Student-Centred Classroom Environments in Upper Secondary School: Students' Ideas About Good Spaces for Learning Versus Actual Arrangements

Anna Kristín Sigurðardóttir

Abstract The aims of this chapter are to shed light on upper secondary school students' ideas about good spaces for learning and to explore how the actual arrangement of the physical learning environment fits with these ideas. Data were collected in nine schools in Iceland through classroom observations and group interviews with students using the diamond ranking method. Pictures were used to learn about students' attitudes about good and bad places for learning. The data were reviewed in the context of theories on student-centred learning. The results indicated that the physical environment in upper secondary school classrooms was rather traditional, with students sitting at individual tables in rows and the teacher positioned in the front of the room. The students seemed to acknowledge this arrangement, as they know it best. It was also most often ranked somewhere in the middle of the diamond. They especially liked arrangements that allowed them some flexibility or which enabled them to influence the environment, which was not very common to these schools. Most lessons were characterised according to the teacher-centred approach.

Introduction

The aim of the study is to shed light on students' ideas about good learning environments (spaces for learning) and how their ideas fit with the actual arrangements in school. Student-centred learning is in focus as it reflects the possibilities for students to influence their own learning environment. 'Spaces for learning' are physical learning environments such as places in the school building that are available for different learning activities, the arrangement of furniture in the classrooms and technology. This study is limited to the space inside the school building or activities on behalf of the school, such as fieldtrips. It is expected that the results will be useful for designers, teachers and others who influence the

A.K. Sigurðardóttir (✉)
School of Education, University of Iceland, Reykjavík, Iceland
e-mail: aks@hi.is

L. Benade and M. Jackson (eds.), *Transforming Education*,
DOI 10.1007/978-981-10-5678-9_12

physical learning environment in schools. The results are reviewed within the perspective of student-centred learning environment and student engagement, which has gained increasing attention in the research literature. It is assumed that physical learning environments that cohere with students' ideas about good places for learning are student-centred, which is a supportive condition for student engagement in school, and in such cases, might therefore enhance students' well-being so that they are less likely to drop out.

Background

The upper secondary school phase in Iceland is a 3- to 4-year programme for young people aged 16–19/20. Some of the schools are academic while others are comprehensive, offering a variety of programmes, both academic and vocational. The incidence of high dropout rates in this school phase is indeed worrying and is considered one of the major challenges of the educational system in Iceland, with less than half of the students graduating within 4 years (Ministry of Education, Science and Culture 2014).

Icelandic laws relating to the upper secondary school phase (Upper Secondary Education Act, No. 92/2008) stipulate the right of students to affect their learning environment, but do not define the ways in which they can exert influence:

> All upper secondary school students shall be entitled to receive suitable instruction carried out in a stimulating study environment in appropriate premises. Students shall have the right to express their views on the study environment, learning arrangements, organisation of schooling and any other decision concerning them. These views shall be taken into account where possible. (Article 33)

Theoretical Framework

Constructivist approaches to learning assume that students' active participation in shaping their learning environment is a fundamental condition for learning; thus, the learner must be active in building his or her own understanding. This calls for student-centred learning environments that provide multiple activities enabling individuals to address their own learning interests and needs and to study at multiple levels of complexity (Land et al. 2012). Based on this, the structure of daily school work must allow space for students to influence and participate in decision-making regarding their own learning environment. There is evidence to suggest that this kind of learning environment can support higher levels of perceived autonomy and student motivation (Smit et al. 2014), which influences student engagement and well-being in schools (Blackmore et al. 2011; Fullan 2016; Fredricks et al. 2004; Greene et al. 2004; Tanner 2008). A recent study (Blöndal and Aðalbjarnardóttir 2012) on Icelandic upper secondary schools drew a clear

connection between student disengagement and dropout risk, which was congruent with Kanevsky and Keighley's (2003) results, suggesting that students perceive that they are not heard and are more likely to become bored in school. Prain et al. (2015) use the term personalising learning as an "integration of differentiation and self-regulation strategies by individual students" (p. 17). They maintain that the term is based on students' rights and capacities as learners for self-regulation, which is addressed through flexible approaches to curricular structure.

