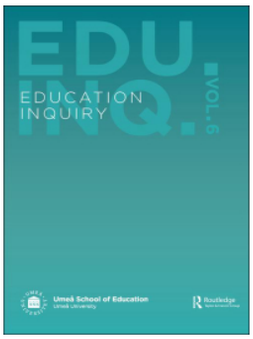

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ORIGINAL ARTICLE

Who controls the learning environments? A critical inquiry of national policy of school architecture in Sweden

Hanna Hofverberg [a] and Erik Sigurdson[b]

[a]Department of Natrual Science, Mathematics and Society, Malmö University, Malmö, Sweden;
[b]Department of Creative Studies, Umeå University, Umeå, Sweden

ABSTRACT

In Europe and other parts of the world, many new schools are to be built. In Sweden, for instance, some 1000 new schools are to be built between year 2020–2025. As a response to this need of new school buildings, there are policies emerging. One example is the Swedish National Board of Housing, Building and Planning (SNBHP), who published policy by presenting a digital collection good examples. In this paper we are zooming in on the learning environments in the policy and examining the meaning that is made of the learning environments. With the aid of the practical epistemological analysis (PEA), four the learning environments are identified: 1) general and flexible learning environment; 2) stimulating learning environment with spatial diversity; 3) an exciting learning environment that encourages creativity; and 4) an open learning environment. How these learning environments come about is further analysed with the concept of material classification, which helps identify some of the implications on teaching and learning and how the pedagogical vocabulary and material classification condition behaviours. This is further discussed in terms of what happens when"good learning environments" are made into policy.

KEYWORDS

School architecture; policy; learning environments; pedagogical space; material classification

Introduction

Many new schools need to be built in Europe and other parts of the world. In Sweden, for instance, some 1,000 new schools are to be built during 2020–2025, which is a substantial amount in relation to the size of the Swedish population. As a response to this need for new school buildings, new policies are emerging. For example, the Swedish National Board of Housing, Building and Planning (SNBHBP) published a digital collection of seven built schools to set an example of well-designed schools (Boverket, 2021). On their webpage, the SNBHBP emphasises that (1) well-designed schools can have a major impact on young people's learning, health, and well-being; (2) the physical learning environment is of great importance if a school is to accomplish what it sought to do; and (3) a well-designed school environment can contribute to increased equality in society. When a policy maker such as the SNBHBP, which is the authority for community planning, construction, and housing in Sweden, presents examples of good schools, there is no doubt that this policy will govern

CONTACT Hanna Hofverberg hanna.hofverberg@mau.se Malmö University

school architecture and the way learning environments are built in the future. This makes it relevant to examine school architecture policies to show what is at stake when learning environments are governed by policy.

The notion that the physical environment organises school activities is well established, and the literature shows that there is a close connection between the physical environment and pedagogical visions (Alerby, Bengtsson, Bjurström, Hörnqvist, & Kroksmark, 2006; Bennett & Hyland, 1979; Bjurstrom, 2003, 2004; Björklid, 2010; Blackmore, Bateman, Loughlin, O'Mara, & Aranda, 2011; Grannäs & Stavem, 2021; Kristenson, 2005; Krupinska, 2022; Skantze, 1989). One major historical shift in school architecture is the change from a "teacher-centred egg-crate classroom" to that of a student-centred learning environment (Fisher, 2007). One of the reasons for the shift is the move from a separated perspective on educational activities to a more integrated perspective (Bjurstrom, 2003). The latter perspective places high relevance on how the educational activities are envisioned in spaces. In fact, when physical environments are evaluated, research shows that apart from direct qualities (such as poor air quality, too high or low temperature, and noise), learning environments need to be evaluated in relation to the use of the space (Blackmore, Bateman, Loughlin, O'Mara, & Aranda, 2011; Duthilleul, Woolner, & Whelan, 2021). Overall, to deepen the knowledge about how the physical environment can enhance young people's learning, health, and well-being, as intended by the SNBHBP's policy objectives, it becomes necessary to understand how the physical environments outlined in the policy are envisioned.

From a policy perspective, one crucial matter when designing learning environments is that the environments should correspond to different needs. In Sweden, for instance, there is a new law that requires schools to meet the needs of every child and teenager so they can develop and reach the educational goals to the best of their abilities (SFS, 2022:146, Ch. 3, 2 §). It is often demanding for schools to actually provide environments that meet the needs of every child. Therefore, it is relevant to acknowledge how learning environments are designed to meet different needs. In other words, since schools need to meet pupils' different needs, it becomes important to study how the policy on learning environments handles differences.

By making a case of the Swedish school architecture policy, this paper aims to contribute with knowledge about school building policy and specifically show what is at stake when learning environments are displayed in policy. Two research questions guide our examinations:

(1) What learning environments are displayed in the Swedish policy for building future schools?
(2) What learning is promoted in the policy on learning environments?

