

# **Disruptions and disturbance as challenges in a blended learning (BL) environment and the role of embodied habit orientation**

## **Abstract:**

In this paper we analyse two cases where BL courses have been run since the summer 2012 (Teachers' and the radiography educational programmes at University College North in Denmark (UCN)). In this study it was clear that the majority of students preferred face-to-face instructions and interaction over the implemented BL approach and they felt more disrupted and disturbed when required to work more online and from home. In the paper we therefore discuss how disruptions and disturbances have an influence on students' study and learning activities in a BL environment. We argue how disturbances are related to students' embodied experiences and habitual and spatial orientation, and how they play a role in students' perceptions of different learning spaces. Based in Simonsen's (2007) 'geography of human practice' and an ecological understanding of 'orientations' developed by Jander (1975) we analyse and discuss how students' orientation in different learning environments influence their navigation, and how disruptions and disturbances affect their orientation. The findings illustrate and discuss students' challenges of adapting to the BL approach and how students' prior experiences and habits challenge their learning activities outside the educational institutions. Based in these findings the concluding discussion presents new perspectives on students' orientation in BL environment to take into consideration in BL programmes.

**Keywords:** Blended learning, orientation, disturbance, ecotones, knowledge development.

## **1. Introduction**

BL is on the agenda of most educational institutions. The advantage of being able to organize the program for both face-to-face and online learning seems to accommodate both flexibility, as well as self-directed learning independent of time and place. These were also intentions of the FlexVid project (Jensen 2012) which the two cases we analyse in this paper were part of.

In spring 2012 models of BL were developed by lecturers in radiography and teacher undergraduate education at University College North (UCN). Blended or flexible learning, as understood in this context, was designed in a way so that approximately 50% of the education was planned to take place outside UCN's buildings, whereas normally students would spend the majority of their study time on-campus. Thus, in this educational context, shifting to a pedagogical model featuring more self-directed learning outside the institution was a relatively major change. From our interviews and survey it became clear that the majority of students preferred face-to-face instructions and interaction over the implemented BL approach. Also, they experienced difficulties adapting to the particular design of BL where they were required to work more online and from home (where they would work both online and offline).

A prevalent theme that emerged from the interviews is that students felt more disrupted and disturbed when working from home. Therefore, in this paper we discuss how disruptions and disturbances have an influence on students' study and learning activities in a BL environment. We argue how disturbances are related to students' embodied experiences and habitual and spatial orientation, and how they play a role in students' perceptions of different learning spaces. We base this in Simonsen's (2007) 'geography of human practice' and an ecological understanding of 'orientations' developed by Jander (1975), and we use these to suggest focal points of interest for BL. Initially, however, we look into current research on the matter of disturbances and disruptions; thereafter we will describe the theoretical concepts of habits and spatial orientation adopted in the paper.

## **2. Disturbances and disruptions in a BL environment**

Disturbances and disruptions are a condition in daily living. Despite the fact that managing disruptions and disturbances and multitasking is a competence that students must achieve, there are many disadvantages. For instance; some argue it limits deeper learning and thoughtful information processing (Marien, Custers, Hassin & Aarts 2012) and it takes attention away from the study activities (Matthew & Evans, 2012). Disturbances and disruptions are interruptions which can be both internal and external. External disruptions are characterised by stimuli emerging from the environment and objects in the surroundings. Internal disturbances are activated by stimuli from thoughts and feelings (Rosen, Carrier & Cheever 2013).

The impact of disturbances and disruptions are described in contemporary research, where it is argued that the consequence of 'continuous partial attention' (Rose 2010) and media multitasking result in poorer study performances. For instance, Foroughi, Werner, Nelson & Boehm-Davis (2014) found that interruptions negatively impact on quality of work during a complex, creative writing task. Additionally, it seems to increase the time of study-processes and make the thinking more superficial with consequences for grades and the quality in performances (Rosen, Carrier & Cheever 2013). Werner et al.(2011) have investigated what makes a person better or worse at dealing with interruptions and they found that people who have better working memory capacity and better spatial abilities are better at resuming interrupted tasks. However, we shall argue that interruptions are also related to students' habitual and spatial orientation i.e. their previous embodied experiences in various environments.