There is an unfortunate lack of empirical evidence linking the physical learning space, educational practices and student outcomes (Blackmore et al. 2011; Gislason 2010; Woolner et al. 2012). There is much to be learned, however, from previous studies on students' attitudes towards the physical environment, studies that attempt to make students' voices heard. A common theme is that variety and flexibility, which allow individual choice, seem to be preferred by students for many reasons (Blackmore et al. 2011; Woolner et al. 2012). A physical learning environment that is in coherence with students' ideas about good spaces for learning is a supportive condition for student engagement in school (Fredricks et al. 2004), and students participate in school if the physical learning environment enhances their well-being (Blackmore et al. 2011).

It is a long tradition in school design to have classrooms of the same size along corridors as well as classrooms designed with individual tables in rows and every student facing the same direction. Veloso et al. (2014) refer to this as an industrial design that relies on old ideas, assuming that learning is a simple linear process where the teacher transmits knowledge to the students. This also seems to be the case in Iceland. A recent study in upper secondary school (Óskarsdóttir 2012), revealed that the traditional arrangement, with individual tables in rows and everyone facing the same direction, was the most common. At the same, observations in lower secondary schools disclosed only few indications of student-centred learning, such as self-directed inquiry or opportunities for students to make independent decisions about learning (Sigþórsson et al. 2014). This, however, was more frequently noted in open-plan classrooms than in traditional ones (Sigurðardóttir and Hjartarson 2016), where the entire space is seen as a learning area and is not divided into traditional classrooms. Rooms are of different sizes and serve multiple functions; common areas are designed in such a way that makes them suitable for collaboration. This is congruent with results from an Australian study, indicating that open-plan classrooms enable more personalised learning and student well-being (Prain et al. 2015).

There is a relative consensus in the literature that educational practices are not influenced by one single factor but, rather, by a complex interaction between different components (Barrett et al. 2013; Blackmore et al. 2011; Gislason 2010; OECD 2013). The focus of the study on which this chapter is based is on the extent to which students' views, as they appear in the interviews, conform to the physical environment; however, there are many other factors that could affect their attitudes towards their learning and well-being in school. Based on the literature discussed above, the authors suggest a causal link, as illustrated in Fig. 1. A student-centred learning environment is likely to have positive affect on student engagement, which could in turn improve student well-being and learning outcomes and decrease the

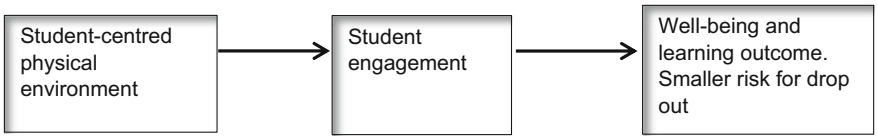

Fig. 1 Proposed relation between student-centred environment and student well-being and learning outcome

Table 1 Arrangement in observed classrooms

	Physical arrangement	Number of lessons	%
1	Traditional classroom with individual tables in rows (2–5 in each) or in a U shape; all students facing the same direction	81	63
2	Traditional classroom with tables of different sizes clustered together so that the students sit in groups and face each other	20	15
3	Untraditional space such as an open learning space, outdoor education or community hall	22	17
4	A classroom for vocational activity or sports	7	5
	Total	130	100

risk of student dropout. This study is limited to the first box; it enquires about the extent to which the physical environment is student-centred by comparing students' ideas about a good place for learning versus the actual arrangement.

Method

This research is part of a larger project on school practices in upper secondary schools in Iceland. A group of researchers collected data from nine schools from a population of 31 upper secondary schools in Iceland, which were selected on the basis of stratified sampling. These schools comprise about 33% of the student population at this level and are located in different places around the country. They also constitute a mix of schools providing vocational and academic programmes. Two types of data inform this part of the study: classroom observations and group interviews with students.

Classroom observations were carried out during 130 lessons, which were randomly selected within selected study programmes in each school to ensure variety. Detailed descriptions of the physical environment in each classroom were made and involved, e.g. information about the arrangement of the furniture, the use of technology and the procedure of the lesson. The school leaders sought the teachers' permission, and all but one accepted. The researchers were allowed to observe, write notes and take pictures in an empty classroom. All descriptions were stored in an electronic database and categorised into four groups based on the physical arrangement listed in Table 1.

Group interviews with students were conducted on the same days as the classroom observations. The students volunteered for the interviews and were all over 18 years old; thus, their parents' permission was not required. A total of 56 students participated (54% female and 46% male) in 17 groups, with two to five students in each group. Each interview was about 45–60 min long.

