Space as designs for and in learning: investigating the interplay between space, interaction and learning sequences in higher education.

Abstract

In this article, I seek to investigate the interplay between space, interaction and learning sequences in higher education. I argue that space is an important part of designs *for* learning, where the building and the rooms are parts of the framing and the conditions for learning; furthermore, I discuss space as a resource in the meaning-making process, considering space as a significant part of designs *in* learning (see. Selander, 2008; Selander & Kress, 2010).

The analysis builds on the concept that we can read space as three-dimensional text, using Halliday's metafunctional theory (1978) to understand meaning potential in a space. It also draws on a design-oriented perspective called "Designs for Learning" (see. Selander, 2008; Selander & Kress, 2010). The article demonstrates how we can understand space as being a part both of designs *for* learning and of designs *in* learning.

Introduction

Space, place, interaction and learning in higher education are under-researched topics (see Temple, 2007, 2008; Savin-Baden, MacFarland & Savin-Baden, 2008) when compared to similar research with a focus on schools. Literature reviews (Ertl & Wright, 2008; Temple, 2008) illuminate the tendencies of studies on higher education to focus either on architecture or on the design of learning environments in connection to digital media or e-learning. Traditionally, on-campus education is often associated with lecture theatres and tutorial rooms, and the physical room is often taken as a given (see Jamieson et al., 2000). What kind of campus space does higher education offer students? How can we understand space becoming a place for learning?

Space, place and room are related concepts. Room and space could refer either to the physical organisation of an environment and place or to the social aspects of the same; that is, we are located in spaces but we act in places (see Dourish, 2004). In this article, I connect to the idea of both space and place as being social products (see de Certeau, 1984; Dourish, 2006; Tuan, 1977). My focus is on how room and space can be understood as potential areas and resources for interaction and meaning-making when places are shaped.

This study is inspired by the ways in which Stenglin (2004, 2008, 2009) and Ravelli (2000, 2006, 2008) interpret space as three-dimensional texts. I will return to their way of understanding space in the theoretical part of this article. Closely related to this study is a multimodal studies field that focuses on the interplay between human interaction, space and learning in schools (see Bourne & Jewitt, 2003; Flewitt, 2006,

Jones, 2008). A multimodal approach also highlights how physical environment, as part of the setting, constitutes an essential element of communication (see Kress, 2003). Kress et al., (2005) discuss space in relation to teaching by examining how teachers in English classrooms utilise space to establish relations and control the activities in the room. Jewitt (2008) argues that arranging furniture in a classroom can affect the ways a teacher orchestrates verbal interaction among pupils, and Kress & Sidiropoulou (2008) discuss how changing a physical layout affects social relations in a classroom. My own research (Leijon, 2010) connects to the field by discussing interaction in a teacher education context, where the setting plays an important role. By focusing on space, place as well as interaction and learning sequences in higher education, my ambition in this article is to further contribute to the field.

One could discuss the meanings and interaction conveyed by a room as dependent on the affordances of a room. The design in a room clearly communicates what is possible and what behaviour is allowed (Gitz-Johansen, Kampmann & Kirkeby, 2005). Space shapes interaction, but interaction also shapes space; thus, it is essential to consider space in relation to negotiation and transformation. Even a strong setting is open to change (see Gulløv & Højlund, 2005; Jewitt, 2005; Leijon, 2010, 2012a,b, in press 2013).

Consequently, the point of departure for this article is to examine space and place in higher education in relation to interaction and learning sequences. The aim is to examine *how* space can be understood in relation both to the concept designs *for* learning and to the concept designs *in* learning (see Selander, 2008; Selander & Kress, 2010). I achieve this by following two groups of students during one course in their formal, on-campus learning activities. The study is guided by the following research questions: What kind of rooms do the teacher and students encounter, and how are they designed? How are students and teachers interacting using the resources afforded by the room?

The article is divided in different sections. The first part explains the theoretical frame where the design-oriented perspective "Designs for Learning", Halliday´s metafunctional theory and the term genre are presented. The next part includes design and methodological considerations. The article then moves on to the analysis of interaction in different kinds of spaces in a higher education setting. The final part presents a conclusion, revisiting the analysis and discussion on space as a part of both designs *for* learning and *in* learning.

Theoretical frame

Designs for Learning
For theoretical anchoring, this research draws upon a multimodal design-oriented perspective called "Designs for Learning" (Selander, 2008; Selander & Kress, 2010). A multimodal approach highlights different kinds of resources used in people´s meaning-making activities. In this article, I am particularly interested both in the interplay between the resources afforded by a room in a higher education setting and in the interaction in the same room. Designs for Learning offer an approach to

understand space in relation to the concept of design. Selander & Kress (2010) discuss two aspects of design: designs *for* learning and designs *in* learning. The first aspect focuses on the institutional framing, settings and conditions for learning, such as institutional norms, curricula and learning resources. The second aspect concerns the learner redesign of his/her learning process. Thus, in relation to space, designs *for* learning helps us to understand how space, as a part of the setting, constitutes an essential element in communication. For example, spatial arrangements in a room, like furniture and lightning, could be resources in meaning-making processes (Kress, 2003). In this article, I also investigate *how* space becomes a part of designs *in* learning. With the notion designs *in* learning, one could understand space as a resource in the meaning-making process; as a learner designs his/her way, he/she chooses apt resources to transform his/her understanding into new representations (Selander, 2008; Selander & Kress, 2010). My argument here is that a room and its resources play an important role in these processes.

Metafunctions
To analyse these two aspects of space, I am also employing Halliday´s metafunctional theory (1978). This theory was conceptualized particularly for language as a social system of communication, and has been extended and applied to other forms of texts (see Kress & van Leeuwen 1996/2006). Halliday´s notion of three communicative functions is based on the idea that in all forms of texts—written, visual and spatial— three types of potential meaning exist simultaneously: the ideational, the textual and the interpersonal metafunctions (see Ravelli, 2000; Stenglin, 2009). The first type of metafunction, the ideational, concerns the meaning of a space in relation to the functions the space has been designed to fulfil. What is the space about and to what use is it put? The second type, the textual metafunction, can be understood as the organisation of a text into a meaningful whole. It concerns how the space is arranged and composed, and how it provides coherence; further, it concerns connections between different spaces (see Ravelli, 2008). The third metafunction, the interpersonal, concerns the way space relates to its users and how it enables interaction (see O´Toole, 1994; Stenglin, 2009)

This article's analysis is, as mentioned, inspired both by Ravelli (2000, 2006, 2008), and by Stenglin (2004, 2008, 2009), who employ the concept of metafunctions to interpret space as three-dimensional texts. For instance, Stenglin (2008) analyses the Olympic site in Lausanne in terms of interpersonal meaning and explores the Hyde Park Barracks Museum in Sydney using all three communicative functions (2009). In a similar manner, the notion of metafunctions is used in Ravelli's (2008) study of the exterior of a ceremonial building at the University of New South Wales, Australia. Furthermore, Stenglin and Ravelli's works stem from a field of social semiotic interest in space (c.f O'Toole, 1994; Pang, 2004; van Leeuwen, 2005), all based on the Kress & van Leeuwen multimodal framework (1996). This article presents an extension of the metafunctional approach; it is here combined with the design-oriented perspective Designs for Learning in order to understand the interplay between space, place, interaction and learning sequences. To elaborate the analysis even further the term genre can be useful.