To answer the first research question, we examine how the meaning is made in the policy presented by the SNBHBP regarding learning environments. A practical epistemological analysis (PEA) is used in the first analysis. To answer the second research question, we deepen the PEA by using the concept of *material classification* (Sigurdson, 2014), which enables us to discuss how the physical environments displayed in the policy govern learning.

The paper is outlined as follows: The following two sections provide a background of Swedish school architecture and present research on designing learning environments. The next section outlines the theoretical framework and the methodology that are used in the paper are outlined; it also presents the policy that is examined in the paper, namely, the schools that are displayed on SNBHBP's web page. Thereafter, the analysis process is described. The results are presented in two sections: the first provides the results from the PEA, and the second outlines the material classification of the identified learning environments. In the last section of the paper, we discuss what is at stake when learning environments are made as policy by pointing to two tensions that become visible in the policy: control versus freedom and the individual versus the collective in educational activities.

Developing trends in Swedish school architecture

Despite the long tradition of valuating school buildings for education, research in the Nordic countries about school buildings is limited (Frelin, Grannäs, & Rönnlund, 2021). In her book on school architecture, Krupinska (2022) compares this lack of research with housing, which has been researched to a much greater extent. She describes the Swedish development of school buildings and acknowledges a major political change when the compulsory school was implemented in 1962, which resulted in a demand for many new school buildings. The core values for the new schools – "democracy" and "to give every child a chance regardless of social background" – were to be reflected in the school buildings. But building many new schools was also expensive. According to Krupinska (2022), this meant that practical functions, technical demands, and standardisation dominated the design of the new schools (p. 39). In many Swedish municipalities, there was also a political interest in building new schools with an open plan as a sign of the new open society (Bjurstrom, 2003; Krupinska, 2022). This in turn boosted a progressive pedagogy, which was the educational trend at the time. Consequently, stereotypical school buildings with subject-specific classrooms were replaced with an adaptable school organisation, new ways of teaching, and informal collaboration between teachers and pupils (Krupinska, 2022, p. 44, 47). Two key concepts guided these political ideas: flexibility, which concerns the capability of a building to change, and generality, with the possibility for a school to adapt to different activities (p. 44).

Later, in the 1990s, school architecture in Sweden was once again an object for political change (Bjurstrom, 2003).Bjurstrom (2003) describes that, in the beginning of the 1990s, the educational discourse vocabulary was related to notions of "home" (*hem* in Swedish, for example, *hemrum* and *hemvister* referred to homeroom and dormitories). This later changed to "work unit" to emphasise that schools' purpose was to prepare students for working life. In political debates, opinions about how the curricula should be more discipline- and knowledge-based also affected educational discourses (p. 48). The new work unit that Bjurstrom (2003) describes also included other smaller rooms. The main idea was to eliminate not only the classroom but also the traditional school corridor. Today, when new schools are built, there is no clear distinction between traditional enclosed classrooms and non-traditional open spaces for learning; rather, these pedagogical spaces intertwine and reflect both tradition and innovation (Frelin, Grannäs, & Rönnlund, 2021).

Designing learning environments

As noted in the introduction, research reviews of physical environments and school architecture have concluded that *the use* of the physical environments needs to be in focus to evaluate the design (Blackmore, Bateman, Loughlin, O'Mara, & Aranda, 2011; Duthilleul, Woolner, & Whelan, 2021). In this section, we will focus on three different topics that are related to the use of the physical space when designing a learning environment.

The first topic is how spaces in schools are controlled. Historically, the "open" versus "closed" spaces have often been discussed in relation to how architecture governs learning environments. Biesta (2006) gives the example of Mossbourne Community Academy in London, where there are no staff rooms, no corridors, and glass walls to the front and back of each classroom so it is possible to see what is going on from any vantage point in the school (p.109). Every space in the school is thus governed. Biesta concludes that these open spaces function as a modern-day Panopticon, where the "desire to create an environment in which children will flourish turns into a surveillance machine where appropriate behaviour is secured because everyone and everything is visible from the central point of surveillance" (p. 109). The open space makes it possible to govern appropriate behaviour.