### **2.1 Habits and spatial orientation**

In her paper "Practice, Spatiality and Embodied Emotions: An Outline of a Geography of Practice" Simonsen (2007) argues for an understanding of human practice and spatiality based in a social ontology of practice (drawing particularly on the phenomenological approach inspired by e.g. Merleau-Ponty, Heidegger and Bourdieu). She argues how everyday practice and bodily/spatial actions are situated, reflexive, but also based in our embodied experience i.e. recurring and repeated ways of 'doing things' in practice. Drawing on Bourdieu she argues how these embodied experiences themselves form a basis for social action, and are part of our 'habitus' (Bourdieu, 1990).

*“These are moving bodies “measuring” space in their active construction of a meaningful world. In taking up or inhabiting space, bodies move through it and are affected by the “where” of that movement.” (Simonsen 2007, p. 173).*

This inhabiting of space is about way-finding and a spatio-temporal orientation of experience and perception where people's relationship to the environment is conducted through both orientation and demarcation (Simonsen, 2007). However, this orientation and way-finding is an interactive process between the environment and the human.

Although Simonsen (2007) discuss notions of spatiality as part of her 'geography of human practice' her basic arguments are of a more theoretical nature and she does not address movement and orientation more concretely. Therefore, to discuss students' orientation we are inspired by Jander's (1975) use of 'orientation'. Jander (1975) argues for a unified theory of an 'orientation ecology' to understand orientation and movement for all living creatures - from bacteria to humans. As these concepts have been developed to understand all organisms' movement and orientation within the cross-field of ecology and ethology, we adopt the concepts in a broader way than perhaps originally intended.

Jander defines spatial orientation as “self-controlled maintenance of change of body-position relative to the environmental space” (Jander 1975, p. 173). This definition implies a close connection between the organism and the organisms' space of action and navigation. He outlines six different types of orientation where habitat orientation overlaps them all:

- Positional orientation
- Object orientation
- Strato orientation
- Zonal orientation
- Topographic orientation
- Geographical orientation

Positional orientation is about whether an organism stays in a place or moves on. Disturbances can influence these causing a response or counteraction. For example, for a fish it could be a change in the stream, or for a human it could be a message notification from Facebook causing one to move elsewhere online or stay in place. This overlaps with the concept of object orientation. Object orientation concerns searching, approaching or avoiding objects. In object orientation the organism compares (more or less conscious) the sum of positive and negative stimuli values and their intensity, and accordingly approach or avoid these. In relation to the former example we could view a message notification from Facebook as a disturbing object, which becomes a more desirable object than the current object of activity.

Strato and zonal orientation are “general foreseeable conditional orientations” across vertical layers (strato) or horizontal (zonal) for example the vertical “migrations of organisms up and down through [...] the biosphere [...] maintained by light and gravity” (Jander, 1975, p. 181) or horizontal zonal movement across different ecotones (e.g. cross-shorelines). We understand these as very basic and

instinctive orientations and although we are interested in movements between different zones we see the zonal orientation (for humans) as strongly connected to the topographical orientation.

Topographic orientation is movement where the object orientation is extended by learning. This movement concerns learned spatial relationships among objects and between objects and organisms e.g. students' learned relationship to objects in the classroom, where various objects afford certain spatial behaviours, and students have learned how to navigate appropriately in these spaces. The classroom as location can be thought of as an embodied experience; as a memorized resource and environment for learning activities. Geographical orientation partly integrates object orientation and zonal orientation. However, in this kind of orientation there is an increased length of ongoing movement over a distance.

