with expert opinions about architecture, architects can convincingly argue for choices regarding planning, construction, and design solutions. Users can be perceived as problematic or demanding (Bye, 2008; Eikseth, 2009; Lefdal, 2016). However, “the differences between lay and expert opinions about architecture mean that it is necessary to involve ordinary users in any design process” (Woolner, 2009, p. 2).

The qualifications required for user involvement are often discounted. Participation is not a trivial activity that a user can easily handle; both experience and training are necessary (Lefdal, 2016). Woolner (2009), Dudek (2000), and Horne Martin (2002) are aware of this challenge. Dudek (2000) refers to a research project by Melanie Evans at the *University of Brighton, Department of Architecture*, in which teachers, by working with large-scale three-dimensional models to aid in their consultation, developed their abilities “to make informed comments not just about functional issues, but also on design and aesthetic criteria” (Dudek, 2000, p. 51). This experience also “assisted their own spatial knowledge, enabling them to make better use of existing classroom spaces” (Dudek, 2000, p. 51). The key here is to develop teachers' appreciation of physical settings and enable them to “play a much more central role in the process of designing a new school or classroom” (Woolner, 2009, p. 3). Horne Martin (2002) questioned teachers' awareness of their surroundings and called for “environmental awareness” in teacher training and ongoing professional development (Horne Martin, 2002). According to Gislason, “[t]he lack of research on school architecture represents a significant gap in education scholarship, because such research could help architects and educators make informed decisions about the design and use of school space” (2010, p. 127). However, school architecture is far from randomly designed, and pedagogy and school architecture must be seen in context. The

school environment can have “a direct impact on the way in which teaching and learning takes place” (Salama, 2009, p. 35). The value of a positive interaction and dialogue between architects and teachers (i.e., users) in the design of school buildings has been acknowledged in previous studies (Kirkeby, 2006; Ulleberg, 2006).

Teachers are one among several types of professionals involved in planning a school building. As employees, they should be listened to in matters relating to their own workplace. “The opportunity to have a say, to be heard and taken seriously is important for teachers [...]” (Parnell et al., 2008, p. 213). During planning processes for workplaces, it is common to distinguish between representative participation and individual involvement. The terms “indirect interaction” and “direct interaction” are also applied. The claims that teachers are not heard have led me to focus on their chances to become involved in and affect the design processes for learning environments.

In Norway, a system for user participation in the planning process is already established and intended to ensure that the user’s voice is heard. In representative interactions, employees usually have an influence through their elected representatives (NOU [Norway’s official reports], 2010, p. 1). Thus, it is relevant to question why users say or feel that they are not being listened to. The research questions for this study are as follows: *How do teachers experience user participation in a planning process for the Art and crafts studios in a new school building, and in what way do choices at the level of details affect teaching and learning conditions?*

## Presentation of the subject Art and crafts in Norwegian schools

Before presenting relevant previous research, this section highlights why it is important to focus on the room conditions for Art and crafts as a subject. Art and crafts has a broad subject structure consisting of several different traditions, each with its own history in the school system (Sømoe, 2013). The subject is divided into four main areas: design, art, architecture, and visual communication, and each area has a set of formulated goals that the pupils should achieve competence in after the 2nd, 4th, 7th, and 10th grades (Utdanningsdirektoratet, 2006). The varied content of this subject means that different spaces are needed for different activities if the expected learning is to take place. The strong tradition of handicraft education in general education is being reassessed (Pöllänen, 2009), and there has been “[a] reintroduction of the subject’s historical concepts such as quality workmanship, citizenship, and useful objects, combined with a focus of (*sic*) global awareness” (Digranes, 2009, p. 26). Art and crafts is a combined compulsory subject for all pupils in Norwegian schools. It is comprised of woodwork, ceramics; textiles; various technical skills; and the ability to use basic techniques, materials, and tools, and then transfer that knowledge into learning

more challenging skills and, eventually, apply such skills in working life or leisure. It is a subject that carries the expectation that pupils should become competent in several skills (Pöllänen, 2009). According to Lutnæs and Fallingen (2017):

The subject of Art and crafts is the primary and lower secondary school's lens for viewing the world of objects, buildings, and images – it is the general education subject concerned with visual and material culture. With 623 teaching hours [...], of which 146 hours are in lower secondary school, the subject contains practical problem solving, aesthetic experiences, relations with materials, and a critical gaze. (Lutnæs & Fallingen, 2017, p. 4) (*Author's translation*)

On the other hand, school leaders tend to prioritise theory subjects, not specialised rooms or studios, small classes, and material resources for Art and crafts (Bråten, 2017). Over the last few years, there has been a tendency in Norwegian schools to operate with large pupil groups (about 18–28 pupils) in practical-aesthetic subjects (Carlsen et al., 2018), and teaching in these subjects has become more theoretical. From a political perspective, the school authorities and policy makers are discussing a more practical approach to teaching in all subjects to increase pupil motivation, while in Art and crafts, teachers must fight to keep class numbers below 15 pupils per teacher (Utdanningsforbundet, 2012). A limitation on the number of pupils in the studios is considered essential in maintaining their safety when handling tools (Moe, 2016). Because some of the tools and machines used in Art and crafts can be dangerous (Qualley, 2005), “issues of physical security should receive the highest priority” (Broome, 2013, p. 40).

### **Previous research on Art and crafts studios in Norwegian schools**

There is not much Norwegian research-based knowledge on Art and crafts studios, and “[r]esearch related to this particular field of education is sparse” (Randers-Pehrson, 2016, p. IV). However, a summary of some relevant research findings is provided below.

Tvedt (2018) investigated the extent to which rooms for Art and crafts enable teaching in accordance with the national curriculum of the *Knowledge Promotion Reform*, an education reform introduced in 2006 in primary, lower secondary and upper secondary education and training (Utdanningsdirektoratet, 2006). This work was conducted as a literature study and a case study, which included three school visits and in-depth interviews with three teachers. The *National Curriculum for Knowledge Promotion* was analysed to determine which guidelines had been presented for the design of these types of facilities. Area and function description programmes from five municipalities were studied, in addition to floor plans from nine lower secondary schools in four of these municipalities. Tvedt's analysis of these schools and programmes showed that there is a general agreement regarding which rooms a department of Art and crafts should contain and which activities these rooms should facilitate. The schools in the study have one or more multipurpose rooms for activities such as textile work, painting, and

drawing, as well as studios for wood and metal, a machine room, and a pottery studio. The results of Tvedt's research showed that digital competence is clearly emphasised in the subject curriculum, but the access to computers in the Art and crafts departments, as well as digital competence more generally, was not given the same priority in the examined schools. This suggests that the design of the area is mostly based on traditions, rather than guidelines from the curriculum. Paradoxically, it is common to refer to current curricula when designing new schools. This is intended to address future educational changes and, possibly, new methods. Tvedt (2018) showed that the curriculum adds few guidelines concerning which practical activities are to be facilitated. According to Tvedt, this lack of specific guidelines provides freedom when designing the Art and crafts studios. School owners may take the opportunity to limit studio area to a minimum, which can ultimately have a negative impact on pupils' practical aesthetic training. The school visits showed that the Art and crafts teachers face various challenges in using these learning areas regarding the size of the rooms, storage space, and noise. The teachers in Tvedt's study stated that they felt they had not been heard in the planning process and, hence, the area became less functional (Tvedt, 2018).