Another way of conceptualising the first topic, control of physical spaces, is to address the way educational spaces are talked about and to further acknowledge how the words and their spatial imaginaries are made meaningful. Wood (2020) gives an example on this matter by comparing the word "room" with the word "space". He argues that "spaces" sound freer than "rooms", and from a material point of view, spaces are liberated from certain physical, cultural, and financial constraints, whereas rooms are (usually) walled and indoors. Wood (2020) contends that rooms "require construction (and demolition) by building professionals (and planning permission and financing) and therefore tend to indicate investment, commitment and conscious, public motivations or justifications. In contrast, anyone can make spaces" (p. 474). This is of course interesting from a policy point of view, that designing a space could mean less effort. Based on Woods argumentation, a space, as a spatial imaginary, is also envisioned as a place where everything can happen. The possibilities are infinite. But how many possibilities are there when building a school? In their paper, Dovey and Fisher (2014) identify five primary plan types, ranging from the traditional classroom through various degrees of convertibility to permanently open plans. The plan types that Dovey and Fisher label "convertible" are those with a relatively high level of reversibility through the use of removable (e.g. folding or sliding) walls; they reflect the tension between pedagogies and the demand for an architecture that can satisfy both traditional and student-centred learning at different times. The other plan type that differs from convertible is what Dovey and Fisher label as "fluity", which involves the capacity for flow and change between activities within the cluster. However, these spaces are more likely to become more exposed and noisy and produce a demand for segmentation, closure, or semi-closure. Dovey and Fisher also point out, in a similar argumentation as Wood (2020), that there is a danger with open plans as they are cheaper to build than segmented plans and may be supported for budgetary rather than pedagogical reasons (Dovey & Fisher, 2014, p. 58). Moreover, the envisioned usage of

a space is not always used as intended, and there are several examples where school design has not functioned (e.g. Woolner, Clark, Laing, Thomas, & Tiplady, 2014). This makes it important to also investigate how the intentions correspond to how the design is used in school life, which brings us to the second topic.

The second topic that relates to the use of a space is how the use of space is experienced. This is something Rönnlund, Bergström, and Tieva (2021) address in their study about what is considered as a "good learning environments". Based on interviews with Swedish principals, school managers, and architects involved in the planning, construction, and reconstruction of primary and secondary schools, they identified four concepts: (1) variation, (2) flexibility, (3) active and self-directed learning, and (4) safety. These concepts meant different things to each interviewee, and two orientations were identified. The first orientation had clearer boundaries and control, which the authors define as a "strong classification and framing", and the second orientation had looser boundaries and control, which the authors define as a "weak classification and framing". For example, with variation and flexibility, the first orientation presented classrooms with movable furniture, which gave the teacher the opportunity to choose what to do. In contrast, the second orientation had greater flexibility regarding movable walls. For design to guide the experience of a learning space, there are of course different aspects to consider. Gislason (2010) has developed a framework for understanding school design's effect on learning environment. The framework consists of four components: physical environment (the ecology of the building, technology, and other material aspects), organisations (teaching, scheduling, and curriculum), school culture (assumptions, values, and patterns of thought and behaviour), and student milieu (learning, motivations, and social climate). All these components need to complement each other for the design to create a good learning environment. Another way to communicate the experiences of a specific space is to use metaphors. For example, Cold (2002) identifies four metaphors in her research: the green house, village, market, and exhibition hall. By using a metaphor, the intended experiences of the users of that space become explicit: social encounters were important in the "village", whereas the "exhibition hall" had flexible spaces that could change depending on the content of the exhibition. In her research, Cold (2002) asserts that these different spaces were experienced differently by pupils, teachers, principals, and designers. For instance, the users of the school had a greater understanding of why some places were messy, whereas the external experts were more critical.

The third topic that relates to the use of space is how *learning* is understood and conceptualised in a physical environment. Learning, when discussed in a school practice, is also closely connected to teaching and what the teacher seeks to do. One question that can help when discussing learning is to ask where or how learning ought to happen. Is learning understood as an individual process (that focuses on cognitive aspects such as listening, reading, memorising, etc.), as a collective process (where learning is thought of as situated or conditioned in or by a specific context and often with others), or as a process of actions (doing activities, alone or together)? Depending on how learning is constituted, the physical environment may both hinder and make learning possible. There are different ways of describing learning in school architecture. For example, Dovey and Fischer (2014) describe two typologies: The first typology describe student-centred pedagogies that are based on the pupils' learning

activities, such as presentation, large interactive activities, medium interactive activities, creative interactive activities, small interactive activities, and reflection (p. 47). The second typology describes the learning spaces, including classroom, commons, street place, meeting area, fixed function, and outdoor learning (p. 48). Thornburg (2014) has a similar, yet slightly different, description of activities; he uses primordial learning metaphors, such as the campfire, the watering hole, the cave, and the top of the hill, and these metaphors are combined with a pedagogical imaginary. For example, at the campfire, pupils learn from a storyteller or from an expert, whereas at the watering hole, pupils learn from peers. How these metaphors are designed in school architecture, however, is not given. Rather, each metaphor is an "educational holodeck" that is imagined to reconfigure immersive learning spaces and can be designed physically or in a digital learning environment.

In sum, this previous research describes, in various ways, is that a learning environment is always a relational space. The physical is always in relation to the social, such as how people understand or control spaces and what experiences and actions can be made in the space.