### **3. Methods**

This research is conducted as a follow up on the implementation of BL, in teacher education and radiography education at University College North (UCN) in Denmark. We used a pragmatic approach of mixed methods, where the qualitative parts have the highest impact in our case-study. The design consisted of; one survey (S) among all students and eighteen focus group interviews (FI).

#### **3.1 Survey**

The purpose of the survey was to gain insight into students' prerequisites, resources and preferences in relation to attending the BL programmes. The survey (S) was conducted as an online questionnaire around a five point Likert scale. Questions were supplemented by open rubrics for comments. The survey-questions identified: 1) background information, such as prerequisites, 2) learning preferences and 3) students intentions of using of educational stations as a supplement to existing learning environments. The survey was piloted and subsequently posted to all students (N=59) after three months of students' enrolment in both programmes. There was a response rate of 66% (n=37) after two rounds of notifications.

#### **3.2 Focus-group Interviews**

Focus-group interviews (FI) were chosen to obtain detailed information about informants' individual and shared perceptions of the BL program. The interviews were conducted after half a year (FI1), one year (FI2) and one and a half years (FI3) after the students' enrolment. Focus group interviews were conducted among: radiography students (RS) and teacher student (TS), lecturers at teacher education (TL) and lecturers at radiography education (RL), practitioners at municipal schools (TP) and at radiography units at hospitals (RP) and mentors.

The selection of informants was based on their involvement in the BL program and prioritised variation in gender, and students' area of residence. Prior to the focus-group interviews informants completed a consent form accepting participation in the research project.

The structure of the interviews relied on a narrative approach by use of themes and open-ended questions. Three main areas were explored: 1) informants experience/sense of BL, 2) informants'

opinion on how BL influence or might influence student knowledge development and learning and 3) how the different learning environments and spaces influence on these matters. Each interview lasted about one hour and was audio-recorded and transcribed.

### **3.3 Analysis and interpretation**

The analysis and interpretation were structured by a critical hermeneutical approach, inspired by Ricoeur's (1984) use of the hermeneutic arch. Empirical data were analysed and interpreted by prefiguration, configuration and refiguration. In the prefigurative analysis the text derived from the empirical data appeared in its unstructured form. In configuration the data were put into order as thematizations around main plots. The themes represent common concerns and issues that were expressed amongst the participants and as durable themes across the three rounds of interviewing. Finally, refiguration added further critical distance by use of critical perspectives, interpretation and explanations (e.g. adoption of new theoretical perspectives and concepts to understand the data). There are additional relevant themes and plots, specific survey data and insights emerging from the rich set of data that we cannot retrieve in this paper, however, they have been explored in other work (Dau, 2014, Dau 2013, Nyvang & Dau, 2013).

## **4. Findings**

We initially include some general information on the implementation of BL in the educations. Then we discuss and analyse the influences of disruptions and orientation in BL environments as a main plot.

### **4.1 Implementation of BL in teacher and radiography education**

For teacher education the blend aimed at increasing the students' study activities outside UCN. The students had approximately one full study day a week in their first year, and two days in their second year where they would manage their own study-tasks e.g. from home. Furthermore, they had approximately one or two days a week for study-group work where they could choose how and where to engage with group members. The lectures at UCN were carried out as face-to-face lessons except lessons with one of the lecturers who had some experience with online lecturing. In the first half year these lectures were designed as online synchronous video-conference lessons and online discussions (available asynchronously as well). However, the limited physical appearance of the lecturer was problematized by students as they preferred face-to-face instructions. These complaints resulted in the lecturers reorganising the lessons toward more face-to-face activities with some use of IT-assignments e.g. by using Web 2.0 tools and creating digital cartoons illustrating the subjects investigated

For radiographers education the blended model had been in use for some years before 2012 in order to offer students from different parts of the country access to education. The blend is structured with face-to-face lessons two to three days a week and then self-directed study activities outside UCN. Within the first year of the period of the flexible education (2012) some experiments were made

offering students online synchronous lessons by streaming the lessons. However, all students enrolled in 2012 preferred to participate in face-to-face lessons and streamed lessons were cancelled.