Maapalo's (2017) study deals with Art and crafts teaching and learning in Norwegian primary schools in three counties, Nordland, Nord-Trøndelag, and Sør-Trøndelag, and focuses primarily on woodworking. The data generation consisted of observation, semi-structured interviews, photo documentation, and video and audio recordings. Maapalo uses a large survey and a micro-ethnographic study in eight selected primary schools. The study identifies five human and non-human factors that either enable or constrain woodworking practices in Norwegian primary schools: *competence, studios and materials, integrity, pupils' involvement and teachers' dedication in interaction, and tradition*. According to Maapalo, these five factors can affect whether a useful woodworking studio is available at all in a school. The *studios and materials* factor reveals major differences between the selected schools. For woodworking studios to serve pupils well in their work and achieve successful outcomes, the quality of interaction between users (humans) and tools, equipment, and materials (non-human) is crucial. Maapalo (2017) also assumes that the studios and materials factor is engaged in a self-supporting interaction with teacher competence.

Hansen (2015) points out the poor framework conditions of the specialised learning areas or studios for Art and crafts in elementary schools, as well as the challenges in teaching in various disciplines and material areas. In her interviews with head teachers and management, she found that the majority think that the state of the studios can be crucial in attaining high-quality teaching. Hansen's case study is consistent with a comparative study conducted between two schools (Holthe et al., 2013). Holthe and colleagues discussed how the framework factors affect the quality of training in practical-aesthetic subjects. In elementary schools, these are Art and crafts, Food and Health, Physical Education, and Music. They

found a lack of specialised rooms or studios for Music and for Art and crafts to be a limiting factor for curriculum implementation. A lack of specialised rooms limits learning activities in these subjects (Holthe et al., 2013, p. 17).

Lastly, regarding *user participation* in Norwegian Art and crafts studios, I mention Underthun (2002), who focused on aesthetic and functional aspects of such studios in four (at that time) newly built schools. Underthun concludes, “[t]he sad fact of my research is that teachers in Art and crafts have not participated in the planning of the Art and crafts studios at any of the schools” (p. 102) (*Author’s translation*). She mentions that the school’s principals were involved in planning or decorating the schools and “[e]verything was decided by the Oslo municipality and the equipment was purchased in advance” (p. 102) (*Author’s translation*). Only in one of the four schools in Underthun’s survey did the Art and crafts teachers participate in the purchasing of equipment for the studios in their department.

## Methods

I have studied users’ participation in the planning process for physical learning areas for Art and crafts in one combined primary and lower secondary school in Norway<sup>1</sup>. This school’s older buildings were demolished, and contemporary buildings were built. Several spacious and traditional studios for Art and crafts were replaced with fewer studios, and these were distributed in smaller areas with open and flexible solutions.

The main data were collected by interviewing four Art and crafts teachers at this school. The interviews were conducted in the teachers’ working environment, i.e., in the studios after class. The interviews were audio recorded and transcribed and ranged in duration from ca. 35 to 60 minutes.

**Table 1.** Informants: Teachers 1 to 4.

<i>Informants</i>	<b>Age</b>	<b>Gender</b>	<b>Relevant education</b>	<b>Representative</b>
<i>Teacher 1</i>	68	Female	Subject teacher training programme in Art and Craft (3 years) Special education (1 year)	Head of Section
<i>Teacher 2</i>	39	Female	BA Art and crafts (3 years)	
<i>Teacher 3</i>	60	Female	BA Art and Craft (3 years) Practical teacher training (1 year)	
<i>Teacher 4</i>	43	Female	MA in Art (5 years) Practical teacher training (1 year) Trade certificate in Goldsmith/Jewellery Craft	Employee safety representative

<sup>1</sup> For the sake of anonymity, the school’s name and location are not mentioned.



Because all four informants had experiences from both the old and the new school building, this school was an ideal case for studying users' opportunities to participate in the planning process for a new school. Two of the Art and crafts teachers (1 and 4) I interviewed were actively involved in a user group as representatives of their subjects during the planning of the new school building. The other two teachers (2 and 3) could provide input and express their wishes during the internal section meetings. It was up to the user representatives to convey these contributions in the user meetings.

A semi-structured interview guide was used to obtain equal and systematic information. This guide contained open questions about competence and experience, user participation, the qualities of the classrooms and studios, and so on. The first section of the guide contained questions about participation in the planning process for the new school, as well as about participation in user groups, when users participated, and how this happened. Questions were also asked about the use of the studios, what it is like to keep order, and what systems are used for storing materials and pupils' work. The informants were also asked about how they think the rooms should be designed to provide a good framework for teaching and learning in Art and crafts. One follow-up question was, for example, whether the informants could say that their own inputs were considered. The interviews were analysed by conducting a thematic analysis, mainly built on what the informants mentioned as problematic factors in the studios. After reading the transcripts several times, colour codes were used for statements related to different themes. I identified passages in the interviews that dealt with current challenges related to the physical learning environment. I ultimately chose four themes, or *physical factors*, which seemed to be particularly challenging for teaching and learning in Art and crafts: *Furniture*, *Automatic sensor taps*, *Vacuum sawdust collection solution*, and *Storage space*.

The empirical data also include visual materials, such as photos and architectural drawings of the new school buildings and a few photos and architectural drawings of the old school. I conducted digital searches, collected pictures and drawings, and visited the new school twice. During the school visits, I used my mobile phone for photography. Some materials were emailed to me by the school's contact person in the current municipality. The visual materials have given me a better understanding of how the areas in the building are organised. These have also given me an overview of the spatial and practical conditions of the old and the new school buildings.

Through this study, I have obtained some teachers' statements about how they experienced being heard in the process of designing and furnishing studios for Art and crafts. I have no reason to claim that these represent current trends in general. The findings do not necessarily provide a general picture of teaching and learning in this subject, but they do contribute to the knowledge about a less-explored field and may provide a basis for further studies.

## Results

The following section begins by presenting teachers' experiences of participation in the planning process. Participation in this case is about *when* in the process they could provide input, whether the teachers were *listened to*, and the fact that the teachers *faced a dilemma* and *chose to compromise*. Next, four factors identified from the interviews will be presented. These factors represent examples of what can be of importance for teaching and learning in the subject of Art and crafts.

### **Teachers' experience of participation in the planning process**

To the question regarding *when* in the planning process they attended the user meetings and how they participated in planning the new building, the teachers responded as follows:

Not very much. We participated in the very beginning to see what kinds of studios and classrooms we needed. We conveyed that we would like to have a preparation room and [...] a large enough textile studio so that we [could have] enough space for 15 sewing machines. [We communicated that] we would like to have a studio for woodwork with enough space for 15 carpenter workbenches too... and [...] a separate studio for clay work. None of the rooms were ultimately as large as we requested. (Teacher 1) (*Author's translation*)

[...] I experienced that we could participate in the [process] relatively early on, so we had some impact. And so, we followed up [...] every time new architectural drawings came in. And [we] gave some input, but [...] I can only remember that we participated in one proper meeting. (Teacher 4) (*Author's translation*)

As I understand it, two teachers participated as user representatives in *one* meeting early in the planning process. They experienced only some involvement, not all their specific wishes, or what they felt was needed, regarding the Art and crafts studios, were approved. Teacher 4 added that, during the process, they were presented with new floor plans, which they followed up and gave their input on. As Teacher 4 perceived the situation, most of the dialogue was with the architect, who was responsive and noted some of their suggestions regarding how they wanted to organise the studios.