Genre
A genre can be defined as a "text type whose social goals are supported by distinct structures" (McMurtrie, 2009:65). Furthermore, genres are not fixed – they are

possible to change, but are at the same time relatively stable, as Bakhtin (1986) puts it:

Language is realized in the form of individual concrete utterances (oral and written) by participants in the various areas of human activity. [...] Each separate utterance is individual, of course, but each sphere in which language is used develops its own relatively stable types of these utterances. These we may call speech genres. (p. 60).

Lemke (1990) connects to Bakhtin with the concept of activity genres – repeated pattern of actions in social practices with semiotic resources, constructed not only by speech but also with other semiotic resources. This, somewhat extended understanding of genres, connects well to the analysis of space in this article. Here the notion of genre is used to understand how the social purpose of a space is supported by different structures. It is also used to highlight how a space can be transformed and re-design during participant interaction (see McMurtrie, 2009, 2013; Ravelli 2006). To sum up: The article combines a theoretical design-oriented perspective with the analytic notions of metafunctions and genre in order to examine space and place in higher education in relation to interaction and learning sequences.

Design

The study combines video observation, as its main method, with interviews. Mixing observations with interviews through a joint viewing of the observations offers a way to deepen the understanding of the interaction in the rooms. Thus, descriptions can be more pronounced through discussion with the subjects of the observation. Moreover, video observation affords a multimodal perspective as it combines visual and auditory information and connects to the idea that humans use a variety of semiotic resources, including speech, gesture or text, in order to communicate (see Pink, 2007; Rose, 2001). However, video is not a neutral medium for representing reality (Pink, 2007; Goldstein, 2007); instead, the medium affords many choices before, during and after filming (see Jewitt, 2011). Clifford & Marcus (1986) even compare video observation to fiction, as the researcher as director has a number of decisions to make concerning angles, frames and so on. In the same manner, the interview can be understood as a construction created by the researcher and the interviewee. This construction contains a hierarchical relationship where the researcher sets the agenda and — by choosing topic, questions and so on — rules the interview (Kvale, 2006). In an effort to reduce the researcher monopoly of interpretation, the interview was designed as a joint discussion of the filmed material. Concentrating the dialogue on a representation somewhat reduces the focus on the relationship between the researcher and the interviewee. Thus, the interviews were inspired by the idea of "stimulated recall" (Kagan, 1984; Haglund, 2003), with video viewing as a way to reflect upon activities, assuming the viewing will stimulate recalling what those involved were thinking at the time of the action. During the interviews, excerpts from the video observations were watched and discussed, focusing on the interaction in the rooms.

The video observations were conducted in a teacher education setting, and a teacher education group of 31 students and 2 teachers were observed on four occasions (that is, during the scheduled course seminars). The four seminars were conducted in two different rooms, and each session lasted 1 hour and 15 minutes. First, the empty

rooms were observed, then the interaction in the formal spaces. A video camera was placed at a fixed point in the room, recording whole sessions from one perspective and allowing me to take the role of an observer rather than a videographer. However, the fixed camera has constraints regarding capturing complex interactions in a classroom. Consequently, I chose to support the data gathering with a mobile phone, filming snapshots of interaction; I could then capture shorter alternate positions (see Heath, Hindmarsh & Luff, 2010). The video observations were followed up by individual interviews with 3 students and 2 teachers on two different occasions. All 31 students were invited to participate in the interviews, but only 3 accepted. The teachers are those teaching the course. All interviews were individual, except one, where 2 students chose to be interviewed as a pair. On the second occasion, those students were interviewed individually. The interviews lasted between 20 and 40 minutes and were conducted in different classrooms as well as in an office space. All interviews were audio recorded and transcribed verbatim.

Different modes and representations

As previously mentioned, I am investigating space as three-dimensional texts, but the analysis is conducted on the filmic, two-dimensional representations of the rooms and on the interaction in the room. Consequently, the actual three-dimensional space, where the action is, and the two-dimensional visual representation of the space are two different semiotic modes. Thus, there is a discrepancy between the participant experiences interacting in the rooms and the camera recording of the same. The film is only a partial representation as the camera angle, chosen by me, excludes a great part of the interaction in the room. In the analysis, I thereby move from the immediate experience in the room to the filmic representation of the experiences in the room, combined with the participants' discussions regarding their experiences in the rooms. In the interviews, the participants and I form a new, joint-spoken representation based both on the immediate experience *in* the rooms and on the filmic representations *of* the rooms. Finally, the analysis of both the filmed observations and the interviews is represented here in a written form with illustrating stills from the films. There are further limitations in this representation as it contains excerpts from the films and the interviews. This movement between different modes and media could be understood as semiotic work where representations are formed and transformed in several steps in a sequence of transduction—shifting modes (Lindstrand, 2006; Leijon, 2010; Bezemer & Mavers, 2011).

Multimodal transcript and analysis

The multimodal transcript should be read as a partial, limited representation (Bezemer & Mavers, 2011) of the empty rooms and the interaction in the rooms. First, the analysis of the filmic representation and the selection of video extracts of the empty rooms were based on the communicative functions of the space. Stills were chosen to represent different aspects of the ideational, textual and interpersonal functions. These stills were complemented with excerpts from the interviews, illustrating the meaning potential in the empty spaces. The filmed representations of the interaction in the rooms were analysed multimodally. I watched the films in whole, going back and

forth in a search for focal episodes where I interpreted that the participants were using the space as a resource in their meaning-making process. For example, this could be a teacher moving around in a room, students re-grouping placing themselves around different tables, or someone using the white board. One focus was sequences that could connect to the detected meaning potential in the empty rooms; another focus was the teacher design of the space and how this was used during the interaction. As a result, only some of the interactions in the room are highlighted in the transcripts; other parts are excluded. Thus, the transcript is designed by me as a researcher to represent certain foregrounded actions that stands out to be more significant than others and thus relevant and motivated (Halliday, 1973; Hasan, 1989; Ravelli, 2000). More specifically, the transcripts are designed as a table that contains a selected still from the film, the participant's bodily movements, resources in the room and speech. However, in the final written text that constitutes this article, I have chosen to discard the table form; instead, I represent the excerpts with stills combined with written text.