Theoretical framework and methodology

Over the past decades, the way in which space organises the social world has received increased attention (Lefebvre, 1991; Massey, 2004, 2005; McGregor, 2004). Massey (2004) states that although researchers recognise that things vary from place to place, they need to integrate an understanding of spatiality into the very processes and practices under investigation. From this stance, space is not the physical *or* the social but rather the interaction between the two. Based on this understanding of space, the interplay between the physical and the social is crucial. Moreover, the physical and the social can be seen as constituting each other in events (rather than substances) of what Dewey (1938/1997 defines as a "transactional activity". To show the meaning-making of this joint activity, we make use of a PEA.

PEA draws on a transactional theory on meaning making (Dewey, 1938/1997). The method has been developed by Wickman and Östman (2002) to analyse the direction that meaning-making takes as a result of situated transactions occurring in educational situations. In previous studies, PEA has been used to study meaning-making processes through observations in science education, physical education, and crafts education (e.g. Andersson, Garrison, & Ostman, Andersson, Garrison, & Östman, 2018; Author, 2018; Jakobson & Wickman, 2008; Maivorsdotter & Quennerstedt, 2019; Maivorsdotter, Quennerstedt, & Öhman, 2015). PEA has also been used to study the meaning that is made in texts (e.g. Andersson & Maivorsdotter, 2017; Author, 2021; Maivorsdotter & Wickman, 2011). In this paper, we use the latter to trace the meaning that is made by the SNBHBP policy.

The policy, that is, the digital collection presented on the SNBHBP web page consists of seven schools, and each school is described with eight themes. One of the themes is "good learning environments". In this paper, we have selected the sections regarding this theme for investigation, focusing on elementary schools described in its entirety. Accordingly, our selection includes the learning environments of four schools, namely Adolfbergsskolan, Brogårdaskolan, Kristofferskolan, and Landamäreskolan (for full

description of the schools, see Boverket, 2021). In the analysis, we use the descriptive texts of the selected learning environments, quotations from teachers and pupils that are presented in the policy, and the plans and photos that describe the learning environments.

Analysis

To identify the meaning of learning environments, we conducted PEA by applying four analytical concepts: ends-in-view, gaps, relations, and encounters. The analysis was conducted as follows: The first step (1) involved identifying the *ends-in-view* of a learning environment described in the digital collection of schools. The ends-in-view are what the actions described in the digital collection are directed towards, that is, the goal of the actions described in the digital collection. For example, if the end-in-view of "flexible environment" was identified in the digital collection, then the goal is to present a flexible environment. The second step (2) in the analysis concerned identifying the *gap*, as in, whether one can fulfil the end-in-view or not. For example, if the end-in-view was to present a "flexible environment", this opens an analytical gap as to whether one can present a flexible environment or not. The third step (3) identified the various *relations* that are used analytically to fill the gap, that is, what is considered to lead towards the fulfilment of presenting a flexible environment. For example, relations such as "influence the environment with removable furnishings" show that being able to move furniture leads towards the fulfilment of presenting a flexible environment. In the fourth step (4), the encounters that are analytically constructed within the relations were described. For example, what encounters emerge in this relation to "influence the environment with removable furnishings". Encounters can be physical things, such as furniture, but also mental structures that may arise, such as someone's previous experience or someone's values. We used the PEA to answer our first research question: What learning environments are promoted in the Swedish policy for future schools? The findings from the analysis are presented in the next section by describing the ends-in-views, relations, and encounters.

In the second analysis, which answers the second research question, we deepened the analysis by focusing on how the physical environment is designed and how the policy envisions the learning environments to be used. Here, Sigurdson's (2014) concept of the *material classification* is used. A starting point for the analyses is that pupils are never physically detached from the material conditions of the environment. A material classification always has a direct impact on actions in a room. For example, if you are trying to pass a very narrow tunnel, the construction (the physical condition of the tunnel) forces you to bend down or crawl to be able to pass through the tunnel. From a material classification point of view, the tunnel has a strong material classification as it forces certain actions, namely to bend down or crawl. In an open space, such as a square, the material condition of that space do not force any action and give little guidance for what one can do. Thus, if a classroom has a strong classification, the physical environment condition movements, whereas in a classroom with a weak material classification, it does not. Sigurdson (2014) further argues that the materiality of rooms (such as walls, floors, and doors) not only conditions movement and actions but also affects what experiences can be made in this environment due to the

architecture. In the analysis, we used the material classification to discuss and deepen the findings from the PEA. This analysis answers our second research question: What learning is promoted in the policy on learning environments? In following sections, first, we describe the material classification in the identified learning environment, and second, we discuss how the material classification governs movements and actions, with a specific focus on who is responsible for or controls learning.