Regarding whether the teachers' inputs had been considered and brought forward, Teacher 2 confirmed that *some* of their contributions were taken into consideration and that they had been listened to in some areas. More specifically, to avoid teaching in large classes, the teachers had deliberately proposed a structure based on several small rooms, instead of fewer and larger rooms. As Teacher 3 expressed the situation, "So, we have been a bit smart and made sure that the size of the studios accommodates only 15 [pupils]" (*Author's translation*). Teacher 4 also highlighted the size of the classrooms:

[...] some of our inputs have been considered. Yes, for example, we had our opinion on the size of the classrooms. We wanted to have rather small classrooms or studios to avoid too large pupil groups in the studios. [We consider this as an opportunity] to keep

smaller pupil groups because we believe this is important when teaching a practical subject. We feel we got this through. (Teacher 4) (*Author's translation*)

All four teachers clearly stated that none of the rooms had the size that they really wanted. They said that the studios were narrow and had too little space as compared with the previous area. "It was a lot easier before; we had several studios [...] and enough space to store both equipment and tools [...] and pupils' works. We hardly have [any] room for all these now" (Teacher 3) (*Author's translation*).

As shown above, the teachers have been compromising regarding what they really wanted and made a strategic choice to avoid a solution that they perceived as negative. This means that the total area for the Art and crafts studios was reduced to about half the size of what they had in the old school building. The teachers I interviewed appreciated the opportunity to teach a reduced number of pupils when the classes were divided in two, with each being taught by one teacher.

### **How choices at the level of details affect learning conditions**

Four factors from the interviews indicate that choices at the level of details in the planning process can be important for teaching and learning in Art and crafts. In the following, the four factors *Furniture*, *Automatic sensor taps*, *Vacuum sawdust collection system*, and *Storage space* are presented.

#### ***Furniture that meets user needs***

An interior plan is often used when ordering furniture for a school building, and several clarifications must be made before the final order. However, it is important that the quality of classroom and studio furniture meets user needs. Furniture and interior solutions acquired for use in the Art and crafts studios should also be more robust than furniture in ordinary classrooms. This is because teaching and learning in this subject requires more activity and varied use with different craft materials and tools. Low-cost purchases can quickly prove to be expensive if repairs and replacements are needed within a short period. Furniture and fixture costs must therefore be perceived in relation to their expected lifespans (i.e., the costs of acquisition and maintenance over time). Many choices are about what is good enough. After years of teaching in the subject Art and crafts, the teachers know the appropriate qualities for the furniture. They also have clear opinions about the interiors of the studios, how much space is needed, and where there is a need for electrical outlets.

Teacher 4 pointed out that the teachers "came with quite detailed input, and not everything had been followed, but some". The quality of the selected furniture (the desks) was a critical point:

[...] these desks [...] were brand new in August; now, it looks like they've been here some years already. Yes, and the surface treatment is not as good as it was on the desks we used to have. It's a bit like... not [built] thoughtfully enough [...] and [of] poor quality

compared to what we used to work on. It [Art and crafts] requires good materials.  
(Teacher 2) (*Author's translation*)

The preceding statements show the teachers' knowledge of detailed needs. They know that furniture intended for Art and crafts studios should be made of solid materials. When asked to what extent they were involved in choosing the furniture, Teacher 2 answered, "No, we had nothing really; we had [...] a catalogue [...] and then you have to choose from it. It was quite limited) (*Author's translation*). Teacher 3 admitted having no experience in evaluating interior solutions, preferring "to look at, feel, and test" the furniture before making a choice. She confirmed that it was difficult to choose the right furniture based on pictures in a brochure. Teacher 4 pointed out the deplorable materials used in the furniture: "Rickety and already broken, and we have been here only for almost half a year [...], overwhelmingly bad surfaces on the tables in the drawing studio and in the textile studio, for example" (*Author's translation*). She claimed that there really was no real user involvement here. These tables were the ones that were delivered, and she added that, as the school's safety representative, she was involved in choosing chairs. "And then we could choose between... only *the colours* really! There were basically no choices, so the user involvement in the process has not been authentic or real" (Teacher 4) (*Author's translation*).

### ***Automatic sensor taps***

In a studio for Art and crafts, ordinary water taps are preferable in order to have a flow of water when brushes and other items are being washed. When the informants were asked about their opinions on why some of their inputs were not considered, Teacher 4 assumed that it was for practical and economic reasons. "For example, sinks with automatic sensor taps have been selected [...], which is a disaster for us" (Teacher 4) (*Author's translation*). She also claimed that this was something that everyone who used a sink in an Art and crafts studio would understand. As mentioned by all four teachers, the selection of sensor taps was considered entirely inappropriate for Art and crafts studios. Sensor taps had been chosen throughout the entire school, and the teachers pointed out that these were neither cheaper nor more convenient. They believed that the underlying reasons for this choice may be procurement schemes and the advantage of clinching good deals.

Many municipalities make agreements with one or more suppliers of furniture and fixtures. The advantage is that they can make concrete choices regarding the types of fixtures needed at an early stage. One drawback of this situation is that buyers largely make choices from the product range offered by the suppliers and buy in a large volume to secure good price agreements. Partial deliveries may cause increased prices (Risstad, n.d.). Teacher 4 mentioned, "[...] the thought behind the selection of sensor taps is certainly that they (the school owners) think it will save water and heat and [...] be more environmentally friendly, more energy saving" (*Author's translation*). At the same time, Teacher 4 said that this was not

the case, because, in practice, pupils will use more water; it will take time to rinse brushes and wash the equipment well enough. Teacher 3 points out that the teachers really wanted larger and longer sinks and regular taps: “[...] you can imagine standing there to rinse equipment; you get mad (laughs) [...] because the water goes on and off all the time, right? As you stand there with the paint brushes, [...] it turns off after a certain amount of time... automatically, even if you hold them under the taps” (*Author’s translation*). When asked if washing brushes took more time now, Teacher 3 answered, “It does, and [...] you can imagine, 15 pupils washing paint brushes and other equipment. We had sinks twice as big in the old school, and we could use a room next door” (*Author’s translation*). Teacher 1 agreed that washing took more time now:

Washing a paint brush under a sensor tap is almost impossible [...] – pupils do not think they can do anything else while the others are washing their brushes and palettes. They just stand in the queue [at the sink]! And then, we spend disproportionately more time on cleaning [...] now than before. (*Author’s translation*)

The necessity of additional time for cleaning would, of course, mean less time for teaching and learning – doing practical work in Art and crafts. Thus, it is reasonable to think that the wrong choice regarding an apparently insignificant thing such as sensor taps can have a direct impact on the amount of learning in the subject.

### ***Vacuum sawdust collection system***

In the new school building, the craft benches are placed in groups of four in the Art and crafts studios, unlike before, when they were placed one after another in rows. *Why* there has been a change in furnishing practice in this regard has not been researched in this study. Maybe, it is technically more convenient to arrange the craft benches in groups of four, with hoses and arrangements hanging from the ceiling located above each group? The sawdust collection system installed in the new school’s woodworking studios is referred to by Teacher 2 as “another time thief”. It is “clumsier” to use than their previous system:

Now, we somehow must take a long flexible hose and put [it] together here and there [...] so to ask them [the pupils] to... somehow to connect the pipes, and such things means that it can quickly become confusing and ineffective [...]. And this will simply reduce the teaching time because you need to spend more time cleaning, instead of being able to use it on practical work. (Teacher 2) (*Author’s translation*)

Also, Teacher 4 mentioned some challenges with the dust collection system in the woodworking studio. She believes that the system works badly and states that it has become more difficult to teach the pupils how to keep the studio clean. Here, it must be mentioned that it is important to choose a sawdust collection system of good quality. For example, it should be able to remove very fine dust at a low power, and it should make little noise. This is something subject teachers have in-depth experience with. Teacher 2 emphasised the importance of listening to those

who teach the subject and have long experience with how everything works in the studios.