Ethical considerations

Combining video with interviews offers rich data. However, many ethical decisions have to be made with both methods. Careful considerations were made to ensure the participants consented, and the participants were informed of the purpose and the implementation of the study both verbally and in written text. Further, they had time to decide whether to participate or not, and they signed their participation (written consent) with the knowledge that they could cancel at any time with no further explanation necessary.

Although usual ethical considerations were taken, the question of how to represent the material remains. Here, I will concentrate on issues concerning the visual material as this material dominates the article. The practice of anonymisation, for example, is almost impossible. The participants were informed in advance of the decisions on how the material was going to be represented, and they were told that their faces would be cropped and/or blurred in order to, if not anonymise, hinder identification (cf Pink, 2007; Wiles et al., 2012).

However, the desire to protect participants is inextricable from the issue of manipulating empirical material. This leaves the researcher faced with a dilemma that may lead to compromises and sacrifices in transparency and accessibility in representing data (Pauwels, 2008; Wiles et al., 2012). Jordan (2013) asks if altering images interferes with the integrity of the research, and he differentiates between image management and image manipulation. Image management concerns actions like changing contrast, altering size and cropping with the intention neither to alter the intended meaning of the image nor to change the terms of the participant agreement to the research. If the changes lead to a misrepresentation of the situation where the image was taken, we are dealing with image manipulation and, according to Jordan, research misconduct. However, there is a thin line between management and manipulation. To navigate the problem of the identification of individuals in this article, I have obtained a written informed consent from all participants where image-managing techniques like cropping and face blurring were presented. Furthermore, the original film recordings are kept unedited and are archived in a secure location. The alterations are performed on copies of the images. To maintain transparency,

every representation presented in this article is commented on with the information of which image management technique is employed.

Results

The result section presents both a multimodal analysis of two campus rooms in a higher education setting and the interaction in these rooms. The analysis is combined with excerpts from selected participant interviews.

The first part of the results concerns the design of the two rooms which the teacher education group met in on the four occasions of the study. As mentioned, in the analysis of the "empty rooms", space is interpreted as three-dimensional texts using the concept of metafunctions; that is, I will try to read the rooms as three-dimensional texts in relation to the ideational, textual and interpersonal metafunctions. Even if all metafunctions co-exists at the same time when meaning is made, they are here pulled apart for analytic reasons. For a more nuanced understanding the concept of *genre* is used, and the three-dimensional spaces are interpreted as textual genres. The analysis is complemented with some interview excerpts.

Figure 1. The first room.   Figure 2. The second room.

(Stills from video film, no image management technique used.)

The ideational metafunction
The ideational metafunction concerns the meaning of a space in relation to the functions the space has been designed to fulfil and how we name and classify different spaces (O´Toole, 1994; Stenglin, 2009). Ideational meanings are constructed by the sense of content in a space. Functionality and use includes textual and interpersonal aspects, and the understanding of what a space is about very much depends on the actions taking place there (Ravelli, 2008). However, for analytical reasons, the ideational metafunction is here singled out and could, according to O´Toole (1994), include functions like (1) private/public; (2) industrial, commercial, agricultural, governmental, educational, medical, cultural, religious and residential; and (3) domestic or utility (p. 86). Here, the two rooms could be understood as *public* as they are situated in an open university building designed for educational purposes. In the interviews the discussion of the empty rooms highlights the participants pre-existing understanding of the higher education spaces as genres:

Interviewer: What do you think when you see this room?
Student 1: To me it is a room for lecturing—a talk, a conference or something like that, but nothing more.

Student 2: No, I think about lectures at the university.
I: Why do you think like that?
S1: Everybody is facing the same direction.
S2: Yes, it has to be a lecture; it has to be someone telling something. That is what you think about—there is no room for discussion. One thinks about someone standing in front, telling something, and there will be a lot of people listening.

Teacher 1: When you enter a room like this, you already have a clear image of what is going to happen.
I: What then?
T: In a room like this, with tiered floors—that is monologue; that is one-way communication. That is how I understand it. And clearly, it does something to you when you enter a room like this. And it was a little … If I had been more with hindsight, I would have checked the room in advance. If I had known, I would have prepared in another way. But I was taken by surprise… I would not have booked a room like this for a seminar.
I: Is there something more you think about?
T: Yes, cinema… I think. No, it is… I mean, it is made for focusing on what is going on in the front. And it is all focus on me, standing there. Because there is no… the students seated in the rows, they just see each others necks…

According to the interviewees, the purpose, or *the genre*, of the first empty room is the function of a *lecture hall*. They talk about activities supporting the genre, such as lectures, talks, conferences and viewing films, in a room designed for a speaker and an audience. The notion of genre is also concerned with identifying the objects, or the semiotic resources, involved in the activities (see Lemke, 1990; Stenglin, 2009). What clearly constitutes the lecture hall is the layout of the room, with the sloped, tiered floors and the seating arrangements. The participants are also talking about directions of faces and bodies in their understanding of the ideational meaning (even if the quotes also can be read as comments on interpersonal and textual meanings, which together with the ideational meaning constructs the genre) of the three-dimensional space.

In the same way, the participants read the second room:

Teacher 1: This is more of a traditional classroom that you could refurnish the way you want. You can move around and do what you want…

I: What signals do you get from the room?

T: The traditional classroom, and "we can work in groups here".

In another interview, a student recognises the room:

Student 3: You know the alternative from a classroom. It is typical, this working in a group constellation… You have seen it before. It is easy to adjust; it is nothing to wonder about. You do not have to say "what´s going on?"

Consequently, the *genre* of the second empty room, according to the participants, is the "group room" or the "seminar room". The participants recognise how the tables

and chairs are arranged in groups, and it is a familiar space that reminds them of a more traditional classroom. Furthermore, there is some flexibility in the layout of the room, and the possibility to move the furniture around connects to the idea of the room as a classroom.

This first part has highlighted the participants pre-existing understanding of the spaces as genres. The notion of genre will also be useful later in the article when it comes to understand how a space can be transformed during interaction. The next part will concentrate on the textual and interpersonal meaning potential in the rooms.