The purpose of implementing BL was to accommodate to students from rural areas by offering flexibility, but also to encourage students to engage with more self-directed learning (Jensen 2012). All students who enrolled in radiography education had to participate in BL, and one of two classes in teacher education had to participate. Here the students were randomly selected. Both classes began their education in autumn 2012.

Despite the intentions of offering the students more flexibility by using various BL approaches it was clear from the survey that students strongly preferred face-to-face lectures at UCN (79% of the student teachers and 100% of radiography students). Similarly, other face-to-face activities were preferred by 74% of the student teachers and 88% of the radiography students who answered that they learned best by cooperation and discussions with their peers at UCN. We therefore go into more in-depth analysis to understanding some of the reservations and reluctance towards the flexible and BL approach. These were particularly related to the notion of disturbances and disruptions, but as we proceed we interpret this more widely as having to do with students' embodied experiences, and their spatial and habitual orientation.

#### **4.2 Disruptions and disturbances - influence on students' study activities**

Students in both radiography and teacher education were facing challenges in their adaptation to BL and self-directed study days. These concern different disturbances and disruptions in different spaces.

For instance, they were disrupted when technological problems with the internet occurred or access to sound or learning materials was insufficient. Informants described it like this: "*There we had some technical problems, they couldn't get access to the radiographs*" (F11, RL), "*I have tried to sit at home, it was terrible...creaking of chairs, it (the microphone) recorded it all louder than his (the lecturer's) voice*" (F11, RS)." Despite the fact that these disruptions could partly be explained by the premature efforts of adapting new kinds of technology it was something that was still an issue even after one and a half years.

*"It is difficult and time consuming...you expected the technology to work and it did not"* (FIQ3, RP).

The technological disruptions cause extended use of time thereby limiting students' immediate access to knowledge and interaction. However, other kinds of disturbances also emerged from the interviews. Disturbances, we see as being related to the habitual and spatial orientation of the students.

##### **4.2.1. Object and topographic orientations – disturbances and disruptions**

Other online disturbances seem to influence students' learning and knowledge development. This is described as follows:

*“Well, it is the internet-flow. When you search for literature you fall into something and then get to read about it, and all of a sudden you end up on YouTube where you look at a cat playing the guitar. (F12, TS). It runs as a huge reflection process when you are online, because all the time there will be new windows and new messages and everything it runs just in such a great hotchpotch, so you never have 100% focus” (F12, TS).*

While online activities may seem a very immobile activity, we understand it as movement and as online orientation between different objects (topographic orientation). In the citation above, the student uses motional terms such as ‘flow’, ‘end up’, ‘runs’ and describes various objects emerging along the ‘path’ of movement (windows, messages). Students’ online orientation is thereby disturbed by available and upcoming interruptions. Their way-finding is disrupted and they orient instead towards non-study activities as they navigate through sites capturing their attention. Social media (and Facebook in particular) appear as more ‘desirable objects’ and as sources of procrastination and disturbance in students’ orientation within the online environment.

This can be interpreted as part of their topographical habitus for online orientation. Their prior paths and habits in online spaces relating to social media may be more oriented towards fun and social connections than educational purposes. Some students (F13, TS) comment on this and explain that although Facebook is used for “serious” communication in study groups it quickly becomes unserious, as it is also the environment for sharing party pictures and the like. They ponder whether using ‘It’s learning’ would provide a different and more “serious” environment despite the fact that they find it difficult to navigate in this platform. Thereby, according to the studies presented previously, their learning could be at risk of becoming superficial. There are so many paths to follow that it might be hard to stay focused. These external disruptions can limit students’ possibility to gain deeper learning as they are interrupted by notifications and pop-up’s.