### ***Storage spaces***

All the teachers I interviewed worried about storage spaces. Because the storage space in the case school was generally too small and narrow (i.e., not well planned), the teachers were upset about carrying boxes containing all sorts of items (Teacher 1). They had challenges in storing the pupils' work and confirmed the space problem's negative consequences in other ways. For example, they needed to adjust the tasks assigned to the classes. One limitation that was mentioned was the size of Art and crafts work. "In ceramics, whereas the 10<sup>th</sup> grade used to design and produce utility objects or items that met an area of usage, we now have to say, 'No [...], it will be too large because we do not have enough space', even though the idea might be good! We must limit a lot" (Teacher 2) (*Author's translation*). She added, "Good ideas are somehow [being] hushed; we do that a lot because of the shortage of space" (*Author's translation*). Teacher 3 pointed out that one of the challenges was insufficient space for custom-functional storage furniture. "Yes, you can see [...] in here, there is no place to keep the pupils' works... and here, we have got [...] such drawers, but [these are] only [for] two classes" (Teacher 3) (*Author's translation*). Because of the size of the drawers, the portfolios could only be in size A4, and the teachers may need to roll the A3 sheets. The teacher showed me a rack for storing sheets, explaining that it could hardly handle anything because the shelves would break or bend at the bottom if the weight became too heavy.

## **Discussion**

### **Involving employees in designing their workplaces**

It is a democratic principle that, regardless of competence, everyone affected by a development has the right and an opportunity to participate in that development. Authorities and other public officials, as well as private organisations and institutions affected by some proposals, will be given an opportunity to express their views through hearings (Plan- og bygningsloven, 2008, § 5-2). In this case, the Art and crafts teachers came with quite detailed input about the quality requirements for the furniture to be used in the school studios, but as one of the teachers in my study pointed out, there was almost no selection of furniture to choose from, so the users' involvement in the process has not been authentic or real. The teachers interviewed in this case know that furniture for Art and crafts studios should be made of solid materials. They could perhaps have been asked what is needed before restrictions were made on the relevant selection. Jensen et al. (2011) point out that the resulting briefing documents should contain the client's requirements for the building design. The challenge is often *how* the users are

involved, and *when* in the process. Time pressure is a typical factor that can influence the choices:

Users are mainly involved as data sources, for instance via interviews and meetings with the experts. According to Nutt (1993), the nature and pace of change has challenged the simple basis of the traditional brief and exposed the limitations in the logic of its process. The future needs cannot be forecasted with confidence, hence the need for a dynamic process. (Jensen et al., 2011, p. 7)

Collaboration and a positive attitude towards user involvement are decisive. The practice of involving employees in designing their own workplace has occasionally been used by architects since the 1970s (Fröst, 2004, p. 16). The understanding of the user's knowledge has also increased. "Engaging the users was seen as a way to create a better final result, a better building and work environment" (Fröst, 2004, p. 16) (*Author's translation*). According to Underthun (2002), it is important that school builders are made aware of the consequences of poor or no user participation. If the planner does not follow up on important inputs from users, this may later reveal weaknesses that can lead to additional costs for reconstruction or replacements. This may soon be the case with the desks that were brand new in August, and are now, according to Teacher 4, looking like they have already been used for a few years. Poor quality does not suit rooms for Art and crafts, where the furniture should preferably withstand practical work. There may be additional charges if the furniture must be replaced earlier than planned or the builder receives complaints from teachers who are frustrated with equipment and devices that do not work. The goal must be to avoid unsuitable conditions in new school buildings, which are often intended to be used for several decades.

Myrdal (2005), who focuses on universal design and accessibility, assumes that architects and planners can be held responsible for usability weaknesses. On the other hand, as outlined by Byers and Lippman, "there is limited evidence to support the idea that making physical changes to classrooms boosts learning outcomes. The reason for this is [that] schools are complex places" (Byers & Lippman, 2018). The four factors presented above indicate that physical details in the studios, which are best known by the users, *may* have an impact on teaching and learning in Art and crafts. The main reason for saying this is that my findings show that the users' specific suggestions on minor changes of the environment can ensure that the pupils spend more of their time in class on practical work and learning, and less time on cleaning up. Minor changes, such as larger cabinets and more storage options for pupils' work in larger formats, could also have a positive impact on teaching and learning in the subject. Nevertheless, it is difficult to say exactly what effect the environment can have on learning outcomes in schools because many variables must be considered in such research, such as temperature, ventilation, lighting, air quality, noise, colour, and build quality (Woolner et al., 2007b).

Sanoff (2002) argues that the various users involved in a school should be engaged in the process of building a new school. He argues that, throughout the process, stakeholders can design and build more efficient and functional schools by involving teachers, students, parents, and school leaders in collaboration with architects. The goal is to achieve comprehensive teamwork involving individuals with different skills and perspectives that are as valid as those of architects and engineers. According to Sanoff, involving the users of a school facility in the design process is an effective way of gathering information and can contribute to more thoughtful decisions. Accepting the value of users' contributions to design solutions can have positive effects. For example, the teachers become more aware of how the school facility can maintain educational goals.

I want to highlight the value of users' expertise and experience-based competence levels, as well as that it is necessary to address the level of details to understand the potential consequences of not listening to teachers' input. I believe that incorrect choices at the level of details (e.g., in selecting appropriate equipment and poor decision-making relating to space) can affect pupils' learning outcomes in the Art and crafts subject. Similar issues may affect other practical subjects. Haug (2010) comments, in his study concerning how school activities vary with time and subjects, that Art and crafts is among the subjects "with [the] most working tasks" (p. 34); it is not a prominent "listening-discipline" (p. 35). It takes time to start and finish lessons, which can lead to academic activity for only about half of the session (Haug, 2010) (*Author's translation*). This is why sessions that start and end efficiently, e.g., with well-organised clean-ups, are crucial for pupils' learning in the subject. Regarding the criterion "well organised", sufficient space and good storage conditions are both of great importance. In a literature review, Woolner et al. (2007b) "looked at the evidence of the impact of environments on learning in schools" (p. 47). Under the heading *Display and storage*, they refer to Loughlin and Suina (1982), who:

[...] discussed how the storage and arrangement of materials may be ignored, but argued that the methods used affect how, and whether, items get used and are returned afterwards. There is some empirical evidence to suggest that accessible, well-thought-out storage leads to more time spent learning. (Cited in Woolner et al., 2007b, p. 60)

From my empirical data, it appears that all the interviewed teachers were concerned about storage spaces in the case school. As mentioned above, the storage space was generally too small and narrow, which may mean that, at this point, it was not planned well enough. The fact that the teachers had to change the tasks in the subject due to a lack of storage space is not ideal.

On the other hand, it can be questioned whether the teachers' strategic choices to ensure fewer students in the class have played a role here. As mentioned before, the total area for the Art and crafts studios was reduced to about half the size of what had been in the old school building. Rather, it indicates that the new school



building is a result of area optimisation and strict spatial planning, and not planned with enough space for storage in the first place.