To encourage discussion in the interviews, a diamond ranking method (Clark et al. 2013; Clark 2012) was used. This method involves presenting nine pictures that participants are asked to arrange in a diamond shape (Fig. 2). Clark et al. (2013) describe this method as a 'thinking tool' meant to encourage group discussion. At the top of the diamond (rows 1 or 2) are pictures displaying an environment that students categorise as a good space/arrangement for learning, and at the bottom (rows 5 and 4) are the arrangements that students count as a space that is not good for learning, and in the middle is an arrangement that is considered neither good or bad.

While Woolner (2010) and Clark (2012) recommend the use of nine pictures, in this study, twelve pictures were used, from which the participants were asked to select nine to rank in the diamond shape. The purpose of using twelve pictures instead of nine was to increase the variety and not overly limit the students' choices. The results were more diverse, however, and not as clear as if there were only nine pictures (for more detail in Magnúsdóttir 2015). The researcher also asked the group whether there were any other settings they could think of that was not displayed in the images. Only one group could come up with something else. The pictures illustrated the following settings:

- Traditional classroom, tables in a row, all students facing the same direction,
- Tables arranged in a group (not necessarily group work)
- A private table somewhere in school
- Group work (anywhere)
- Working alone at a computer (could be anywhere)
- A computer room
- Fieldwork outside the school premises, in nature or at workplaces

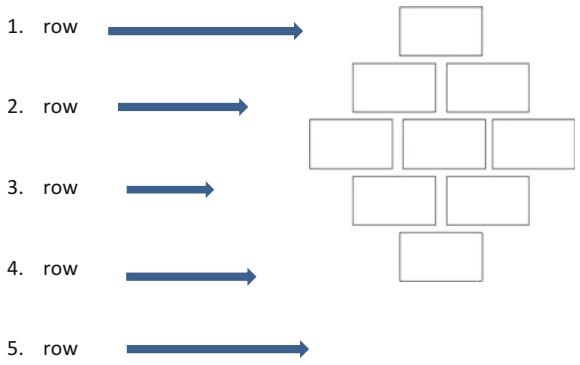

Fig. 2 Diamond ranking method (illustration is based on Clark et al. 2013, p. 6)

- A lecture hall
- Reading alone in a quiet area
- Art and craft facilities
- The library
- A 'technical' classroom.

The participants in the group were asked to work together and try to agree on one diamond. The researchers occasionally encouraged them to discuss their decisions by asking 'why' questions. The discussion was recorded and transcribed. In conducting group interviews, there is always the danger that one person in the group takes a leading role and makes decisions on behalf of the remainder of the group. To prevent this from happening, the researchers tried to encourage silent participants to reveal their opinions so as to ensure that the group would agree on the final conclusion.

The use of visual methods when studying physical environments is common and is used as a tool to trigger and initiate fruitful discussion; however, this should be seen as complementary to discussion (Burke et al. 2014). Therefore, in this study, the discussion among the students in the group did not constitute less valuable data than the results from the diamond at the end of the interview. Since the researchers selected the pictures in this case, there was the danger that the selection did not fully reflect the students' ideas. Another option would have been to ask the students to walk around the schools and take their own photographs of places that they deemed good or bad places for learning. As the purpose of this study was to expose students' views in general, rather than towards some particular space in their own school, it was, however, more suitable to use pictures that were unfamiliar to the students.

Students' Ideas and the Actual Classroom Environment

The results are presented in two parts: first, the classroom arrangement as it appeared in the classroom observations and, second, the results from the interview describing how the students ranked the pictures and why.

Classroom Arrangement

As expected, the majority of observed lessons took place in traditional classrooms (63%) where the students sat in rows at individual tables facing the same wall where the teachers sat or stood in front of a blackboard or screen (see Table 1). Other arrangements were less obvious, such as clustered tables in 15% of the observed lessons and untraditional spaces in 17% of the observed lessons. These involved, e.g. open-space classrooms in one of the schools, a classroom consisting

only of chairs (discussion room) and an outdoor lesson. In order to gain a clearer picture of the environment, an example from the descriptions is provided below, which is rather typical of a classroom arrangement in this category.