Disturbances are not limited to technology and online spaces. They are also conditions at home. *“There are thing that constantly distracts me...you sleep more, watch television and there is a couch to lie on, and things like that” (F11, RS).* These disturbances seem to be ongoing as students after one year still experience these: *“...it is hard to read at home because there are so many ... so called web... the computer or something... there are many things that distract. I have repeatedly gone to school to read, like getting the optimal learning...but at home, it can be difficult” (F12, TS).* The environment in which the students are situated have an impact on their orientations. For example, the habitat makes students orient towards daily living activities. Their activities change from studying online or reading a book, to lying on the couch or watching television. *“So the whole thing, I think it is all tempting, I want to eat all the time, I like to watch television, I want to sleep in my bed” (F12, RS).* This can be interpreted similarly to the online orientation, namely that the connections between the objects afford a particular topographical orientation, where couches, TV, beds and dirty plates become more desirable objects.

Students' activities at home can be viewed as internalized dispositions for actions and part of their daily living habits. Some students use avoidance strategies and seek refuge in the UCN environment, where reading and working for them is better afforded. In this school environment students are familiar with studying. In contrast, the home offers other motions and paths between the objects in place and affords daily living activities such as leisure, relaxation or house holding. These demarcations of the home environments make some of the students' orient geographically towards other resources and environments for learning. This is a conscious avoidance of disturbing objects at home by geographically moving to other environments.

However, disruptions and disturbances are to be understood as not only problematic. Despite the fact that an orientation away from study activities can have consequences for students' learning, they can also be useful in hindering cognitive overload of the working memory (Fredens 2012, Sweller & Chandler 1994). For example, some of the students in our case study claimed that they gained energy through pauses allowing them to resume the study tasks with more concentration. Furthermore, some of them claimed that they made unconscious reflections throughout disruptions which made them better able to resume their study-task afterwards.

It is worth mentioning that students are, at least in retrospect, consciously aware of the role of disruptions and disturbances. It also seems that it is something which they are continuously trying to cope with and to develop resistances towards:

*"It is still disturbing (authors: studying at home) but I have at least become more mindful that when you are reading, then you are reading. Then you don't go to Facebook, YouTube or something else. Maybe I have become better at shutting off and say: 'OK, when I have finished this, then I can watch ten videos' rather than viewing one every time I have read a page"* (F13, TS).

In this sense students are developing strategies to counter the disruptions, which is something we return to in the final discussion.

## **5. Discussion and conclusion**

What emerges from the material is that students have trouble adapting to the particular design of BL. They are experiencing technical difficulties in accessing online lectures and material, but more importantly how their online orientation and movements are disrupted. They start to 'wander off' rather than staying on the study path, when online objects of procrastination offer themselves. These disruptions are not merely a property of the online environment, but equally in their homes where dishes, beds, TVs and couches act as more desirable objects. What we are suggesting is that these disturbances are not only related to 'social media', but rather that these disturbances are linked to people's or students' habitual, spatial orientation.



Thus, there are some important aspects to take into account when implementing BL, as is illustrated in this case:

- Disturbances and disruptions are an ongoing condition limiting or distracting students' orientation
- The environment is co-constitutive for students' orientation towards or away from study activities and resources in situ
- Students habits, object orientation and topographic orientation are important in relation to orientation in various environments, and potentially for their learning outcome and knowledge development.

Following Simonsen (2007) much of our everyday life orientation is embedded in almost pre-reflexive patterns of actions learned through our daily practice. A reason for the students' reservations towards the offered flexibility might be that students are familiar with navigating in face-to-face learning environments. Most students are enrolled in the undergraduate programme directly from high school where their topographical orientation has mainly been centred on classroom participation. Their way-finding in the educational system is learned through many years of practice and afforded by the objects and the topographic orchestrations of the educational settings. Their familiar habitual and spatial orientation thereby becomes both a resource (in way-finding) and a limitation in students' adaption to the BL approach as they are forced to navigate more online and outside classrooms.