Another point, which has not been emphasised earlier in this article, is that in school buildings like this new one, with extensive use of internal glass walls, there is not much wall space left in the classrooms or studios for rows of material and tool cabinets. The glass walls should preferably not be covered. Teacher 1 explained that: “The principal made it clear that it’s not allowed”, and Teacher 3 said: “[...] it should be transparent, that was kind of just decided. And as you can see, throughout the building you have a visual view into all rooms. And that’s how it should be here” (*Author’s translations*). The teachers are not quite sure why, but having an overview, and that students must learn to relate to each other, is mentioned (Teachers 1 and 3). Furthermore, the back of the tool cabinets visible from the corridors through the glass walls, does not create a pleasant indoor school environment (Lefdal, 2016).

Overall, user participation can help improve the learning environment or create a more positive learning community. Regarding school buildings, it is important to place user-based innovative processes at the centre of the design of the physical learning environment in tomorrow’s schools (Kuuskorpi & González, 2011). The expertise of the teachers and students – the primary users of the building – combined with the designer’s knowledge of how to shape their educational wishes into a building form, helps create a successful design and foster a positive school community spirit (Sanoff, 2002, p. 115). In the early 1970s, Holst (1971) wrote about the importance of consulting educators and teachers who would be able to formulate and express their wishes and needs to school owners and architects in an unambiguous way. Regarding user involvement, Lefdal (2016) emphasises the importance of “having [the] language” to present legitimate arguments about the design of school facilities.

### **Design competence and consultants in the school building arena**

The teachers in this case have provided some clear demands regarding Art and crafts studios through representative participation. In addition, they are teachers with design-based skills and experience in assessing both aesthetic quality and product functionality. They knew the challenges of choosing furniture using only pictures in a catalogue, but they were given no other choice (Teachers 2 and 3). In addition to being a part of the teaching profession, Art and crafts teachers have some expertise in design, so in this case, they are not regular “lay people”.

Nielsen and Digranes (2007) state in their study on design education for the general public: “Lay people are often involved in decisions concerning solutions, buildings and development, and often they lack the necessary design knowledge to understand the consequences” (p. 1). In this context, Nielsen and Digranes mean that a strengthened design education for the general public can enable users in general to make more qualified choices in several areas, such as design, function, and quality. “The users should be actively involved, for instance in

commenting on design solutions, and the involvement of the users is particularly crucial in building projects that are part of a corporate change process like [...] ways of working” (Jensen et al., 2011). Manzini (2015) and Kjeldgaard Stoltz (2019), found it valuable to promote the methods and mindset of design-thinking. Manzini advocates collaboration and a closer relationship between two types of design: *diffuse design* (design by non-experts) and *expert design*. Kjeldgaard Stoltz suggests letting “design-thinking methodology be the guiding principle of the types of learning spaces needed” (Kjeldgaard Stoltz, 2019, p. 7). Nielsen and Digranes (2007) suggest that “[u]sing a ‘design consultant’ to speak for the user interests will strengthen the users’ possibility to be heard” (p. 3):

Another strategy for users is to involve an objective ‘design consultant’ in a design process. The consultant would have to be qualified in design, education and communication, and have a capacity for involvement in the interests of either the user, or both the user and the designer. A solution of this kind would probably increase the costs, but misunderstandings or conflicts between the involved parties could be avoided. (Nielsen & Digranes, 2007, p. 2)

Nielsen and Digranes’ (2007) suggestion of involving a “design consultant” in the process is supported by SINTEF Byggforsk, which proposes that *an external consultant* can organise discussions in user groups and collect and systematise the results in a report (Buvik et al., 2014).

Regarding school buildings, in my opinion, it cannot be the user’s responsibility to consult with a design adviser or a facilitator in the planning process. If those who make the decisions are not trained to assess the quality of products or built environments, they should bring in those with these skills or enhance their own capacities. In the case studied here, this is not necessary since the teachers already have some competence in the subject area without being professionals in the field of interior or architecture. Anyway, the results show that they don’t experience their inputs being sufficiently considered.

Service design is defined as a “user-oriented, collaborative and experimental method that can help develop better solutions” (Design and Architecture Norway [DOGA], 2017). Loeng and Fyhn (2021) point out that the user-participation facilitators involved in the translation of users’ needs are mostly interested in users’ requirements and perspectives. I believe this is important because “a central barrier to improved user participation is a perception barrier: construction companies, architects, leadership, employees, and others operate with different senses of direction and purpose [...]” (Loeng & Fyhn, 2021, p. 19–20).

Inviting *service designers* to operate as facilitators and thus bridge the gap between the municipality’s or the county’s project management, head teachers, architects, and the users, can be a good solution in most cases. Especially important if the users have no expertise in the field of interior, design and architecture. Loeng and Fyhn point out that inspiration can be drawn from the discipline of service design:

Inspired by service design and over time experience from the construction industry, facilitators have an increasing repertoire of tools and procedures to explore users' needs in future buildings and spaces, and expertise to translate them into feasible solutions. (Loeng & Fyhn, 2021, p. 13) (*Author's translation*)

Facilitation may be useful in creating and maintaining interactions and dialogue during the design process and should be included in the project costs. Facilitation can change the balance of power among those involved. Taylor (2010) asks what architects can do to support education and how educators could contribute to the design processes. In this intersection, a design imbalance will easily arise, one that is to the users'/teachers' disadvantage. The question is who has the professional language to articulate lasting arguments about designing physical learning environments.

Parnell et al. (2008) point out that “[t]he opportunities that arise from involving stakeholders in the design process, were seen to facilitate better dialogue between the school and architect. [...] Additionally, architects and designers could find it a rewarding experience” (Parnell et al., 2008, p. 215). Thus, participation can be educational for all involved. The architect's basic attitude, insight, and expertise are very important in how usable the school becomes. The municipality's or county's project management, as well as their expertise, is also crucial. A positive attitude and willingness to cooperate determines whether the project can exploit the resources of broadly based participation (Myrdal, 2005, p. 22). Taylor (2010) observes that both architects and teachers will benefit from expanding their understanding of one another's fields of study. A change in attitude and an increased awareness of collaboration may be necessary to find solutions for physical learning environments that work effectively for users. A basic competence in design and planning processes for physical environments can help increase the public's ability to understand and have a clear voice in decision-making processes.

## Summary and conclusions

This article attempts to provide a deeper understanding of how teachers experience user participation in a design process, as well as how choices at the level of details can affect teaching and learning conditions.

This study was limited to Art and crafts studios in primary and lower secondary school, but the potential solutions regarding better user participation could be relevant to other contexts. I have studied user participation in the planning process for the physical learning environments for Art and crafts in *one* school in Norway. Nevertheless, my findings do align with previous research in the field. My intention is to contribute to the knowledge about a less explored field, the design of Art and crafts studios in Norwegian schools. Choices at the level of details influence both the working conditions of teachers and pupils' learning in Art and crafts.

This may also be more generally relevant. Further studies are required, for example, with several schools participating and perhaps focusing on more than one subject. The potential of designing Art and crafts studios for the future that work well for users can be optimally exploited through a change in attitudes towards involvement in design, specifically an assessed, systematic and creative process focusing on the users, involving both teachers and pupils. I suggest further development and the use of methods and tools to systematically retrieve users' experiences and skillsets. The overarching goal should be to get the best possible solutions for daily users, down to the level of details.

## About the author

Else Margrethe Lefdal is an associate professor in art and design education at OsloMet – Oslo Metropolitan University. Her research interests include school buildings, physical learning environments, user participation, universal design, and specialised learning areas for Art and crafts.

Institutional affiliation: Department of Art, Design and Drama, Faculty of Technology, Art and Design, OsloMet – Oslo Metropolitan University, P.O. Box 4, St. Olavs plass, 0130 Oslo, Norway.