> The classroom is on the first floor with large windows on one wall and light green curtains. There are empty cupboards under the windows and a white blackboard behind the teacher's desk upfront. There is nothing on the walls except a clock. An old projector (for transparencies) is in one corner of the room, and a newer one is hanging from the ceiling. There are four individual tables in eight rows (all facing the same direction), and the students are sitting on a wooden chair with pink pillows. The doors open onto the corridor. (Author observation notes)

The open-space classrooms (category 3) were found only in one of the schools, which is a new school in an innovative building. The arrangement in one of the lessons was described in the observer's notes:

> The lesson takes place in the so-called math area where there are five closed classrooms (of different sizes) that open onto a central area. In the central area are ten workstations (group tables). The students are sitting there in groups of two to four on wooden chairs on wheels. Almost all the students have their laptop on the table in front of them. The teachers (5–6) are sitting in a group in one of the workstations. There is artwork on the walls. (Author observation notes)

These above descriptions reflect the classroom conditions that students in upper secondary schools could expect in terms of a place for learning. It can be said that the classroom arrangement in the observed lessons was rather traditional and well known by the students. It is, however, noteworthy that the classroom is far from being the only space for learning; the whole school building should be designed as a space for learning, not to mention the home environment. The following sections present the students' voices about the best and worst spaces for learning within the school.

Students' Voices

In the group interviews, the participants were given 12 photographs and were asked to prioritise them in a diamond ranking shape (Fig. 2), which had already been drawn on paper, based on their ideas about learning in different settings in the school environment. The top of the sheet read: 'this is a good space for learning'; the bottom read 'this is a bad space for learning'.

The pictures did not display an actual environment which was familiar to the participants, and text describing the settings was also written on each picture in order to avoid overly focussing on what was actually displayed. As the group had more than nine pictures, each group had to exclude three of them. They tended to exclude pictures of unfamiliar settings, with only three groups selecting high-tech classrooms with interactive, electronic tables (Table 2). Some students claimed that they knew nothing like this and therefore decided against using it, even though it

Table 2 Overview of the settings reflected in the pictures, their ranking and the number of groups using each picture

		Row 1	Row 2	Row 3	Row 4	Row 5	Total
a	Traditional classroom	2	1	5	6	3	17
b	Tables in groups	4	1	7	4	0	16
c	Private table	3	2	7	0	1	13
d	Group work (anywhere)	1	2	6	5	2	16
e	Alone in a computer	1	6	4	2	1	14
f	Computer room	0	0	2	7	4	13
g	Fieldwork	1	6	3	5	0	15
h	Lecture hall	0	1	4	4	3	12
i	Alone in a quiet area	3	5	4	1	0	13
j	Art and craft classroom	3	0	4	0	3	10
k	Library	2	9	3	0	1	15
l	Technical classroom	1	0	2	0	0	3

could be considered ‘cool’. Seven groups excluded the picture of the art and craft classroom. Most of the students were enrolled in academic programmes and claimed that doing art and craft was not for them. A picture displaying a traditional setting was used by all 17 groups, most often in the bottom rows but also in the top rows (Table 2).

Figure 3 illustrates the frequency with which 10 out of the 12 pictures were ranked on the two top rows (1 and 2), the middle row (3) and the bottom rows (4 and 5). There was obviously considerable diversity in the responses from the 17 groups. Therefore, the students’ comments on each photograph provide valuable insight into their views.

Spaces Deemed Good for Learning

As illustrated in Fig. 3, the library and working alone in a quiet area were most often ranked in the top two rows as a good space for learning. The library was ranked in row 1 by two groups and in row 2 by nine groups (Table 2), and only one group ranked it on the bottom rows. When asked what they liked most about the library, these conversations came up in one of the schools:

S1. “Just comfortable and cosy”

S2: “There is peace and quiet; no noise”

S3: “Easy to access different resources … computers … and almost everything one needs.”