Despite the relative small sample included in this case study; we argue that the analysis and interpretations reveal more general phenomena of human orientation in various environments. Disruptions and disturbances are conditions in life, and the students in this case are reporting experiences of disruptions and disturbance as part of their learning in blended environments. However, whether these are actually significant inhibitors of students' study activities and deeper learning, as Marien, Custers, Hassin & Aarts (2012) findings could suggest, and whether they have a broader impact on their learning would require further studies. Notwithstanding, we argue that students' orientations towards, or away, from learning activities, are related to their learned habitual and spatial patterns of orientation. We suggest that disruptions and disturbances need to be understood in relation to these orientations, and that the concepts by Jander (1975) might be productive in providing a better understanding of orientation within BL environments.

In relation to this, we also suggest that the notion of 'ecotones' could be productive in relation to understanding (blended) learning environments. Ecotones are zones where two ecosystems meet and are in tension. Such zones can look vastly different and have either sharp or blurry boundaries as illustrated in Figure 1.

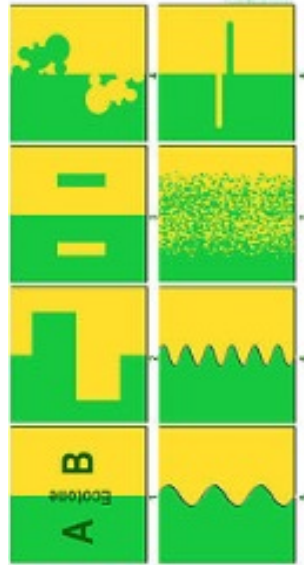


Figure 1. Ecotones

Whereas earlier there might have been a sharper distinction between 'home' and 'school' these 'ecosystems' are now increasingly meshing. While we have emphasised that disruptions and disturbances are prevalent both in the physical surroundings, as well as online, we also argue that the boundaries between different online spaces might be more blurry, and can be transcended without much effort. You are only a 'tab' or a click away from engaging with others. We are not suggesting this is worse, but that the ecotones between focused work and pleasurable, social procrastination are more blurry and vague than perhaps earlier. We see how students are developing strategies to counter and reduce their tendency to procrastination over reading difficult theory. Thus, we also recognize that students can make their orientations more strategic through reflective and metacognitive processes by being aware of the challenges in the environments. This development of coping strategies or study strategies could be worth exploring

We see students' orientation on a continuum being directed towards study activities or more disruptive activities. In a more metaphorical and playful sense we could understand this as students' strato orientation, and whether they strive upwards towards the '(en)light(enment)' or are pulled down by gravity by 'objects of disturbance' in the environment; such as online notifications, television and the couch, where the latter seems to be more ready-to-hand when in the home environment or online.

We have strived to gain a qualitatively better understanding of the disturbances and disruptions students have reported in relation to the implementation of flexible learning. We have argued that these are related to the students' learned habitual and spatial orientations, and that there is a relation between the environment, the experiences and role of disturbances (i.e. at school and at home). This suggests that a switch to BL environments is not only a technical and pedagogical challenge, but equally a disruption of students' study habits. Although students are reflexively aware of these challenges (at least in retrospect), and are working on changing their habits, we would suggest that these difficulties need to be taken into account when working with new organisations of learning.

These challenges have resulted in efforts to develop user-generated methods to handle students' orientation and disruptions outside campus through an action research project under the Digital Training Laboratory (DUIIT) at University College North (Digitalt Uddannelseslaboratorium 2013). The conceptualisation of students' orientation and way-finding in blurred ecotones and disruptive environments have added new theoretical perspectives within DUIIT's follow-up research, and these concepts might also contribute to other kinds of contemporary research of students' orientation in BL environments.

## References

Bourdieu, P. (1990). *The logic of Practice*. Polity Press, Cambridge.