E-mail: [lefe@oslomet.no](mailto:lefe@oslomet.no)

## References

- Arge, K. (2008). *Tverrfaglighet og fagkompetanse i prosjekters tidlige fase* [Interdisciplinarity and professional expertise in projects' early phase]. Prosjektrapport 28, SINTEF Byggforsk.  
<https://www.ntnu.no/documents/1261860271/1262021752/Tverrfaglighet+og+fagkompetanse+i+prosjekters+tidlige+fase.pdf/2b2cc50e-ff28-4bd1-a614-2f7b1b2fc34e?t=1684245245982>
- Björklid, P. (2005). *Lärande och fysisk miljö: En kunskapsöversikt om samspelet mellan lärande och fysisk miljö i förskola och skola* [Learning and physical environment: An overview of current knowledge about the interaction between learning and physical environment in preschool and school]. Myndigheten för skolutveckling: Forskning i fokus, nr. 25. <https://byggaskola.se/wp-content/uploads/2022/05/La%CC%88rande-och-fysisk-miljo%CC%88.pdf>
- Broome, J. L. (2013). A case study in classroom management and school involvement: Designing an art room for effective learning. *Art Education*, 66(3), 39–46.  
<https://doi.org/10.1080/00043125.2013.11519222>
- Bråten, I. (2017). Ikke del faget mitt, Røe Isaksen [Don't split my subject, Røe Isaksen]. *Bergens Tidende*, 2 April 2017. <https://www.bt.no/btmeninger/debatt/i/mobW0/ikke-del-faget-mitt-Roe-Isaksen>
- Buvik, K., Cold, B., Høyland, K., & Ulleberg, H. P. (2014). *Internevaluering av skoleanlegg. Fokus på funksjonelle og estetiske sider* [Internal evaluation of school buildings. Focus on

- functional and aesthetic aspects]. SINTEF Fag 14. SINTEF akademisk forlag.  
[https://www.sintefbok.no/book/index/977/internevaluering\\_av\\_skoleanlegg](https://www.sintefbok.no/book/index/977/internevaluering_av_skoleanlegg)
- Bye, R. (2008). *Lærende bygninger – nøkkelferdige brukere?: Bruk, brukervedvirkning og energieffektivisering i yrkesbygg* [Learning buildings – turnkey users? Use, user participation and energy efficiency in non-residential buildings]. Doctoral dissertation, NTNU. [https://ntnuopen.ntnu.no/ntnu-xmlui/bitstream/handle/11250/244079/124098\\_FULLTEXT01.pdf](https://ntnuopen.ntnu.no/ntnu-xmlui/bitstream/handle/11250/244079/124098_FULLTEXT01.pdf)
- Byers, T., & Lippman, P. C. (2018). Classroom design should follow evidence, not architectural fads. *The Conversation*, 7 February 2018.  
<http://theconversation.com/classroom-design-should-follow-evidence-not-architectural-fads-89861>
- Carlsen, K., Randers-Pehrson, A., & Hermansen, H. (2018). Design, kunst og håndverk i Norge [Design, art and craft in Norway]. *Techne Serien – Forskning i sløjdpedagogik och sløjdvitenskap*, 25(3), 58–73.  
<https://journals.hioa.no/index.php/techneA/article/view/3028>
- Cheryan, S., Ziegler, S. A., Plaut, V. C., & Meltzoff, A. N. (2014). Designing classrooms to maximize student achievement. *Policy Insights from the Behavioral and Brain Sciences*, 1(1), 4–12. <https://doi.org/10.1177/2372732214548677>
- Cronberg, T. (1976). *Brukaren: Utgångspunkten för byggnadens utformning: Utveckling av en metod* [The user: The starting point for the building design: Development of a method]. Stockholm: Statens råd för byggnadsforskning.
- Design and Architecture Norway [DOGA] (2017). *Bergen design morning: Dare to experiment*. Announcement, 27 September, 2017. <https://doga.no/kalender/designfrokost-i-bergen/>
- Digranes, I. (2009). The Norwegian school subject Art and crafts – Tradition and contemporary debate. *FormAkademisk*, 2(2), 26–36.  
<https://doi.org/10.7577/formakademisk.83>
- Dudek, M. (2000). *Architecture of schools. The new learning environments*. Architectural Press, Taylor & Francis Group. <https://doi.org/10.4324/9780080499291>
- Eikseth, B. G. (2009). Mesterlæremodellen: Til hinder for utvikling av arkitekters kommunikasjonskompetanse? [The apprenticeship model: An obstacle to the development of architects' communication skills?] *FormAkademisk*, 2(1), 49–59.  
<https://doi.org/10.7577/formakademisk.60>
- Flisnes, T. (2010). Skinndemokratiske praktbygg [Semi-democratic magnificent buildings]. *Adresseavisen*, 27 October, p. 31.  
<https://www.adressa.no/midtnorskdebatt/i/JEegmJ/skinndemokratiske-praktbygg>
- Fröst, P. (2004). *Designdialoger i tidiga skeden: arbetssätt och verktyg för kundengagerad arbetsplatsutformning* [Design Dialogues in Early Phases of Building Projects: methods and tools for customer engaged workplace design]. Doctoral dissertation, Chalmers University of Technology.  
<https://publications.lib.chalmers.se/records/fulltext/61662/61662.pdf>
- Gislason, N. (2010). Architectural design and the learning environment: A framework for school design research. *Learning Environments Research*, 13(2), 127–145.  
<https://doi.org/10.1007/s10984-010-9071-x>
- Gitz-Johansen, T., Kampmann, J., & Kirkeby, I. M. (2001). *Samspel mellem børn og skolens fysiske ramme* [Interaction between children and the school's physical environment]. Rum Form Funktion.  
[https://www.academia.edu/1025764/Samspil\\_mellem\\_b%C3%B8rn\\_og\\_skolens\\_fysiske\\_ramme](https://www.academia.edu/1025764/Samspil_mellem_b%C3%B8rn_og_skolens_fysiske_ramme)