Reading alone in a quiet area received similar remarks, more specifically, was located eight times in the top rows and three times in the first row. As with the library, only one group ranked it on the bottom row. The same occurred with the

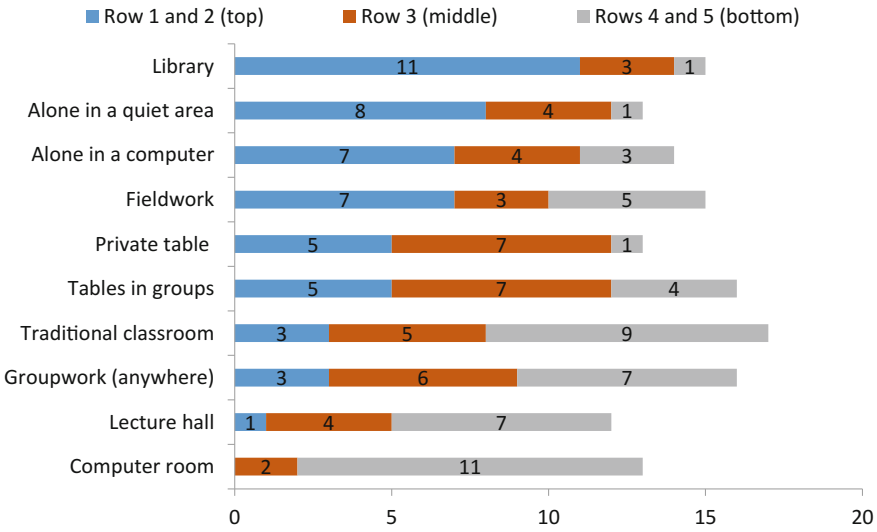

Fig. 3 An overview of the frequency with which each picture was selected and located at the *top*, in the *middle* and at the *bottom* of the *diamond*

picture: 'working alone on a computer anywhere in the building' was ranked by seven groups in the top rows and only once in the bottom row. Three groups ranked it on the bottom rows. The positive comments from the groups came when these pictures were most often concerned with the quietness and freedom of being able to work anywhere in the building. As one student put it: "Freedom and peace: I can go anywhere I want to; that suits me". The groups which ranked the picture on the bottom rows thought it was too easy to get distracted while sitting alone: "it is too tempting to do something else [than what you are supposed to]".

Having access to a private desk is not common in upper secondary school. Nevertheless, it was selected by five groups on rows 1 or 2. Four groups excluded the picture because it was unfamiliar. Most of them thought that this was a great idea, answering positively to the question: 'Do you agree that it would be brilliant to have your own private desk in school?' (school A). As an advantage for having a private desk, students mentioned: to be able to access all their things in one place and "definitely a very good place for learning". Some of them said that it was similar to being in the library, but your own place. They were somewhat concerned, however, about whether there would be enough space for private desks in the building.

A picture of a classroom with tables arranged in groups (not as group work) seemed to be rather popular since it was ranked on the first row by four groups (Table 2), five times on the two top rows, never on the bottom row but four times on row 4 (see Table 2). During the discussions, this arrangement received many

positive remarks as it enabled the possibility to work independently as well as to work with fellow students if so desired. As a student in school B said: “You see, we often sit like this, really comfortable; if you are working on a project and don’t understand something, you can always ask the person sitting next to you”. In school (E), the students agreed that this was a ‘nice’ arrangement, which gave them the flexibility to choose whether or not to chat. It was also good for learning because “you learn best by talking about the topic”. They thus valued the ability to learn close to other people, without formal collaboration, as well as to be able to learn without being disturbed.

Spaces Deemed ‘Not Good’ for Learning

It seemed that the very worst room for learning was the computer room. In these kinds of classrooms, several computers are on tables in two or more rows, with everyone facing the same direction. This picture was used by 13 groups and ranked four times in row 5, seven times in row 4 and never in the top rows. The students’ negative views mainly concerned disruptions, a lack of space, or: “it is always too hot in these rooms” (school G), or “it’s like you are suffocating or something” (school K) and “there is always a lack of space in a computer room, no space for books, for example” (school J). “There are constant disruptions from computers, from other people from everything” (school H).

The unpopularity of the traditional classroom arrangement (Fig. 3) is indeed interesting as it is the most common arrangement in upper secondary school (Table 1). This involves students sitting at individual tables, side by side, in rows and facing the same direction. All groups used this picture, which ranked three times in row 5 and six times in row 4. It was, however, also ranked in the top rows by two groups, claiming that it was satisfactory and that they were used to this kind of arrangement. One of the groups ranked it on the bottom rows and said it was “rather boring; it has been like that since grade 1”. One of the groups in school A was among those who did not like this arrangement:

S1: “This is what we are always complaining about – always sit and listen and write.”

