

**This is an electronic reprint of the original article.
This reprint *may differ* from the original in pagination and typographic detail.**

Author(s): Lievonen, Mirja; Vesisenaho, Mikko; Lundström, Anette

Title: Hybrid Learning Situation as a Challenge for Design

Year: 2016

Version:

Please cite the original version:

Lievonen, M., Vesisenaho, M., & Lundström, A. (2016). Hybrid Learning Situation as a Challenge for Design. In J. Viteli, & A. Östman (Eds.), Tuovi 14: Interaktiivinen tekniikka koulutuksessa 2016 -konferenssin tutkijatapaamisen artikkelit (pp. 49-57). Tampereen yliopisto. Trim research reports, 22. <http://urn.fi/URN:ISBN:978-952-03-0307-5>

All material supplied via JYX is protected by copyright and other intellectual property rights, and duplication or sale of all or part of any of the repository collections is not permitted, except that material may be duplicated by you for your research use or educational purposes in electronic or print form. You must obtain permission for any other use. Electronic or print copies may not be offered, whether for sale or otherwise to anyone who is not an authorised user.

Hybrid Learning Situation as a Challenge for Design

Mirja Lievonen

mirja.lievonen.2001@live.rhul.ac.uk

Jyväskylä Educational Consortium

Mikko Vesisenaho

mikko.vesisenaho@jyu.fi

University of Jyväskylä

Anette Lundström

anette.lundstrom@jyu.fi

University of Jyväskylä

In the paper, we address the physical *learning space* and focus on designing enabling settings for learning. New practices emerge from an accelerating context change and a rapid adoption of novel ICT solutions. Educational institutions and professionals strive to implement effective settings and instructional methods in order to facilitate an acquisition of the 21st century skills. Little attention is paid to changes that take place at the level of interpersonal communication, let alone their possible impacts in the long run. As the methods and the settings diversify, and the whole learning landscape turns hybrid, a good fit between the setting and the instructional method is a daily design challenge.

Changing context and changing practices

An unprecedented context change in terms of extent and pace has taken place in the beginning of the 21st century as can be seen in the ITU graph below (Figure 1). We hardly grasp its cultural and ecological implications in the long run. Yet, it is clear that the penetration of internet usage and the rapid adoption of mobile communication technologies worldwide have brought about an increasing pressure to adapt to the changing context in order to keep update with an accelerating pace of life. As the field of education aims to harness the next generation with skills needed to navigate tomorrow's world, the situation is a true challenge for both decision makers and educationalists.