- Hansen, B. H. (2015). *Trearbeid og treverksteder i grunnskolen: Skolelederes verdsetting og prioritering sett opp mot tradisjon og fornyelse i faget Kunst og håndverk* [Woodworking and workshops for wood in compulsory school: School leaders' appreciation and prioritisation compared to tradition and renewal in the subject Art and Crafts]. Master thesis, Oslo and Akershus University College. <https://oda.oslomet.no/oda-xmlui/handle/10642/2712>
- Haug, P. (2010). I klasserommet [In the classroom]. *Bedre skole*, 3, 32–36. <http://www.utdanningsnytt.no/files/2019/08/22/Bedre%20Skole%203%202010.pdf>
- Holst, N. (1971). *Om skolebyggeri og skoleindretning: Nogle pædagogiske problemer og muligheder ved nybyggeri og modernisering af folkeskoler* [About school construction and school interior design: Some pedagogical issues and opportunities in new construction and modernisation of primary schools]. Copenhagen: Gyldendal educational library.
- Holthe, A., Hallås, O., Styve, E. T., & Vindenes, N. (2013). Rammefaktorenes betydning for opplæringen i de praktisk-estetiske fagene – en casestudie [The significance of the framework factors for training in the practical-aesthetic subjects – A case study]. *Acta Didactica Norge*, 7(1), Art. 13. <https://www.journals.uio.no/index.php/adno/article/view/1118>
- Horne Martin, S. (2002). The classroom environment and its effects on the practice of teachers. *Journal of Environmental Psychology*, 22(1–2), 139–156. <https://doi.org/10.1006/jevp.2001.0239>
- Jensen, P. A., Alexander, K., & Fronczek-Munter, A. (2011). Towards an agenda for user oriented research in the built environment. In *6. Nordic Conference on Construction Economics and Organisation: Shaping the Construction/Society Nexus* (Vol. Executive Summaries – full paper in electronic proceedings, pp. 55–56). Danish Building Research Institute, Aalborg University. <https://backend.orbit.dtu.dk/ws/portalfiles/portal/5697015/Towards+an+agenda+for+user+oriented+research.pdf>
- Kernohan, D., Joiner, D., Daish, J., & Gray, J. (1992). *User participation in building design and management: a generic approach to building evaluation*. Butterworth Architecture.
- Kirkeby, I. M. (2003). Det adfærdsregulerende rum. Kontrol, delegation og kode [Physical environment supporting behaviour regulation. Control, delegation and code]. *Nordic Journal of Architectural Research*, 16(3), 9–22.
- Kirkeby, I. M. (2006). *Skolen finder sted* [Creating school buildings]. Doctoral dissertation, KTH School of architecture and the built environment (ABE). [https://www.academia.edu/67914828/Skolen\\_finder\\_sted](https://www.academia.edu/67914828/Skolen_finder_sted)
- Kjeldgaard Stoltz, K. (2019). *Schools and learning spaces are to be build on scientific grounds – a research-based framework for school architecture and learning space design*. Conference presentation, The International Conference on Educational Architecture – Education, Heritage, Challenges, Lisbon, 6–7 May, 2019. [https://www.academia.edu/39045524/Schools\\_and\\_learning\\_spaces\\_are\\_to\\_be\\_build\\_on\\_scientific\\_grounds\\_-\\_a\\_research-based\\_framework\\_for\\_school\\_architecture\\_and\\_learning\\_space\\_design](https://www.academia.edu/39045524/Schools_and_learning_spaces_are_to_be_build_on_scientific_grounds_-_a_research-based_framework_for_school_architecture_and_learning_space_design)
- Kuuskorpi, M., & González, N. C. (2011). The future of the physical learning environment: School facilities that support the user. *CELE Exchange, Centre for Effective Learning Environments*, 11, OECD Publishing. <http://dx.doi.org/10.1787/5kg0lkz2d9f2-en>
- Lefdal, E. M. (2016). *Nye skoleanlegg for videregående opplæring – Transparens, sentrumslokalisering og brukervedvirkning* [New Secondary School Buildings – Transparency, Centre Location and User Participation]. Doctoral dissertation, Norwegian University of Life Sciences. <http://hdl.handle.net/11250/2420939>



- Loeng, M., & Fyhn, H. (2021). *Tidlig, Tydelig og Framoverskuende Brukermedvirkning. Rapport om forbedring av brukermedvirkning i komplekse byggeprosjekter* [Early, Clear and Future-Oriented User Participation. A report on improving user participation in complex construction projects]. Institutt for sosialantropologi, NTNU. [https://www.ntnu.no/documents/10473/1282093407/Rapport\\_BedreBrukerinvolvering\\_3021\\_TilPublikasjon.pdf/11ba304e-f094-af41-b85b-023a0bbe491c?t=1636408722920](https://www.ntnu.no/documents/10473/1282093407/Rapport_BedreBrukerinvolvering_3021_TilPublikasjon.pdf/11ba304e-f094-af41-b85b-023a0bbe491c?t=1636408722920)
- Loughlin, C. S., & Suina, J. H. (1982). *The Learning Environment: An Instructional Strategy*. Teachers College Press, Columbia University. <https://eric.ed.gov/?id=ED220470>
- Lutnæs, E., & Fallingen, N. (2017). Bærekraftig utvikling gjennom skapende praksis: Utvikling av økoliteracy i et samlet kunst- og håndverksfag [Sustainable development through creative practice: Development of eco-literacy in a combined Art and Crafts subject]. *FormAkademisk*, 10(3), 1–19. <https://doi.org/10.7577/formakademisk.1825>
- Maapalo, P. (2017). «Vi rigger til så godt vi kan» – konturer av praksisarkitekturer som muliggjør og hindrer undervisning i materialet tre i kunst- og håndverksfaget i norsk barneskole [“We rig up as well as we can” – contours of practice architectures that enable and constrain woodworking practices in the subject of arts and crafts in Norwegian primary school]. *Journal for Research in Arts and Sports Education*, 1(1), 1–20. <http://dx.doi.org/10.23865/jased.v1.520>
- Manzini, E. (2015). *Design, when everybody designs: An introduction to design for social innovation*. MIT Press. <https://doi.org/10.7551/mitpress/9873.001.0001>
- Meland, A. T. (2011). *Ansvar for egen læring – Intensjoner og realiteter ved en norsk videregående skole* [Pupils’ responsibility for their own learning. Intentions and realities in a Norwegian upper secondary school]. Doctoral dissertation, University of Gothenburg. [https://gupea.ub.gu.se/bitstream/2077/25569/2/gupea\\_2077\\_25569\\_2.pdf](https://gupea.ub.gu.se/bitstream/2077/25569/2/gupea_2077_25569_2.pdf)
- Meland, A. T. (2015). Læreres erfaringer med en transparent arkitektur [Teachers’ experiences with transparent architecture]. *Norsk pedagogisk tidsskrift*, 99(5), 375–386. <https://doi.org/10.18261/ISSN1504-2987-2015-05-06>
- Moe, E. (2016). Forsvarlig arbeidsmiljø? [Safe working environment?] *FORM*, 50(1), 1. [https://docs.wixstatic.com/ugd/75f35c\\_d7b4b2f6c7fa40a4a93f02621d882b0c.pdf](https://docs.wixstatic.com/ugd/75f35c_d7b4b2f6c7fa40a4a93f02621d882b0c.pdf)
- Myrdal, S. (2005). *Fokus på skolebygg. Tilgjengelighet – Planlegging – Brukermedvirkning* [Focus on school buildings. Availability – Planning – User participation]. Oslo: Norges Handikapforbund & Husbanken. [http://biblioteket.husbanken.no/arkiv/dok/2907/fokus\\_skolebygg.pdf](http://biblioteket.husbanken.no/arkiv/dok/2907/fokus_skolebygg.pdf)
- Nielsen, L. M., & Digranes, I. (2007). User participation – real influence or hostage-taking? In E. Bohemia, K. Hilton, C. McMahon, & A. Clarke (Eds.), *Shaping the future? Proceedings of the 9th International Conference on Engineering & Product Design Education, University of Northumbria, Newcastle upon Tyne, United Kingdom, 13–14 September 2007* (pp. 305–310). Northumbria University, Headleys Ltd. <https://healthsystems.designsociety.org/publication/28412/User+participation+-+real+influence+or+hostage-taking%3F>
- Nilsen, Ø. (2009). Brukermedvirkning og pedagogikk [User participation and pedagogy]. *Nordlys*, 16 January, 2009. <https://www.nordlys.no/ytring/brukermedvirkning-og-pedagogikk/s/1-79-4054242>
- NOU 2010:1 (2010). *Medvirkning og medbestemmelse i arbeidslivet* [Participation and co-determination in working life]. Arbeidsdepartementet. <https://www.regjeringen.no/contentassets/2a344e075ffa4d839dd8242a91e1b0ce/no/pdfs/nou201020100001000dddpdfs.pdf>
- Nutt, P.C. (1993). Planned change and organizational success. *Strategic Change*, 2(5), 247–260. <https://doi.org/10.1002/jsc.4240020503>