S2: “It is so boring, always the same.”

S3: “It would be okay to have it sometimes like that, but not for all lessons.”

Two other pictures were ranked on the bottom rows, indicating a less than ideal place for learning. The lecture hall was ranked eight times in rows 4 and 5. Students explained that it was too easy to fall asleep or lose interest: “you learn better by doing the tasks yourself” (school C). A student in school H explained: “I feel the lecture hall a bit too big somehow; you are far from the teacher, and maybe you cannot hear so well”.

Rather negative remarks were also made about group work as the work tends to be split unevenly between participants. One student in school E described it as follows:

> There is usually one person that does all the work; the others only get a piece of paper to read you know. And the only one who wants to get high marks for the projects makes it nice and prints out and everything. The others then receive a copy.

Another group in school H complained about people not doing their fair share in group work: "There are those who like group work because they do not need to do as much work".

It seems that the students did not value an environment for learning that was overly rigid, crowded, hot and lacked flexibility, such as in computer rooms and in traditional classrooms where everyone sits in rows, facing the same direction. They also did not value environments that made it easier for them to avoid tasks.

Students' Influences on Their Own Learning Environment

During the classroom observations, we looked for signs of student choice or their influence on the learning environment. From the observation notes in the traditional classrooms (63%), there were very few signs of student influence and little flexibility or space to adapt; the teachers hardly asked for students' opinions and neither did they ask the students how they wanted to do things. The students did not request it either. Below is an example that is rather typical of this type of lesson:

> The whole lesson (one hour) was characterised by one-way instruction. The teacher used slides and walked back and forth at the front of the classroom; he had a lively way of expressing himself and used rich body language. The students spoke once in a while, especially four of them who mostly responded to the teacher's questions. The other students remained silent. (Author observation notes)

In general, the lessons were teacher-centred, and the students were not expected to do much else than listen and take notes. There was, however, an exception from the norm, especially in one of the schools (the open-plan school). The students there were allowed to leave the room and work on the task in another room in the centre, just outside the classroom or wherever they wanted. Here is an example from the observation notes in one of these lessons:

> The students were working freely on their task in this lesson. The atmosphere was relaxed, and the students moved in and out of the classroom. The teachers walked between the students and talked to them about their ideas about their projects. It was obvious that they wanted the students to develop their ideas and find their own means of realising them. (Author observation notes)

These ways of working seemed to be more common in this particular school than in the others; the lessons were more student-centred, with the teachers assuming the role of a tutor.

In the interviews, students where asked whether they were given possibilities to decide on their environment or their learning process in general. Their opinions reflected a similar situation. They thought that they had very few opportunities to make decisions about their learning, except in relation to choosing programmes. They rarely thought about the physical environment when asked about their possibility of affecting their learning.

Discussion and Conclusions

The aims of this study were to shed light on students' ideas about a good learning environment (space for learning) and to explore how the actual arrangement of the physical learning environment fits the students' ideas. The research questions concerned the arrangement of the classrooms, students' ideas about a good space for learning and their possibilities for influencing their learning environment. Obviously, talking about good or a bad space for learning may seem like an oversimplification of a complex reality. In most cases, it is not a question of either or; rather, much depends on the person involved and the task that needs to be done. Using the diamond ranking method, however, requires putting forward contradictory statements in order to encourage the participants to prioritise, discuss their ideas and talk about what kind of physical settings they value or disvalue.

It turned out that classroom arrangements in the majority of the observed lessons were very traditional, with students sitting at individual tables and everyone facing a blackboard in the front of the classroom. These were teacher-centred lessons dominated by one-way instruction. This is not surprising, and echoed other studies, both in Iceland (Óskarsdóttir 2012) and in other countries such as Portugal (Veloso et al. 2014) where the teaching methods in upper secondary schools remained traditional despite extensive renovations to school buildings. According to the sources cited in this chapter, such arrangement can hardly be seen as supportive of student-centred or individualised learning (Blackmore et al. 2011). There are, however, indications of a more student-centred approach in schools that are designed with more open plans, variety and flexibility in the environment (Sigurðardóttir and Hjartarson 2016), as in one of the schools in this study. This is in line with results from Prain et al. (2015), suggesting that open-plan schools are promising in terms of enabling more personalised learning and student well-being.