Four learning environments

This section presents the findings from the PEA.

A general and flexible learning environment

The first school, Adolfbergsskolan, is a newly built school for Grades 7–9. The policy states that the school is "light, energy efficient, and has general and flexible learning environments". Thus, the ambition with the learning environment, the ends-in-view, is to present a general and flexible learning environment. The analysis revealed two relations to fulfil the ends-in-view: (1) "the possibility to influence the indoor environment" and (2) "the opportunities for teachers and pupils to choose and adjust the learning environments". In the policy's description, there are quotations from teachers emphasising that they can influence and adjust the environment:

> Pupils and teachers are proud of the school and feel that it is their own school – we adjust and change furniture based on needs. (Teacher 1, Adolfbergsskolan)
> The whole school is a learning environment. There are dialogues between pupils and teachers in the lunch areas and everywhere. (Teacher 2, Adolfbergsskolan)

The quotation from Teacher 1 highlights not only the flexibility but also the possibility to adjust the learning environment. In the policy, there are also photos showing movable furniture, which emphasises the possibilities to change the space. In one photo, there are movable desks in rows, and in the photo of the music classroom, there are chairs forming a half circle and placed in smaller groups. These are all examples of the possibility to change and adjust the environment. From the quotation from Teacher 1, one can read that pupils and teachers are proud of the school and that they feel as if it is their own. In other words, there is sense of agency described. The environment is not just flexible in general but flexible in relation to what the pupils and teachers want to do. In the second quotation, Teacher 2 states that the whole school is an environment, which enables teachers and pupils to choose from a variety of spaces. This becomes visible in the photos and in the plan of the school. A wide staircase, with room for 400 pupils, is described as a core of the school design. The staircase serves as an amphitheatre, an auditorium, an area for gathering, and also a space for pupils to sit and take a break. The staircase also "creates natural patterns of movements between different target points".

When analysing the encounters in the first relation ("the possibility to influence the indoor environment"), we identified mobile furniture and a sense of agency in using the spaces as one wants to as encounters. In the second relation ("the opportunities for teachers and pupils to choose and adjust the learning environments"), the idea that the

whole school is an environment becomes an encounter when teachers and pupils choose their learning environment. Other encounters include the presence of traditional learning environments with desks in rows, areas outside the classrooms, and the staircase, with its multiple functions.

A stimulating learning environment with diversity of space

The second school, Brogårdaskolan, is also a newly built school for Grades 7–9. The SNBHBP document states that the school has created a stimulating learning environment with a spatial variation. Thus, the end-in-view of the design is a stimulating learning environment with spatial variation. Two relations are identified: (1) "an expanded learning environment" and (2) "individually customised spaces". In the policy, these two relations are expressed as leading towards the ends-in-view of a stimulating learning environment with spatial variation. In the presentation of the learning environment, one can read that the school is divided into five clusters, each with their own entrance and classrooms. In addition to these spaces, there are both smaller rooms and bigger common areas. When the learning environments were designed, the policy describes that the pupils wanted to be seen and wanted to experience safe spaces. Therefore, there are windows towards the common areas. The expanded learning environments are in the policy described as providing different spaces for learning. For example, one pupil says that "the whole school is a classroom" (Pupil 1, Brogårdaskolan), which points to the fact that the pupils learn everywhere, not only in the traditional classrooms. In another quotation, from a teacher, this idea is further explained:

> There are different possibilities for different needs. There is everything from the more conventional to completely open. First, we had rules about how to use the spaces, but I no longer use the rules, as it works so well. I circulate more, which is very good for pupil's learning. (Teacher 1, Brogårdaskolan)

TThis quotation provides an example of what is considered an "expanded learning environment" in the policy, that is, that there are different learning spaces for different needs. There is also a photo of the common areas outside the classrooms, where there are an area with bigger boxes sitting, couches, and a sitting area around a tree.

TThe second relation ("the environment is individually customised") becomes visible in the policy when it is stated that "pupils get to be where they learn the best" and that the learning environment "supports an exploratory learning where the pupils help themselves and use the school in several ways". An individual focus on learning emerges in the policy; it states that "pupils help themselves", whereas the teachers "circulate more, which is very good for pupils" learning'. In other words, the diversity of space is directed towards pupils learning, and the teacher supports this learning by circulating.

The encounters that are identified in the relation "expanded learning environment" are bigger spaces, such as the classroom and the spaces outside the classroom, as well as smaller spaces, such as the built "boxes" where pupils can sit and the sitting areas in the common areas. The encounters identified in the relation "individually customised spaces" concern pupils' learning and their ability to choose from the different provided spaces based on their own idea of where they want to sit to learn by themselves.