- Parnell, R., Cave, V., & Torrington, J. (2008). School design: Opportunities through collaboration. *CoDesign*, 4(4), 211–224. <https://doi.org/10.1080/15710880802524904>
- Plan- og bygningsloven (2008). *Lov om planlegging og byggesaksbehandling* av 27. juni 2008 [Planning and Building Act from June 27, 2008]. Ministry of Local Government and Regional Development. <https://lovdata.no/dokument/NL/lov/2008-06-27-71>
- Pöllänen, S. (2009). Contextualising Craft: Pedagogical Models for Craft Education. *International Journal of Art and Design Education*, 28(3), 249–260. <https://doi.org/10.1111/j.1476-8070.2009.01619.x>
- Qualley, C. A. (2005). *Safety in the artroom* (rev. ed.). Davis Publications.
- Randers-Pehrson, A. (2016). *Tinglaging og læringsrom i en kunst- og håndverksdidaktisk kontekst* [Making objects and learning spaces in context of Art and Crafts didactics]. Doctoral dissertation, University of Oslo. <http://urn.nb.no/URN:NBN:no-56700>
- Regjeringen.no (2014). *Medvirkning i planlegging. Hvordan legge til rette for økt deltakelse og innflytelse i kommunal og regional planlegging etter plan- og bygningsloven: veileder* [Public Participation in Planning. How to Facilitate Increased Public Participation and Influence in Municipal and Regional Planning pursuant to the Planning and Building Act: Guide]. Ministry of Local Government and Modernisation. [https://www.regjeringen.no/globalassets/upload/kmd/plan/medvirkningsveileder/h2302b/veileder\\_medvirkning.pdf](https://www.regjeringen.no/globalassets/upload/kmd/plan/medvirkningsveileder/h2302b/veileder_medvirkning.pdf)
- RIBA (2016). *Better spaces for learning*. Royal Institute of British Architects. <https://www.architecture.com/knowledge-and-resources/resources-landing-page/better-spaces-for-learning>
- Risstad, B. (n.d.) *Møblering av skolebygg* [School Interior Furnishing]. Trondheim kommune. <https://docplayer.me/5247744-Moblering-av-skolebygg-forfatter-brage-risstad-radgiver-i-radmannens-fagstab-trondheim-kommune.html>
- Salama, A. M. (2009). The users in mind: Utilizing Henry Sanoff's methods in investigating the learning environment. *Open House International*, 34(1), 35–44. <https://doi.org/10.1108/OHI-01-2009-B0005>
- Sanoff, H. (2002). *Schools designed with community participation*. Washington DC: National Clearinghouse for Educational Facilities. <http://files.eric.ed.gov/fulltext/ED466725.pdf>
- Schleicher, A. (2018). Improving learning spaces by empowering school users. *OECD Education and skills today*, 15 June, 2018. <https://oecdeditoday.com/improving-learning-spaces-by-empowering-school-users/>
- Sømoe, K. (2013). Kunst og håndverk – fag eller tverrfaglig felt? [Art and Crafts – subject or interdisciplinary field?] *FormAkademisk*, 6(3), 1–15. <https://doi.org/10.7577/formakademisk.352>
- Taylor, A. (1993). How schools are redesigning their space. *Educational Leadership*, 51(1), 36–41. <https://www.ascd.org/el/articles/how-schools-are-redesigning-their-space>
- Taylor, A. (2010). Linking architecture and education: Sustainable design for learning environments. *Children, Youth and Environments*, 20(2), 240–243. <https://www.jstor.org/stable/10.7721/chilyoutenvi.20.2.0240>
- Tessem, L. B. (2010, June 1). Dragkamp om åpne skolebygg: Lærerne på sidelinjen [Tug of war about open-plan schools: The teachers on the sideline]. *Aftenposten*, p. 13.
- Tvedt, J. P. (2018). *Kreative rom, eller rom for kreativitet? En studie av hvordan rom for kunst og håndverk utformes i ungdomsskolen*. [Creative Spaces, or Spaces for Creativity? A Study of how Areas for Art and Crafts are designed in Lower Secondary Schools]. Master's thesis, Norwegian University of Life Sciences. <http://hdl.handle.net/11250/2558175>
- Ulleberg, H. P. (2006). *Et vidløftig sted: En analyse og diskusjon av skolegården som et sted for pedagogisk virksomhet* [A wide-ranging place. An analysis and discussion of the



- schoolyard as a place for educational activities]. Doctoral dissertation, Norwegian University of Science and Technology. <http://hdl.handle.net/11250/269128>
- Underthun, K. (2002). *Rom for kunst og håndverk: en studie av de estetiske og funksjonelle aspekter ved rom for kunst og håndverk på nybygde skoler* [Art and Crafts Studios: A study of aesthetic and functional aspects of the Art and Crafts studios in new school buildings]. Master's thesis, Oslo University College.
- Utdanningsdirektoratet (2006). *Læreplan i kunst og håndverk (KHV1-01)* [Art and Crafts subject curriculum]. Norwegian Directorate for Education and Training. <https://www.udir.no/kl06/KHV1-01>
- Utdanningsforbundet (2012). *Store klasser må deles* [Large school classes must be divided]. Resolusjon på årsmøte i Drammen, 27 March, 2012. Utdanningsnytt, 30 March. <https://www.utdanningsnytt.no/store-klasser-ma-deles/150174>
- Vinje, E. (2014). *De norske baseskolene: En kritisk analyse av diskurser og argumenter tilknyttet debatten rundt, og utbyggingen av, de norske baseskolene* [The Norwegian open-plan schools: A critical analysis of the discourses and arguments in connection with the debate on and the construction of the Norwegian open-plan schools]. Doctoral dissertation, Aalborg University. [https://skoleneslandsforbund.no/wp-content/uploads/2019/03/Avhandling\\_Erlend-Vinje\\_240314.pdf](https://skoleneslandsforbund.no/wp-content/uploads/2019/03/Avhandling_Erlend-Vinje_240314.pdf)
- Woolner, P. (2009). *Building Schools for the Future through a participatory design process: Exploring the issues and investigating ways forward*. Paper presented at BERA (British Educational Research Association). [https://www.researchgate.net/publication/242097810\\_Building\\_Schools\\_for\\_the\\_Future\\_through\\_a\\_participatory\\_design\\_process\\_exploring\\_the\\_issues\\_and\\_investigating\\_ways\\_forward](https://www.researchgate.net/publication/242097810_Building_Schools_for_the_Future_through_a_participatory_design_process_exploring_the_issues_and_investigating_ways_forward)
- Woolner, P., Hall, E., Higgins, S., McCaughey, C., & Wall, K. (2007b). A sound foundation? What we know about the impact of environments on learning and the implications for building schools for the future. *Oxford Review of Education*, 33(1), 47–70. <https://doi.org/10.1080/03054980601094693>
- Woolner, P., Hall, E., Wall, K., & Dennison, D. (2007a). Getting together to improve the school environment: user consultation, participatory design and student voice. *Improving Schools*, 10(3), 233–248. <https://doi.org/10.1177/1365480207077846>
- Zachariassen, J.-R. H. (2004). *Baser, soner og rom: Forholdet mellom undervisningsaktiviteter og fysiske rammer i en moderne ungdomsskole anno 2003* [Teaching bases, zones and rooms: The relationship between teaching activities and physical framework in a modern secondary school in 2003]. Master's thesis, University of Oslo.