The textual metafunction
The meaning potential in a three-dimensional text as space could also be understood through the textual function, investigating the organisation of a text into a meaningful whole. A way to analyse textual function in relation to space is to use the concepts *framing, information value, salience and reading path* (Kress & van Leeuwen, 1996/2006)

Framing concerns degrees of connectivity between elements in a space; a strong framing signals separation and a weak framing signals seamlessness. The more an element is separated from other elements in a space, the more it stands out and represents a separate unit of information. Framing can be realised by different resources, such as empty space between elements in a room, windows and doors, colours, contrast, continuity of building elements or style (Ravelli, 2008). Here the concepts *segregation* (realised by some kind of dividers)*, separation* (how people can be separated in a space) *and rhyme/contrast* (connections between elements by visual effects like colours) will be used (van Leeuwen, 2005)

Information value refers to how certain elements are placed in a space to give them a particular value. The element's value can change depending on where the element is located; in information zones (Kress & van Leuween, 1996/2006). In relation to spatial texts information value concerns how the placement of resources in a room make them relate to each other. On a horisontal axis in a space (or in a before-after relation, when a person moves through a space) it is about what is *given* and agreed-upon with other participants or what is *new* and unkown. On a vertical axis in a space elements in the top could be *ideal*, and the generalized essence of information and therefore most salient; Elements placed in the bottom are represented as *real*, and presents more specific, factual information. In a space ideal and real and the polarization of elements can be connected to the concepts *front* and *back*. Elements could also be located in a circular relation along the dimensions of *centre* (the nucleus) or *margin* (more subservient) (van Leuween, 2005).

Salience is about what attracts a participant attraction in a space (van Leuween, 2005). When elements are placed in different positions, some stand out more than others. Elements can be made prominent through different resources, such as colour or size (se also centre and margin above) (Ravelli, 2008).

The *reading path* concerns how we read a space when we enter a building, and how we are moving through a space. Path is about how a space is designed to regulate or afford movement. Path can be connected to *venue,* as the place people come to when

moving around in a space (McMurtrie, 2013; Ravelli, 2006; Stenglin, 2009).

Let us start with *framing* (what connects and disconnects elements in a space)*.* In both rooms the framing between the outside and the inside is strong as they are *segregated* from an outside corridor by doors and partly glassed walls. The segregation is constructed with different thicknesses (van Leuween, 2005), from the thicker wall to the thinner glass partitions. The door is locked when closed, but both teachers and students can use key-cards to open it. In the first room (the lecture hall), the framing between the student part and the teacher part of the classroom continues to be strong as the students' seats are *separated* from the teacher's area by an empty space of floor. The different ways of arranging the furniture (seats in a row in contrast to movable tables) enhance the separation.

Figure 3. The lecture hall. (Still from film, no image management technique used.)

The furniture arrangements in the student part are permanent and bolted to the floor. However, the front space in the room is more flexible, with movable tables and chairs, offering the teacher at least a few options for arranging the space. For instance, the teacher can choose to stand or sit behind or in front of the desk. When it comes to *rhyme* and *contrast,* the fabrics are black in contrast to the white tables at the front of the room; the shape of the seats is repeated in nine rows. These physical differences indicate the different function of the space, that is, student versus teacher, back and front.

Figure 4. Seating plan. (Still from film, cropping used to hide the name of the faculty.)

The seating plan on the wall represents an ideal layout in the room. If you want to refurnish you are supposed to reposition the furniture according to the original layout. Thus, the plan enhances both the strong framing and the disconnection between teacher and students. Because they are fixed, the students' seats are, naturally, placed in the same manner as the plan shows; the only differences are one extra table and one extra chair in the front.

In the second room (the group room) someone has chosen not to follow the seating plan.

Figure 5. Seating plan. (Still from film, cropping used to hide the name of the faculty.)

Thus, the furniture is placed in different ways, in clusters of desks and chairs, and this "breaking of the rules" enhances the sense of seamlessness, and a weaker framing, in the room.

Figure 6. The group room. (Still from film, no image management technique used.)

There is the same kind of *separation* in this room when it comes to a teacher area in the front, with a white board, a computer, a desk and a chair in the front of the room, an empty floor space and then the students' seats. However, the movable white tables in both sections connect the spaces, and the black chairs are *contrasted* only with the scattered orange chairs.

Figure 7. The group room. (Still from film, no image management technique used.)

In the lecture hall, the key information value is the teacher area as centre and student area as margin, even if there is no circular layout. The students seats are symmetrical arranged in rows, all facing the teacher area, thus, they all have their relations to centre in the room. In the group room the layout is different and draws people together. Here the centre is more flexible, depending on choices made by the teacher and the students. There is a teacher area that could be a clear centre with students in the margins. However, all parts of this room could have the same information value in terms of centre and margin. Here, the teacher and the students have a choice.

In a three-dimensional text as space, it also could be interesting to discuss front and back as *information values on a vertical axis.* As discussed above, there is a polarisation in the first room, with the front representing the teacher space and the back, with its higher level, signifying the student space. This indicates the front as an active place—a type of stage for a lecturer. The back, with its tiered floor, supports both the composition of the room and the clear direction towards the teacher space. Although the shape affords the teacher and all the students audiovisual connection, there is a risk that being seated in the back rows means losing contact. In the second room, there is the same front in the teacher space, but the back is not shaped in the same way. The seating arrangement allows the students to face one another in different ways. As a result, some of them will have their backs towards the front, suggesting a form of centralisation to the student part of the room in a kind of dual organisation; this allows the possibility of there being other fronts in the room. The windows and the glassed-walls enhance this blur of front and back. On the horisontal axis, in a before-after relation, the entrances in both rooms are closely connected to the teacher area, being the first space a student meet when he or she enters the room. The *given* refers to the teacher area and the new to a possible place in the student area. Once students are seated their place becomes the *given* and the rest of the room becomes the *new*.

An additional way to investigate the information value is through the concepts of *path* and *venue* (see Stenglin, 2009). The lecture hall could be described as designed with a tiered floor and the seats in split-levels with fixed tables and chairs so that students in the rear sit higher than those at the front, allowing all of them to see the lecturer. With the entrance in front of the room, there are three possible ways for the participants to enter and walk into the room: They can move forward, staying in the front; they can move directly to the right; or they can move forward and then to the right, following the path to the seats. The two latter aisles are constructed as stairs. The paths could be described as stationary, offering few options, with the purpose being to channel the students to their seats and the teacher to the front of the room. Hence, the venue—as being the place people come to, moving along the paths—is the back, placing the students with their faces forward to the lower centre of the room. The venue for the teacher is the space in front of the room, containing a table and two, optional, chairs.

Figure 8 and 9. The lecture hall. (Stills from film, no image management technique used.)

The absence of linearity in the group room offers several paths for the students. Upon entering the room, it is clear that their space is to the right, but the venue can be reached in different ways, and the students have to criss-cross through the room.

Figure 10 and 11. The group room. (Stills from film, no image management technique used.)