An exciting learning environment that encourages creativity

In the policy, the third school, Kristofferskolan, is described as having the overall ambition of an "abundance in spaciousness, colour, and detail, always with care, and artistic and crafted qualities. The environment as a whole is exciting and encourages creativity". The end-in-view of the design is thus described in the document as an exciting learning environment that encourages creativity. The relations that emerge from the analysis are (1) "the form and colour that follow children's stages of development" and (2) "making beautiful learning environments". In the policy documents, these two relations are expressed as leading towards the ends-in-view of an exciting learning environment that encourages creativity. A quotation from the architect of the school further highlights how the environment encourages creativity:

> The environment needs to be an active co-maker to the pedagogy. Neutral spaces that are meant to fit everything are actually not suitable for anything. (Architect of Kristofferskolan)

In the presentation of the school, there are many photos that show colourful, natural materials, such as wood and clay. There is also a closeness to nature and handmade furniture, which, as stated in the policy, constitutes beauty. The policy document states that both the exterior and interior have a rich, colourful environment and many details; further, the environments have been made with a careful, artistic, and crafted quality. According to the policy, this creates an exciting and creative space. In particular, there are colours and forms that follow pupils development, where the younger pupils encounter red and organic shapes in their classrooms and the older pupils encounter blue and straighter shapes. The photos of the classrooms show a traditional environment, with benches in rows and a chemistry classroom with fixed furniture, where pupils are expected to sit and look at the experiments conducted on the teacher's desk upfront. Further, there are several other classrooms described, such as a classroom for handicrafts and a stage for theatre. The encounters identified in the first relation ("the form and colour that follow children's stages of development") are colours of red and blue and different shapes. In the relation of "beautiful environment", the encounters are handmade, place-specific furniture made from natural materials and the idea of beauty, which is constituted through a colourful, artistic, and crafted environment and careful details.

An open learning environment

The fourth school, Landmäreskolan, is presented as a school with a learning environment that is an asset both for the educational activities and for the local community. In the presentation, the end-in-view is described as an open learning environment. Three relations are identified. The first relation (1) is "an open plan with flexible rooms that are more or less delimited". This has consequences for the pedagogy, which the second and third relations point to: (2) "organisational structures for teaching and learning" and (3) 'collaborations between teachers and grades. In the policy document, the teachers express that the learning environment works differently for different ages,

but in general, the open flexible plan is a positive experience as it enables closer collaboration between the different grades. This statement expresses the need for organisational structures for teaching and learning (the second relation), and this need for organisational structures leads towards the end-in-view of an open learning environment. The policy further states that the openness of the learning environments "demand that teachers coordinate and organise pupils, activities and times so that the daily routines do not clash", which points to the third relation ("collaborations between teachers and grades"). The open spaces are shown in the photos in the policy. In one photo, for example, there is a staircase-shaped sitting furniture, and in another photo, there are open spaces with curtains to divide the space. The open spaces also create some challenges. For example, the policy states,

> For the open spaces to work, pupils must be trained to concentrate and consider each other – especially acoustically. It is a challenge for pupils with restless legs. It is especially demanding for those pupils who have concentration difficulties or special needs.

The pedagogical space produced here demands that pupils consider each other, which the policy states is difficult for some pupils. However, the solution seems to be that pupils must learn and practice concentration.

The encounters identified in the open learning environments include different rooms and spaces that are governed by the teaching and learning and by the organisation of the school and its curriculum. Another encounter is the need for collaboration (among teachers and pupils), which also involves the ability to concentrate and be able to pay attention to others.

The material classification of the identified learning environments

Above, four different meanings of learning environments have been identified: a general and flexible learning environment (school 1), a stimulating learning environment with diversity of space (school 2), an exciting learning environment that encourages creativity (school 3), and an open learning environment (school 4). When these learning environments are analysed with the concept of material classification, it is clear that we are dealing with different strengths of material classifications. If we compare the learning environments, school 3 has the strongest material classification as there is physical governance of action by the architecture. In the chemistry classroom, for example, pupils are expected to sit and observe an experiment being carried out at the front of the classroom. The pupils have no choice in what to do here; it is already governed by the architecture. In the other learning environments, there is also physical governance of action, namely of where to sit and what to do.