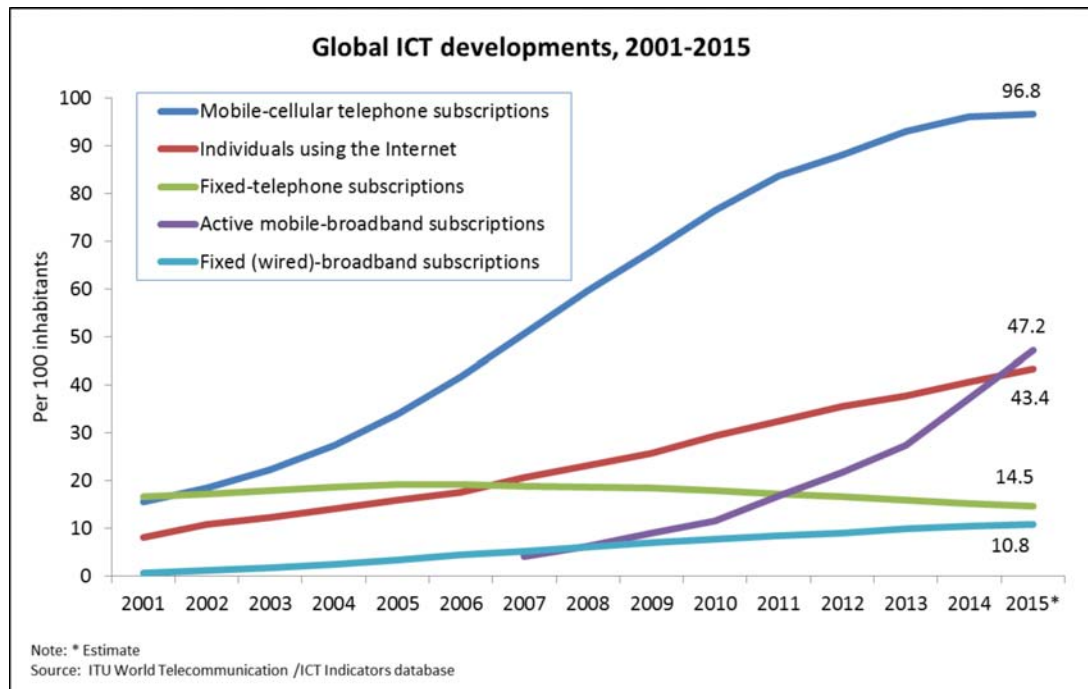


Figure 1. ITU statistics ICT development worldwide 2000-2015 (International Telecommunication Union, 2016).

The emergence of hybrid learning environments is driven by changes in educational practices as established roles, resources and locations are being altered (Zitter & Hoeve, 2012). With emerging ICTs and educational technology, learning situations have diversified, and the whole learning landscape is turning hybrid. Hybrid learning blends traditional methods by employing computer-mediated communication, web-based learning resources, platforms, collaborative software and handheld devices in the service of curricular instruction and independent learning. ICT thus extends traditional instruction beyond the classroom walls by making information accessible far beyond and enabling a remote participation independent of the learner's location. Collaborative, active, self-regulated and personalized learning methods can all be enhanced with the purposeful usage of educational tools. Educational challenge is not to merely replace or substitute face-to-face learning but to find new ways to engage students in learning through hybrid pedagogy (Stommel, 2012). The aim is to create learning situations where these both models coexist (Rorabaugh, 2012). Hybrid pedagogy fundamentally rethinks our conception of place by redefining space to be inclusive of both physical and virtual so that these two realms work together in new and innovative ways (Stommel, 2012). But what do these changes involve if we focus on a learner in his/her learning process? What kind of differences can there be seen in comparison to their parents' and grandparents' learning conditions? What has changed, and is it all in a positive direction?

Natural vs. technology-mediated communication between people

Learning occurs in the learner's interaction with the physical and cultural surroundings, that is: with people, objects and situational information, the person's past experiences, aspirations and interpretations included (e.g. Hillier & Hanson, 1984; Clark & Wilkes-Gibbs, 1986; Kendon, 1990; Tomasello, 1999; Roth, 2004; Clark, 2005; Tomasello, 2009). When

taking a holistic approach to teaching and learning, *learning situation* is the core concept (Goffman, 1964; Gibson, 1977; Malpas, 2002). It can be articulated from different angles (e.g. Burke, 1945), but not torn apart: in terms of who, where, how and what the content of activity is. The overall context implies also a purpose, why / what for something is done in a particular situation. In the formal education, a curriculum provides the wider frame and sets specific targets for learning activities and outcomes. In a wider perspective, the question is not only about achieving technical or even subject skills and knowledge but also the learner's cognitive, social and emotional growth.

In the natural communicative situation, the nonverbal channel (the role of gaze contact, hand gestures etc.) plays an important role (Roth, 2006; Diessel, 2006). That is the case in the traditional learning settings, too. In the field of formal education, the key roles of communication and related tasks are those of the learner's and of the teacher's. In the hybrid learning session, the situational information space of a learner differs in modal/functional aspects from those in the traditional settings (e.g. Turner, 2003; Hartson, 2003; Lievonen & al., 2009): to take a video-mediated session for instance, the bridge beyond the classroom is constrained to audio-visual channel; ICTs thus bring along modal fragmentation in person-to-person interaction with the remote participants.