This leads us to the *salience* (what attracts our attention) of the rooms as the third part of composition (van Leuween, 2005). As shown above, the layout of the lecture hall is focussed and guides the students towards the lower front of the room with the white board, the television set, the overhead projector and the audiovisual centre as visual elements that draw the students' attention. These resources help the users to understand the function of the room and where the action is. Together, they constitute the room as a lecture theatre with auditorium seating. In the group room, there is a clear teacher area comprised of the same elements as in the lecture hall. However, here it is not this area that is salient; instead, the space is dominated by scattered black, white and orange furniture. This organisation directs the participants towards reading the room as a group room with a potentially dispersed layout.

The interpersonal metafunction
The interpersonal metafunction concerns the way space relates to its users. Kress and van Leuuwen (1996/2006) discuss four key aspects in the interpersonal meaning potential; *power*, *involvement*, *contact* and *social distance*. *Power* relations are constructed between people interacting in a space and is realized on a vertical axis, where a level angle signals equality, a high angle (top-down) maximum viewer power and a low angle superiority on behalf of the represented. *Involvement* is realised on a horizontal axis, where a frontal angel affords involvement and an oblique angel detachment and a side-on perspective. *Contact* in relation to space concerns how the participant is enabled to engage with the interior of a space and with other people, for example looking in through a window. *Social distance* refers to the participant position in a space and ranges from personal and intimate to impersonal (see Ravelli & Stenglin, 2008).

The power relations in the lecture hall are manifested by the vertical angle in the room. At a first glance, the clear centre of the room indicates that the power lies with the teacher in the lower space. However, anyone with teaching experience can relate to another power relation. Goffman states (1981) that a lecturer presents him- or herself as a performer to an audience, taking the floor but not necessarily the attention. The lecturer is the focus of the audience "who have the right to hold the whole of the speaker´s body in the focus of staring-at attention (as they would an entertainer)" (p.164). This brings another perspective to power and to students'

agency and possibility to alienate themselve from interaction (Goffman, 1967) proposed by the teacher, and there is a clear risk for the teacher to lose contact with students at the back of the room. Thus, this lecture hall affords complex interpersonal meanings when it comes to *power*.

In the group room power is realised on at more level angle, affording action to a higher degree of equality. However, although the tables and chairs are spread-out all over the room, we still have a clear difference between the designated teacher and student spaces. If the teacher chooses to remain standing in the teacher area, the vertical angle is somewhat less equal, than if he or she decides to participate and be seated with the students in the student area. Thus, here could be the same foreground/background in the group room as in the lecture hall and the same issue of a lecturer as a performer with an audience; however, the difference here is the flexibility in the room and the way it offers a wider range of alternatives when it comes to power. This connects to the issue of involvement, where the teacher in the group room can have a frontal position towards some students, whereas other students are seated on the sides. When the teacher moves around the chances for involvement increases for some students, but decreases for others. On the other hand, the group room offers a higher degree of involvement between students than the lecture hall as some of them are facing each other. In the lecture hall the frontal angel signals one kind of involvement, that is towards the teacher in the front.

When it comes to social distance, the lecture hall establishes a somewhat impersonal relationship with the participants, especially in teacher-student contact. However, the shape of the room guides the students towards the upper parts, where they have a relatively small "private" area comprised of their seat and a small fold-up table. The constraining layout of the room forces the students to be less distant, when it comes to student-student contact, as they are seated very close to each other. On the other hand, this doesn´t necessarily mean that they are going to interact, as they are all facing the front, focusing on the teacher area.

In the group room, there are several paths to choose from when the students enter their part of the room—to choose the teacher space is not an option. Nevertheless, the student agency is higher; they can choose to place themselves at diverse tables and in different directions in the room and thereby control degrees of social distance and contact, both with the teacher and other students. Thus, there are several affordances for interaction when students face their peers or the teacher; accordingly, the possibilities for privacy increase. At the same time, the teacher loses some control through not being able to meet and have eye-contact with all students at the same time.

In this part of the article, the analysis has concerned what kind of rooms the students experienced and the pre-existing understandings of the genres "the lecture hall" and "the group room". Next, an analysis of two examples from the interaction in the rooms is presented; the same concepts of metafunctions are used to understand the meaning potential in the spaces. In this part the notion of genre will also be used as an analytic tool to understand how a space can be transformed and re-designed by the participants.

Figure 12 and 13. Teacher and students in the lecture hall. (Stills from film, cropping used to protect participants' identification.)

In this first excerpt, we meet the students and a teacher in the lecture hall. The teacher is asked to conduct a literature seminar that is designed by other teachers, and she has not booked the room herself; consequently, she does not know beforehand in what kind of room the seminar is taking place.

There is a common understanding of the genre of the space as a lecture hall, as I have previously described in the article:

S2: Yes, it has to be a lecture; it has to be someone telling something. That is what you think about—there is no room for discussion. One thinks about someone standing in front, telling something, and there will be a lot of people listening.

T: When you enter a room like this, you already have a clear image of what is going to happen.

The understanding of the space as a lecture hall leads to both students and teacher expecting a focus on the teacher in the front, indicating the front as an active space (a form of stage for a lecturer) while the back is more of a passive space (a place for listening). However, this is not the case here. The seminar form builds on the concept of communication and interaction, becoming quite a challenge for the teacher. In the stills, we can follow the teacher's actions in the front. She is talking about the book, walking back and forth, and the students may be listening, but she gets no verbal response. She then stops, turns towards the students and asks, "Any thoughts?" She receives no answer.

Figure 14. (Stills from film, cropping used to protect participants' identification.)

The lecture hall in itself does not offer the students a great deal of flexibility, and this example shows how students have agency and tend to use their position in the room to show an unwillingness to interact verbally; they are alienated from interaction (Goffman, 1967). Some students are taking notes, while some look away or look down onto the table or a book. The power is not fixed in the clear centre, and the angle in the room puts the teacher in a vulnerable position when she acts as a performer to the audience (Goffman, 1981). When the teacher grasps the sense of non-participation, she starts to move.

Figure 15, 16, 17. (Stills from film, cropping and blurring used to protect participants' identification.)

In these stills, we can follow how the teacher uses the layout of the room as a resource in her efforts to build communication with the students. She changes her position, and chooses a more side-on perspective towards the students. This could mean a lower degree of involvement, but the teacher walks up the stairs, facing the group. In this way, she is creating a new frontal angle, from her perspective, and offers new ways for the students to involve. She is also using the vertical axis in the room, and trying to establish a new power position walking up the stairs. In the second picture, she even puts her book into the fore and points out what it says, but she still receives no verbal response.

T: And now I am standing here, talking. It is quite the opposite [to what the literature says].