Schools 1, 2, and 4 are similar in that they are described as learning environments that provide many opportunities for how to use their spaces. But there are differences between them. Schools 1 and 2 both have classrooms with desks in rows and areas outside the classrooms where pupils study and work. Nonetheless, the material classification differs. School 1 has a weaker classification as there is little governance of action though the architecture. The "general" and "flexible" aspects of the school building are instead upheld through policy, that is, language. The educational content that the qualities of being general and flexible aim to facilitate is not given. To arrange an

educational content, teachers and pupils need to put time and effort into communicating how to arrange the furniture and adjust it to their own teaching and learning. In school 2, diversity could very well be regarded as an abstract term, similar to "general" or "flexible", as in the case of school 1. However, in addition to the classroom, there are also other spaces where one sits, for example, in the "box" or at a window. These spaces are permanent and always imposing; therefore, this learning environment has a stronger material classification. In school 2, pupils choose from already fixed spaces. "Diversity" becomes an action of choice from different material alternatives; it therefore has a stronger material classification compared to school 1. School 4 has the weakest material classification of them all because there is little governance of action though the architecture. In fact, the space could be better explained as a "not-yet-ready" classification, where the "openness" still needs to be materialised. In school 4, this is upheld and governed by the organisation and learning activities. Although the material classification analysis may seem rudimentary, it is in fact crucial in terms of today's concern to design learning environments that aim to meet different needs. Even if all the schools are described with good intentions in the policy, the learning environments have different material classification and, accordingly, they govern different actions.

By examining the actions presented in the policy, we found a common feature among the learning environments in schools 1, 2 and 4: in the policy, the pupils are held accountable for their own learning. Rather, the students are responsible for the actions assumed to lead to learning. In schools 1 and 2, for instance, the learning environments should "support an exploratory learning where the pupils help themselves and use the school in several ways". The teachers, on the other hand, should instead circulate, which is "good for pupils" learning' (school 2). This is important to recognise. In school 1, there is a similar argumentation, although it is not as explicitly stated as in school 2. As the learning is not happening in just one space but everywhere in the school, it is directed towards the pupils. School 4 is designed with open-space plane and the pupils need to practice concentration and pay attention to each other. In other words, when school architecture fails to provide smaller rooms, pupils must be trained to concentrate. As we see it, rather than "blaming" the school architecture, the policy places the responsibility on the pupils, which has pedagogical consequences, in particular, for pupils with special needs or difficulties in concentrating. However, this approach is in line with a student-centred learning discourse. There are no descriptions in the policy regarding what the teachers should do apart from circulate (in school 2).

School 3 differs from the other schools, as student-centred learning is not dominant. We have identified this environment as having a stronger material classification, where it physically govern what pupils should do. For example, the learning environment described has a distinct colour and shape scheme that follows a specific pedagogy. In the chemistry lab, there are rows of desks in a half circle dictating what pupils are required to do, namely, to sit and look at the experiment that is demonstrated at the front of the room. One photo shows rows of wooden desks in a classroom, also pointing to the activity of sitting and working or listening. Pupils do not choose where to sit or what to do – it is decided in advance through the architecture. The learning environment where pupils sit at desks is also visible in the guidelines about school 1, which call it a "conventional learning environment". However, there are no comments

regarding the pedagogy related to these photos or descriptions of school 1. The assumption is that the reader already knows what desks in rows means.

Discussion

In this paper, we have examined the meaning-making of learning environments in the SNBHBT's policy. Four different learning environments have been identified. We have also analysed the identified learning environments with the concept of material classification. Two of the learning environments, in schools 1 and 4, have a weaker material classification, and the other two, in schools 2 and 3, have a stronger material classification. Drawing on the analysis, we argue that the strong material classification constitutes a more guided approach to what to do in those spaces. This might render different behaviour from the pupils, for example, where they sit and what they are required to do. In contrast, the weak material classification gives little physical guidance, and the learning environment needs to be made on demand by the pupils and teachers. As these school designs are put into policy, these results are relevant to discuss. Below, we discus them in relation to two tensions that have become visible in the policy, namely control versus freedom and the individual versus the collective in educational activities.

Control versus freedom

The tension between control and freedom can be addressed as the way in which architecture governs actions (Biesta, 2006). When learning environments are described as good by the National Board of Housing, Building and Planning in Sweden, these learning environments will then govern school architecture and how learning environments are built in the future. Thus, a relevant question to ask is, in what ways does the policy govern future school architecture? One way to answer this question is to acknowledge the words that are used in the policy and how these words are imagined as a learning environment (cf. Wood, 2020). From our investigation, the words used to define the learning environments are, unsurprisingly, all positive words. This becomes clear if a negotiation is added to the learning environments identified. For example, does anyone want to build a *non*-flexible learning environment, a *non*-stimulating learning environment with *little* diversity of space, or a learning environment that is *non*-creative or *closed* (i.e. not open)? Accordingly, the words used to describe the learning environments have a normative stance, but their spatiality is not obvious. The danger, as Wood argues, is that words that sound free such as learning environment rather than classroom, are liberated from certain physical, cultural, and financial constraints. As we see it, the words that are used to describe the learning environments – "general", "flexible", "stimulating", "diverse", and "open" – all have a normative stance and are "free" from a spatial imaginary. Research has also shown that a word, such "flexible", can mean very different things when discussed in relation to school architecture (Rönnlund, Bergström, & Tieva, 2021). Accordingly, when words have little substance or provide no clear spatiality, they connote "goodness" but could mean almost anything.