Students' ideas about a good space for learning seemed to largely contradict the actual arrangements. They valued learning environments giving them flexibility or power to make decisions about their learning preferences. They liked to sit in groups where they could choose whether to work or consult with other students. Contrastingly, they also liked environments where they could expect a quiet area and various working conditions, for example, libraries. They did not, however, value rigid environments for learning, or those that are crowded, too hot or too inflexible to influence their situations. This was the case for computer rooms and traditional classrooms where everyone sat in rows, facing the same direction.

There thus seemed to be a significant gap between student preferences and the existing environment in upper secondary schools. This mismatch is not likely to support student-centred learning, at least with regard to Fullan's (2016) suggestion that students' views about how they learn best need to be taken into account.

Indeed, the students in this study were given few opportunities to make choices and had few possibilities to influence their learning. This was a common theme, which persisted even as the students got older (Fullan 2016; Óskarsdóttir 2012). The observed lessons were characterised more by teacher-centred work than by student-centred tasks that are "student focused and student built" (Murphy 2016, p. 152). Different studies emphasise student autonomy and increased student influence on their learning environment as one of the fundamental conditions for student engagement (Fredricks et al. 2004; Murphy 2016). It is, however, difficult for this study to make a link between this teacher-centred approach in Icelandic upper secondary schools and the high dropout rate in the country. There was no evidence, suggesting that there was less student autonomy in Icelandic schools than in other countries with lower dropout rates. Nevertheless, this is a noteworthy point, and effort should be made to heed students' opinions and to create a greater level of student-centeredness through a more open and flexible environment. Indeed, the construction of classrooms as flexible learning spaces that better accommodate the new, digital didactical orientation (Norlander 2014) and that enhance twenty-first-century learning (Benade 2015) will encourage student-centeredness. The ideas expressed by students cohered well with international recommendations about innovative learning environments (OECD 2013), thus making it worthwhile for education authorities at all levels to take heed. Even though this study is limited in scope, the results contribute to the discussion about ways to support students in constructing their own learning, knowledge and understanding. It is important to listen to students and provide them with opportunities to influence their own learning conditions in schools.

Acknowledgements This research project received grants from the University of Iceland Research Fund 2013–2015 and from the NordForsk-funded Nordic Centre of Excellence: *Justice through Education in the Nordic Countries* 2013–2018. We extend our special thanks to the upper secondary schools that provided us with access to data.

References

Barrett, P., Zhang, Y., Moffat, J., & Kobbacy, K. (2013). A holistic, multi-level analysis identifying the impact of classroom design on pupils' learning. *Building and Environment, 59,* 678–689.

Benade, L. (2015). Teachers' critical reflective practice in the context of twenty-first century learning. *Open review of Educational Research, 2*(1), 42–54. doi:10.1080/23265507.2014.998159

Blackmore, J., Bateman, D., Loughlin. J., O'Mara, J., & Aranda, G. (2011). *Research into the connections between built learning spaces and student learning outcomes: A literature review.* Melbourne: State of Victoria (Department of Education and Early Childhood Development).

Blöndal, K. S., & Aðalbjarnardóttir, S. (2012). Student disengagement in relation to expected and unexpected educational pathways. *Scandinavian Journal of Educational Research, 56*(1), 85–100.

Burke, C., Grosvenor, I., & Norlin, B. (Eds.). (2014). *Engaging with educational space. Visualizing spaces of teaching and learning*. Umea: Department of Historical and Religious Studies.

Clark, J. (2012). Using diamond ranking as visual cues to engage young people in the research process. *Qualitative Research Journal, 12*(2), 222–237.

Clark, J., Laing, K., Tiplady, L., & Woolner, P. (2013). *Diamond ranking activity. Making connections: Theory and practice of using visual methods to aid participation in research.* Newcastle: Research Centre for Learning and Teaching, Newcastle University.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74,* 59–109.

Fullan, M. (2016). *The new meaning of educational change* (5th ed.). New York, NY: Teachers College Press.

Gislason, N. (2010). Architectural design and the learning environment: A framework for school design research. *Learning Environment Research, 13,* 127–145.

Greene, B. A., Miller, R. B., Crowson, H. M., Duke, B. L., & Akey, K. L. (2004). Predicting high school students' cognitive engagement and achievement: Contribution of classroom perceptions and motivation. *Contemporary Educational Psychology, 29,* 462–482.