Dau, S. (2013) "When creating new learning spaces, the affordance is a key study aspect". Paper presented at the *London International Conference on Education (LICE-2013)*, London, 4-6 November

Dau, S. (2014). „Affordance as a Key Study Aspect in the Creation of New Learning Spaces”. In Niemi, H. Multisilta, J. & Löfström, E. (ed.). *Crossing Boundaries for Learning - through Technology and Human Efforts*. CICERO Learning Network, University of Helsinki, pp. 191-219.

Digitalt Uddannelseslaboratorium (2013). Hvad er fokus for DUIIT's projekter? UCN, Aalborg.  
[http://www.ucn.dk/Forside/DUIIT/Digitalt-Uddannelseslaboratorium/Projekter\\_i\\_DUIIT.aspx](http://www.ucn.dk/Forside/DUIIT/Digitalt-Uddannelseslaboratorium/Projekter_i_DUIIT.aspx)

Foroughi, C.K., Werner, N.E., Nelson, E.T. and Boehm-Davis, D.A. (2014). "Do Interruptions Affect Quality of Work?" *The Journal of the Human Factors and Ergonomics Society*, April 22, 2014

Fredens, K. (2012). *Mennesket i Hjernen En grundbog i neuropædagogik*, Vol 2. No. 1. Hans Reitzels Forlag, København.

Jander, R. (1975). "Ecological aspects of spatial orientation". *Annual Reviews Ecological System*, No. 6, pp. 171-188.

Jensen C.H. (2012). FlexVid - nye måder at studere på. In: Jensen, CH. & Staugaard, HJ (edt.). *FlexVid: Fleksible arbejdsformer i videregående uddannelser - skitser fra tegnebrættet*. Books on Demand, København.

Marien, H., Custers, R., Hassin, R.R. and Aarts, H. (2012). "Unconscious goal activation and the hijacking of the executive function". *Journal of Personality and Social Psychology*.  
<http://dx.doi.org/10.1037/a0028955>

Matthew, A.F. and Evans, R. (2012). "Managing distraction in 21st century learning environments". In Mortimer, Rachel (Ed.) *The 15th International First Year in Higher Education Conference 2012*, 26-29 June 2012, Sofitel Brisbane Central, Brisbane, QLD. Retrieved 15.05.2014 from:  
<http://eprints.qut.edu.au/53489/2/53489.pdf>

Nyvang, T. and Dau, S. (2013). "Læringsrum og vidensudvikling i professionsuddannelser". *Tidsskriftet Læring og Medier (LOM)*, Vol 6, No. 11. Retrieved 15.05.2014 from:  
<http://ojs.statsbiblioteket.dk/index.php/lom/article/view/8564>

Ricoeur, P. (1984). *Time and Narrative*, Vol. 1. (McLaughlin, K. & Pellauer, D. Trans.) University of Chicago Press, Chicago.

Rose, E. (2010). "Continuous partial attention: Reconsidering the Role of online learning in the age of interruption". *Educational Technology Magazine: The Magazine for Managers of Change in Education*, Vol 50, No. 4, pp. 41-46.

Rosen, L.D., Carrier, L.M: and Cheever, N.A. (2013). "Facebook and texting made me do it: Media-induced task-switching while studying". *Computers in Human Behaviour*, No. 29, pp. 948-958.

Simonsen, K. (2007). Practice, spatiality and embodied emotions: An outline of a geography of practice. *Human Affairs*, No.17, pp. 168-181

Sweller, J., and Chandler, P. (1994). Why some material is difficult to learn. *Cognition and Instruction*, 12, pp. 185-233

Werner, N.E., Cades, D.M., Boehm-Davis, D.A., Chang, J., Khan, H.. and Thi, G..(2011). "What Makes Us Resilient to Interruptions? Understanding the Role of Individual Differences in Resumption". *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* September 2011, Vol 55, No. 1, pp. 296-300.