This does not mean that there is a lack of interaction; instead, as I have highlighted before, the students also have agency and use the resources in the space—seating, body position, books and notebooks to be active. However, it is obvious that the students do not want to interact in a dialogue regarding the literature. In the last frame, the teacher uses both her position in the room and her posture to wait for some kind of response.

Figure 18 and 19. (Stills from film, cropping and blurring used to protect participants' identification.)

The teacher is consistent; even though the audience remains quiet, she continues to move up the stairs. When a student raises her head, the teacher comes closer and leans forward, and, finally, the student raises her hand with a pencil in it. When the teacher comes near, the student finally starts to talk. This first move later leads to other students entering the dialogue.

How can the example of interaction in this space be understood? The teacher is working against the shared understanding of the genre "lecture hall". In a process of re-design, she is using the layout of the room (the textual metafunction) and her position in the room to signal something new, leaving the front, or trying to extend it, beyond the separated spaces. Thus, she is trying to create different relations with the students (the interpersonal metafunction) than a traditional lecture hall affords. Consequently, the lecture hall could be understood with the concept designs *for* learning (Selander, 2008; Selander & Kress, 2010), for the space constitutes an important part of framing the learning process. The lecture hall is, *per se,* a part of campus space in higher education, and there is a common understanding of the genre of the space. In this example, the teacher does not consider the room as a part of the didactic design; much depends on her being in the hands of other teacher's choices when it comes to course and seminar design. The concept of designs *in* learning helps us to understand space as a resource in a learning process. Even if the teacher does not integrate space as a part of the didactic design beforehand, she constantly has to reflect on and act in the room during the seminar. She re-designs the room and try to transform the meaning and the genre of the space as a lecture hall. She continuously represents her understanding of the room in an effort to communicate with some of the students. In turn, the students also have agency and use the resources in the room to design their responses, whether they participate or not.

 Interaction in the group room

In my next examples, we will return to the group room. The participants read the meaning potential in the group room as a place for interaction and group work; in fact, it is a form that is well-known to everybody. As a result, the genre of the group room is well established. The two occasions of seminars have a similar design: the two teachers are planning to conduct a literature seminar. The students are instructed to form groups and then discuss their reading of the literature. The participants also accept the space as it is; even if the room offers flexibility the furniture is arranged in a rigid pattern, and the participants do not refurnish it, as one teacher explains:

Teacher 1: Here we have this movable furniture that we could have rearranged. They are neatly formed here, and it will later show that they remained in this formation because this setting afforded possibility for the students to group themselves.

 The students seem also to be content with the layout:

Student 1: It was a good layout, with the tables. ... As we were supposed to discuss in groups, this worked well. Yes, to be placed like this, I like it when people are placed like this.

Interviewer: Around a table like this?

S: Yes, precisely.

I: Why do you like it?

S: Because you don´t have to turn around as much and you have a person in front of you and you could talk to the person on the left and yes ... the conversation is flowing and you can hear loud and clear.

Figure 20 and 21. The group room without and with students. (Stills from film, cropping and blurring used to protect participants' identification.)

However, when then students are asked to construct groups, they avoid the centre of the room and place themselves in the margins, creating a social distance towards the teacher and the other groups. As the excerpt from the student shows, the table form affords interaction, and a close personal distance within the groups. However, what happens when the teacher wants to interact with the groups?

The teacher moves around the groups using different positions in the room to interact with the students and to create different angles to establish involvement. She chooses to foreground the venue in the student area, and she uses teacher space only for a

short part of the introduction in the seminar. The absence of linearity in the group room offers several paths not only for the students entering the room but also for the teacher during the seminar. Once the students have chosen their seats, they remain seated; the teacher takes to the floor, criss-crossing the room.

In the picture below, she moves a chair from one end of the table (where no students are seated) to another end so that she can sit down on the same side as two students. She then leans slightly forward so that she can face all students seated at the table. The students keep their positions and appear open to the teacher's actions.

Figure 22 and 23. The teacher moves around. (Stills from film, cropping and blurring used to protect participants' identification.)

The teacher comments on her different positions in the room:

T2: The way I am positioning myself is about me not wanting to dominate their discussion. I try to subordinate myself; I don't want to affect the discussion. One goal is to moderate my role.

It is clear that moving around, using the layout of the room and furniture, and changing her body position to interact with students are parts of this teacher's conscious didactic design. She talks about power relations, and how she creates different levels in an effort to subordinate herself. The students know that they are going to discuss the literature in groups, and they know that the teacher is supposed to interact; the teacher does not want to dominate this interaction. Thus, in contrast to the teacher in the lecture hall, this teacher can work *with* the meaning potential of the room (constructed by all the metafunctions), and she uses the understanding of the genre "group room" that is shared between teacher and student, to design the seminar.

Figure 24 and 25. Teacher and students in the group room. (Stills from film, cropping and blurring used to protect participants' identification.)

Other stills show how the teacher is crouching on different sides of the table:

T2: If I stand, it is more like an order. But if I sit down, I soften the power relations. But, at the same time, I can give more direct and tough questions. ... Many of these actions are unintended, but I very much consider balancing power relations.

Again, the teacher talks of power and of how she uses the layout (the textual meaning potential) in the room to position herself in relation to the students. However, in this example, she only reaches one individual at a time; the others clearly signal that they are not a part of the discussion. Again, the students have agency and use the available resources: body position, looking down at tables, reading and leaning backwards.

Student 3: I can recall one teacher approaching the group, but there was not much of a group discussion then. ... I am not all that interested; I keep on reading. ... She puts herself in a soft position, below the person she talks to. She is so discrete. It may be conscious; maybe she really wants to contact you individually.

I: Does she affect you?

S3: She blocks the group interaction. If I want to talk to the whole group, it is not possible here.

Another student says:

S2: It is her body, her way of positioning herself that contributes to the interpretation "she is not talking to us; she doesn´t want to listen to us." ... They understand that the conversation is only for the girl and the teacher.

I: How come?

S2: They are still reading, not looking at the teacher. They think, "they have a conversation and it is not for us."

In the excerpts, the students talk about the textual metafunction; that is, how the teacher positions herself in the room and how she approaches the group. They also bring the interpersonal metafunction to the fore: how the teacher, in some respects, blocks some parts of the interaction in her efforts to establish a personal distance, and how one of the students is not interested while the others signal non-participation with their body position.