From a spatial design point of view, learning can be regarded (in a *technical* consideration) as *navigation* (e.g. Tversky & al., 1999; Tversky, 2008, Lievonen, 2015): a trajectory of attention shifting from object to object relevant to a topic (of interest). In a conversation and collaboration, joint attention functions as a platform for gaining a shared understanding of an object of reference (Diessel, 2006). From a spatial design point of view, an important question is *how* a joint attention is established, and *how* the audience's attention is guided to the object of reference. To take a traditional lecture as an example, the gaze direction of the audience focuses on the objects indicated by the lecturer/presenter at the front of a lecture theatre. In a hybrid session, a joint attention may be established on the same spot in the front, or, on the participants' laptop/tablet screens. In the latter case, the learners lack the rich procedural information through the gestures of the presenter. Even though it is possible to guide attention e.g. by a cursor, such guidance is less rich compared with being able to register facial expressions, bodily gestures and the teacher's or other presenter's gaze contact.



Figure 2. Technology-mediated communication is today integral part of the learners' practices both in the class and during a break.

Compelling global context and accelerating pace

In the era of Internet and mobile technologies that enable accelerating global communication, we also face emerging problems as a result from past innovations. When designing premises for technology enhanced learning, the technical focus has to be on the *interface of the learner* with his/her environment: what s/he can see, hear, reach, grasp, feel, make use of, and whether it is relevant and supports his/her learning process. In order to adequately guide the design of hybrid settings for learning, a robust interaction theory is required. Two aspects of the interface have to be considered, that is, interaction with non-human objects and interaction/communication between people.

Hence, a focused attention is required on what is taking place in the schools and other premises for learning in terms of interpersonal communication (particularly nonverbal communication) after adopting new tools and methods. From a spatial design point of view, more research should be conducted to clarify what is going on at the level of person-to-person interactions in *hybrid* learning, both in teacher-learner and learner-learner interactions before rushing all to adopt novel solutions in large extent (Figure 2).

The role of nonverbal communication has been pretty much neglected in an ICT-enthusiastic discussion and in the research in the educational technology. We should consider possible implications of novel learning settings, whether positive or negative; for instance:

- What kind of impacts do the handheld personal devices have in particular young learners' development?
- How does the fragmented information space affect the learner's capacity to focus and concentrate on a given topic?
- What changes can be registered in terms of learners' personal growth such as empathy, patience and tolerance in comparison to learner cohorts before the 21st century?

21st century learning

Impacts of globalization, new demands of working life and proliferation of information technology are all imposing new demands for educational institutions to develop their pedagogies, learning outcomes and educational practices to support new ways of teaching and learning in more and more complex world. Students are expected to be able to participate in and contribute to the society that is characterized by rapid change, global networks, creativity, innovation and co-creation. Competences needed in the future are changing and this compels schools to rethink the roles, goal, contents and practices of learning. In the knowledge society, knowledge is seen as a process that does things, happens in teams and cannot be divided into disciplines (Gilbert, 2007). Learners are active agents who construct knowledge, building on their current understanding and expertise, together with others. And this requires the use of multiple tools and a variety of pedagogies.

The information/knowledge society concept needs people who are capable of demonstrating new skills, and there is an obvious need to continually update teaching technologies and methods to keep pace with the changing society. In order to meet the challenges of the future, there is a strong emphasis on transversal (generic) competences, such as the ability to work independently and in teams, ICT skills, critical thinking, problem-solving, and, in particular, the skills of learning to learn (e.g. Griffin et al., 2012; National Board of Education, 2014).