In our investigation, we have used the concept of material classification to show how the physical environment is not as "free" as one might think. For example, an open

learning environment, as in school 4, could easily be understood as a learning environment that provides a lot of freedom for the teacher, the pupils, or the organisation. As the spaces are open, everything seems possible to do. However, these spaces are not yet made as an environment for learning, so the learning environment has to be invented. On the other hand, when the architecture governs actions, such as in school 2, the architecture provides different options that the pupils can choose from. In such cases, the materiality of a space can be considered as an agent of knowledge due to the experiences that can be created in that environment. This is the case in the previously described chemistry classroom in school 3. The strong material classification means that the environment obligates the pupils to sit at their desks and watch an experiment that is conducted in front of the classroom. The levels of the floor and the way the desks are arranged make it possible for the whole class to watch the experiment. One might ask, is this a good learning environment? Well, that needs to be evaluated in terms of what the school or the teacher wants to do. What becomes problematic, however, is when policy describes a learning environment with normative words and neglects their spatiality.

The individual versus the collective

The second tension that becomes visible in the findings is a tension between the individual and the collective. In the policy, there is a strong focus on the individual, but due to the fact that school activities are collective, a tension still emerges. First of all, the learning activities are directed towards the individual in schools 1, 2, and 4. In school 2, for example, the policy states that "pupils get to be where they learn the best" and that the learning environment "supports an exploratory learning where the pupils help themselves and use the school in several ways". These quotes centre the pupils themselves. The teacher and "teaching" are sparsely mentioned. Apart from one quote, where the teacher says, "I circulate more, which is very good for pupils" learning' (Teacher 1, Brogårdaskolan), teaching is not mentioned. There is also little attention paid to collective activities or collective learning. With a vocabulary directed at the individual and not teaching or collective activities, the responsibility of learning is placed on the individual. This is evident in school 4, where the policy document states that the pedagogical environment produced with the open spaces may be difficult for some pupils. However, the policy implies that this is the pupil's problem as it is the pupils who must learn to concentrate. This is problematic because the policy basically says that if you have a neuropsychiatric difficulties, as many do, one needs to learn to concentrate, which is often impossible. One can also ask whether this goes against the national education policy that schools must meet the needs of every student so they can develop and reach the educational goals as much as possible (SFS, 2022:146, Ch. 3, 2 §9). In this regard, this policy fails to provide a physical learning environment that can help schools to accomplish what is expected of them, namely, to meet every child's needs.

To counter this statement, that the policy fails to do what it ought to, one may ask whether it possible to actually provide a policy on learning environments. The problem, as we see it, is that many things that actually matter in learning

activities are neglected in the policy, which becomes problematic when the policy describes what constitutes a "good" learning environment. We do not know how these spaces become learning environments as the ongoing learning activities are not described, so one avenue is to explore how these activities transpire in these spaces. Another possible way to handle this issue, which is emphasised in previous research (Blackmore, Bateman, Loughlin, O'Mara, & Aranda, 2011; Dovey & Fisher, 2014; Duthilleul, Woolner, & Whelan, 2021), is to explore the use of a space and what teachers and pupils are expected to do in the space. The use that has been identified in the policy is pupils' learning, but pupils' learning cannot be reduced to a short description of the space because, when it is, the description ends up being a simplification of the space. The language of "good learning environment" then becomes what Biesta (2006) defines as a "lernification", where pupils are constituted as consumers rather than subjects (for a longer description, see Biesta, 2006).

Further, learning activities are never isolated activities. Therefore, a learning environment cannot be isolated to the organisations (the teaching, scheduling, and curriculum), the school culture (assumptions, values, and patterns of thought and behaviour), and students' milieu (learning and motivations and social climate) (Gislason, 2010). Thus, is it wise to make a policy on "good learning environments" without taking them into account?

In short, in this paper, we have sought to problematise an existing policy on learning environments. We have identified the meaning that is made through the policy' descriptions and shown the material classification of the described environments. We have also discussed some of the consequences of making a policy on "good learning environments" in terms of control versus freedom and individual versus collective spaces. Specifically, it raises the question of who controls the learning environments – that is, who dictates where to sit down, where to find a private space, where to talk, where to read, or where to play? We hope that this paper can give rise to further discussions about a school architecture that takes the complex activities of learning into account and not only constitutes learning as a matter of pupils' responsibility.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Dr. Hanna Hofverberg, Associate Senior Lecturer at Malmö University, Sweden, at the Department of Natural Science, Mathematics and Society.

Dr. Erik Sigurdson, Associate professor at Umeå University, Sweden, at the Department of Creative Studies.

ORCID

Hanna Hofverberg http://orcid.org/0000-0001-5690-7064

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