Kanevsky, L., & Keighley, T. (2003). One gifted students in school: To produce or not to produce? Understanding boredom and the honour in underachievement. *Roeper Review, 26*(1), 20–28. doi:10.1080/02783190309554235

Land, S., Hannafin, M. J., & Oliver, K. (2012). Student-centered learning environments: Foundations, assumptions and design. In D. Jonassen & S. Land (Eds.), *Theoretical foundations of learning environments* (2nd ed., pp. 3–25). London: Routledge.

Murphy, J. F. (2016). *Understanding schooling through the eyes of students*. London: Corwin.

Norlander, P. (2014). Spaces and places for school-related learning: Challenges to the classroom. In C. Burke, I. Grosvenor, & B. Norlin (Eds.), *Engaging with educational space. Visualizing spaces of teaching and learning* (pp. 148–157). Umea: Department of Historical and Religious Studies.

Magnúsdóttir, S. H. (2015). *Hugmyndir nemenda um gott námsumhverfi* [Students ideas about good learning environments]. Unpublished MA thesis in the University of Iceland.

Ministry of Education, & Science and Culture. (2014). *White paper on education reform.* Retrieved from http://brunnur.stjr.is/mrn/utgafuskra/utgafa.nsf/RSSPage.xsp?documentId=9C0BACF52FAFC31000257FF7005A72A6&action=openDo

Organisation for Economic Cooperation and Development [OECD]. (2013). *Innovative learning environments*. Paris: Educational Research and Innovation, OECD Publishing. doi:http://dx.doi.org/10.1787/9789264203488-en Retrieved from http://www.oecd-ilibrary.org/education/innovative-learning-environments_9789264203488-en

Óskarsdóttir, G. G. (2012). *Skil skólasstiga. Frá leikskóla til grunnskóla OG grunnskóla til framhaldsskóla.* [Transition between school levels. From preschool to primary AND from lower secondary to upper secondary schools]. Reykjavík: Reykjavíkurborg and Háskólaútgáfan.

Prain, V., Cox, P., Deed, C., Edwards, D., Farrelly, C., Keefe, M., et al. (Eds.). (2015). *Personalising learning in open-plan schools*. Rotterdam: Sense Publishers.

Sigurðardóttir, A. K., & Hjartarson, T. (2016). The idea and reality of an innovative school. From inventive design to established practice in a new school building. *Improving schools, 19*(1), 62–79. doi:10.1177/1365480215612173

Sigþórsson, R., Pétursdóttir, A. L., & Jónsdóttir, Þ. B. (2014). Nám, þátttaka og samskipti nemenda [Students' learning, participation and communication]. In G. G. Óskarsdóttir (Ed.), *Starfshættir í grunnskólum við upphaf 21. aldar* [Teaching and learning in the Icelandic compulsory schools in the 21st century] (pp. 161–196). Reykjavík: Háskólaútgáfan.

Smit, K., Brabander, C. J., & Martens, R. L. (2014). Student-centred and teacher-centred learning environment in pre-vocational secondary education: Psychological needs, and motivation. *Scandinavian Journal of Educational Research, 58*(6), 695–712. doi:10.1080/00313831.2013.821090

Tanner, C. K. (2008). Explaining the relationships among student outcomes and the school's physical environment. *Journal of Advanced Academics, 19*(3), 444–471.

Upper Secondary Education Act, No. 92/2008. Available: http://eng.menntamalaraduneyti.is/media/law-and-regulations/Upper-Secondary-Education-Act-No.-92-2008.pdf

Veloso, L., Marques, J. S., & Duarte, A. (2014). Changing education through learning spaces: Impacts of the Portuguese school buildings' renovation programme. *Cambridge journal of education, 44*(3), 401–423. doi:10.1080/0305764X.2014.921280

Woolner, P., McCarter, S., Wall, K., & Higgins, S. (2012). Changed learning through changed space: When can a participatory approach to the learning environment challenge preconceptions and alter practice? *Improving Schools, 15,* 45–60. doi:10.1177/1365480211434796

Woolner, P. (2010). Pictures are necessary but not sufficient: Using a range of visual methods to engage users about school design. *Learning Environment Research, 13*(1), 1–22. doi:10.1007/s10984-009-9067-6