So, how can we understand these examples using the concepts designs *for* learning and design *in* learning? Even if we have this shared understanding of the space as a group room, the interaction does not happen in itself. In the excerpts, the teacher expresses that she has a clear intention with her movements in the room; this is part of didactic design that could be understood as designs *for* learning. Here, the intention is to have a seminar in a space that is understood as a group room. The teacher draws on this genre during the seminar to build relations and interaction with the students. She tends to move around in the student part of the room, avoiding the teacher part and uses different angles on a horizontal axis to create involvement and different levels on a horizontal axis to establish different power relations. In the interview, she declares

that her movement and body position tones down the power relations in the room. Thus, she is relying on the group room as a part of the designs *for* learning in the process of designs *in* learning. However, the space and the interpersonal metafunction are not fixed; instead, they have to be worked on throughout the seminar. The examples above show how students have agency in relation to space and use their positions in the room either to signal participation or to declare that they have no intention of taking part in the interaction the teacher is trying to create. In this case, the intended teacher front is moving around the space. When the students participate, they accept this front as having meaning to them. Students control the situation in this room in different ways; for example, students decide where to be seated, choosing position and distance in the room. Another example is students deciding how to interact, for in this setting, it is impossible for the teacher to engage all students at the same time. Even if this teacher seems to have built-in the space as a part of her didactic design (designing *for* learning) the space is something she has to reflect upon and take action in throughout the seminar. Similarly, the students consider the space of the room as the flexibility in the room offers several choices during the seminar.

Conclusion

In this article, I have sought to understand the interplay between space, interaction and learning sequences in higher education by asking these questions: What kind of rooms do the teacher and students encounter and how are they designed? How are students and teacher interacting using resources afforded by the room? A range of semiotic tools have been used to analyse the campus space in this study as three-dimensional texts, mainly drawing on Halliday's (1978) metafunctional theory, that affords a broad way to explore communication metafunctionally, as extended by others to three-dimensional and other non-linguistic texts (Kress & van Leeuwen, 1996/2006), combined with the design-oriented perspective Designs for Learning (see Selander, 2008; Selander & Kress, 2010). The article contributes to the field of research in both multimodality and higher education by using this theoretical combination together with the focus on both space and interaction in the analysis. The examples outlined in the result session show how space can be understood as both an important aspect in designs *for* learning as well as in designs *in* learning. The concept designs *for* learning highlights how space *can* be a part of a teacher's conscious didactic design. Nevertheless, space constitutes an important part of the setting in creating a learning sequence. When students and teachers enter a room, they read it in similar ways and bring this reading into the situation; thus, they have expectations of the genre and the affordances of the room. The results show that both teachers and students have agency and use these affordances during their meaning-making processes as designs *in* learning. Consequently, space, as designed *for* learning, is something both teachers and students read, transform and re-design in action, designing their paths *in* learning. So, what are the implications for higher education? This article shows how space constitutes an important part of a learning sequence. We know that a room is of importance for the actions taking place in the room (see Gitz-Johansen, Kampmann & Kirkeby, 2005). The result in this article brings to the fore *how* space, interaction and, consequently, learning are related. There is an on-going discussion of space in higher education, especially when it comes to blended learning, libraries and so called "Active Learning Classrooms" or "Flexible Classrooms" (see Temple, 2008; Miller-Cochran & Gierdowski, (2013). However, this discussion is not

21

from a design theoretical and social semiotic point of view and not focused on interaction, learning and space as a resource in a meaning making process. Space is something both students and teachers have to reflect upon and act in everyday. It is time for higher education to recognise space didactics.

Acknowledgements

References

Bakhtin, Mikhail M. (1986). *The Problem of Speech Genres*. In Caryl Emerson & Michael Holquist (Red.), Speech Genres & Other Late Essays (ss. 60-102). Austin: University of Texas Press.

Bezemer, J. and Mavers, D. (2011) 'Multimodal transcription as academic practice: a social semiotic perspective', *International Journal of Social Research Methodology*, 14(3): 191–206

Bourne, J. and Jewitt, C. (2003) 'Orchestrating Debate: A Multimodal Analysis of Classroom Interaction', *Reading: Literacy and Language,* 37(2): 64–72.

Clifford, J. and Marcus, G E. (1986) (eds) *Writing culture: The poetics and politics of ethnography*. Berkeley, CA: University of California.

de Certeau, M. (1984) *The Practice of Everyday Life*. Berkeley, CA: University of California Press, MIT Press.

Dourish, P. (2004). *Where the action is: the foundations of embodied interaction.* Cambridge: The MIT Press.

Dourish, P. (2006). Re-Space-ing Place: Place and Space Ten Years On. In: *Proc. ACM Conf. Computer-Supported Cooperative Work CSCW*. Banff, Alberta 2006, pp. 299–308.

Ertl, H. and Wright, S. (2008) 'Reviewing the literature on the student learning experience in higher education', *London Review of Education,* 6(3): 195 –210.

Flewitt, R. (2006) 'Using video to investigate preschool classroom interaction. Education research assumptions and methodological practices', *Visual Communication*, 5(1): 25–51.

Gitz-Johansen, T., Kampmann, J. and Kirkeby, I M. (2005) 'Samspil mellem fysisk rum og hverdagsliv i skolen', in K. Larsen (ed) *Arkitektur, krop og læring,* pp. 43–67. Köpenhamn: Hans Reitzels Forlag.

Goffman, E. (1967) *Interaction Ritual. Essays on Face-to-Face Behaviour*. New York: Pantheon Books.

Goffman, E. (1981) *Forms of Talk*. Philadelphia: University of Pennsylvania Press.

Goldstein, B M. (2007) 'All Photos Lie. Images as Data', in G. Stanczak (ed) *Visual Research Methods. Image, Society and Representation,* pp. 61–81. Los Angeles: Sage.

Gulløv, E. and Højlund, S. (2005) 'Materialitetens paedagogiske kraft. Et antropologisk perspektiv på børneinstitutioner', in K. Larsen (ed) *Arkitektur, krop og læring,* pp. 21–42. Köpenhamn: Hans Reitzels Forlag.

Haglund, B. (2003) 'Stimulated Recall. Några anteckningar om en metod att generera data', *Pedagogisk Forskning i Sverige*, 8(3):145–157.

Halliday, M. A. K. (1973). *Explorations in the Functions of Language.* London: Edward Arnold.

Halliday, M.A.K. (1978) *Language as social semiotic. The social interpretation of language and meaning*. London: Arnold.

Hasan, R. (1989 [1985]). *Linguistics, Language and Verbal Art.* Oxford University Press. [Originally published by Deakin UniversityPress.]

Heath, C., Hindmarsh, J. and Luff, P. (2010) *Video in Qualitative Research. Analysing Social Interaction in Everyday Life.* Los Angeles: Sage.

Jamieson, P., Fisher, K., Gilding, T., Taylor, P G., and Trevitt, C. (2000) 'Place and Space in the Design of New Learning Environment', *Higher Education Research and Development,* 19(2): 221–237.

Jewitt, C. (2005) 'Classrooms and the Design of Pedagogic Discourse: A Multimodal Approach', *Culture Psychology* 11(3): 377–384.

Jewitt, C. (2008) 'Multimodality and Literacy in School Classrooms', *Review of Research in Education* (32): 241–267.

Jewitt, C. (2011) 'Editorial', *International Journal of Social Research Methodology* (14)3: 171–178.

Jones, P. (2008). The interplay of discourse, place and space in pedagogic relations. In L. Unsworth (Eds.), *Multimodal semiotics: Functional analysis in contexts of education* (pp. 67-85). London: Continuum.

Jordan, S. R. (2013) 'Research integrity, image manipulation, and anonymizing photographs in visual social science research', *International Journal of Social Research Methodology* (ahead-of-print), 1–14.

Kagan, N. (1984) 'Interpersonal process recall: Basic methods and recent research', in D. Larsen (ed) *Teaching psychological skills*. Monterey: Brooks Cole.

Kress, G. (2003) *Literacy in the New Media Age*. London: Routledge.

Kress, G., Jewitt, C., Bourne J., Franks A., Hardcastle J., Jones K., and Reid, E. (2005) *English in Urban Classrooms. A multimodal perspective on teaching and learning.* London/New York: RoutledgeFalmer.

Kress, G. and van Leeuwen, T. (1996/2006) *Reading Images: The Grammar of Visual*

Design. London: Routledge.

Kress, G. and Sidiropoulou, Charalampia (2008) 'Klassrumsdesign', in A-L. Rostvall and S. Selander (eds) *Design för lärande,* pp. 108–117. Stockholm: Norstedts.

Kvale, S. (2006) 'Dominance through interviews and dialogues', *Qualitative inquiry*, *12*(3): 480–500.

Leijon, M. (2010) *Att spåra tecken på lärande. Mediereception som pedagogisk form och multimodalt meningsskapande över tid.* PhD Thesis, Malmö Högskola, Sweden.

Leijon, M. (2012a) 'Presenting as a matter of design – exploring designs for learning', *Designs for Learning*, 5(2): 42–51.

Leijon, M. (2012b) 'Campus space – a place for learning?' Paper presented at the *6th International Conference on Multimodality* 22nd – 24th of August, 2012, University of London, United Kingdom.

Leijon, M. (2013) 'Rummet som resurs för lärande och i lärande', in Amhag, L., Kupferberg, F. and Leijon, M. (eds) *Medierat lärande och pedagogisk mångfald*, pp.53–72. Lund: Studentlitteratur.

Lemke, J. (1990). *Talking Science. Language, Learning and Values.* Westport, Connecticut: Ablex.

Lindstrand, F. (2006) *Att göra skillnad. Representation, identitet och lärande i Ungdomars arbete och berättande med film*. PhD Thesis, Stockholm University, Sweden.

McMurtrie, R.J. (2009). 'The genre of foyers in the contemporary high-rise: A study of Harry Seidler's work', *Linguistics and the Human Sciences* 5(1), pp. 59-92.

McMurtrie, R.J. (2013). *'Spatiogrammatics: a social semiotic perspective on moving bodies transforming the meaning potential of space.'* Unpublished PhD Thesis, School of the Arts and Media, University of New South Wales (available online at: http://trove.nla.gov.au/work/177154179?lformat=Thesis&sortby=dateDesc&q=nuc%3ANUN&l-availability=y&l-australian=y&c=book&versionId=192895826)

Miller-Cochran, S., & Gierdowski, D. (2013). 'Making Peace with the Rising Costs of Writing Technologies: Flexible Classroom Design as a Sustainable Solution', *Computers and Composition*, *30*(1), 50-60.

O'Toole, M. (1994) *The Language of Displayed Art*. London: Leicester University Press.

Pang, A. (2004) 'Making History in From Colony to Nation: A Multimodal Analysis of a Museum Exhibition in Singapore', in K.O'Halloran (ed) *Multimodal Discourse Analysis,* pp. 28–54. London: Continuum.

Pauwels, L. (2008) 'Taking and using', *Visual Communication Quarterly* (15): 243–257.

Pink, S. (2007) *Doing visual ethnography* (2nd ed.). London: Sage.

Ravelli, L. (2000) 'Beyond Shopping: constructing the Sydney Olympics in three-dimensional text', *Text-Interdisciplinary Journal for the Study of Discourse*, *20*(4): 489-516.

Ravelli, L. J. (2006). ' Genre and the museum exhibition'. *Linguistics & the Human Sciences*, *2*(2): 123-141.

Ravelli, L. (2008) 'Analysing Space', in L. Unsworth (ed) *Multimodal Semiotics: Functional Analysis in Contexts of Education*, pp.17–33. London: Continuum

Ravelli, L. and Stenglin, M. (2008) 'Feeling space: interpersonal communication and spatial semiotics', in G. Antos and E. Ventola (eds) *Interpersonal Communication Handbook of Applied Linguistics*, Volume 2, pp. 355–393. Berlin: Mouton de Gruyter

Rose, G. (2001) *Visual Methodologies*. London: SAGE.

Savin-Baden, M., McFarland, L. and Savin-Baden, J. (2008) 'Learning spaces, agency and notions of improvement: what influences thinking and practices about teaching and learning in higher education? An interpretive meta-etnography', *London Review of Education*, 6(3): 211–227.

Selander, S. (2008) 'Designs for learning – a theoretical perspective', *Designs for Learning*, 1(1): 10–22.

Selander, S. and Kress, G. (2010) *Design för lärande – ett multimodalt perspektiv*. Stockholm: Nordstedts.

Stenglin, M. (2004) *Packaging curiosities: Towards a grammar of three dimensional space.* PhD Thesis, University of Sydney, Australia.

Stenglin, M. (2008). 'Olympism: how a Bonding icon gets its charge', in L. Unsworth (ed) *Multimodal Semiotics: Functional Analysis in the Contexts of Education*, pp. 50–66.

Stenglin, M. (2009). 'Space Odyssey: Towards a social semiotic model of 3D space', *Visual Communication*, (8)1: 35–64.

Temple, P. (2007) *Learning Spaces for the 21st century: a review of the literature*. London: Centre for Higher Education Studies, Institute of Education.

Temple, P. (2008) 'Learning spaces in education: an under-researched topic', *London Review of Education*, 6(3): 229–241.

Tuan, Y-F. (1977) *Space and Place. The Perspective of Experience.* Minneapolis: University of Minnesota Press.

van Leeuwen, T. (2005) *Introducing Social Semiotics*. London: Routledge.

Wiles, R., Coffey, A., Robinson, J. and Heath, S. (2012) 'Anonymisation and visual images: issues of respect, 'voice' and protection', *International Journal of Social Research Methodology*, (15)1: 41–53.