There is intellectual and commercial value in thinking about tasks and problems in multiple ways: new ways of doing things often offer more logistically effective solutions, and thus new processes or products may be created. The use of technologies in supporting creativity in learning has also added value in today's educational system, which is under constant pressure to demonstrate how to cope with the demands of tomorrow's society. Dillon et al. (2013) argues that the conventional learning situations rarely offer enough opportunities for innovative connections between ideas and practices. In the cultural ecology of a learning environment, improvisation is defined as a means by which students individually and collectively draw on experience, take risks, make connections, move into new learning spaces and, in so doing, open up new creative possibilities.

Already now and in the future blended learning can thoughtfully integrate synchronous classroom face-to-face learning experiences and asynchronous online learning experiences can be integrated thoughtfully (Garrison & Kanuka, 2004). The idea is not only to produce, to demonstrate, or to communicate but also to support personalized learning and collaborative knowledge building (see Ferdig, 2007; Kaisto et al., 2007; Vesisenaho, 2009; Vesisenaho et al., 2010). The aim is to add a new "layer" on the face-to-face teaching and learning situation through different online environments and tools of social software in order to support students' thinking (Köse, 2010). Yet, there is a risk of technology usage limiting the pedagogy. (Vesisenaho et al., 2016).

Settings - pedagogy fit

The changed ideas of how, when and where learning occurs and what skills and competences are needed in the future require fundamental changes not only in the curriculum and teaching practices but also increasingly in the built environment. The shift from instruction to facilitation has changed the roles of the learning space users. Teachers are becoming facilitators of interactive and collaborative learning situations, and students active participants (Gordon et al., 2009).

The benefits of hybrid and blended, technology-enhanced learning are noticed but physical learning spaces are falling behind in this progress. It is important to note the significance of the physical environment because it has an important role in what can be seen, heard and felt (Barrett & al., 2015) and that, in turn, has an influence on individuals' cognitive and affective performance, how people engage with one another, and whether or not they are able to fully participate in activities (Jensen, 2005; Lippman, 2013). Physical space can support or impede the various types of interaction required in emerging teaching and learning approaches (Monahan, 2000; Oblinger, 2006). New pedagogies require teachers to apply innovative and stimulating practices as well as an environment that facilitates those practices. Yet, traditional classrooms often hinder the educational practices significant to current pedagogies. Classrooms designed for teacher-led frontal teaching do not offer possibilities for active participation, various forms of social interaction or purposeful use of ICT. At worst outdated learning spaces can decelerate the reform of educational practices.

Flexibility of the learning spaces is seen as a natural solution to facilitate current pedagogical approaches, particularly the use of ICT. Research indicates that flexible learning spaces can accommodate a variety of pedagogical approaches in informal and formal learning situations, promote the innovative use of technology and enhance greater student activity, collaboration and social interaction (e.g., Dane, 2009; Phillips et al., 2013; JISC 2006; Mascolo, 2009; Oblinger, 2006). In order to make learning environments interactive and conducive to hybrid learning, new technology should be integrated into the learning environments. Technology itself does not produce hybrid learning environments, but

appropriately designed and planned ICT can enhance learning situations and instruction and support the hybrid pedagogy approach.

It is not (only) about what devices and applications are used but (also) how they are used. The physical space needs to facilitate the learning practices related to the use of ICT. The use of ICTs in teaching and learning offers multiple new possibilities for learning space solutions. For example, students can move around during class and they can choose whether they want to sit or stand. People are not constrained to use the front of the room only for presentations as work surfaces can be expanded to all walls of the room which makes it more interactive and helps to engage more students in the room. The use of tablets and mobile phones differs from the use of laptops and hence, the requirements for the spatial solutions and furniture choices alter.

Integration of the ICT into the learning space is more and more related to the use of mobile devices and BYOD-approach. From the design point of view, this means focusing on infrastructure of the ICT usage. The compatibility of devices and applications and the functionality of networks and cloud-based solutions are becoming major issues in the design. The problem is that we do not know what the use of ICT will be in the next ten or twenty years. Therefore, the design must focus on possibilities to expand the infrastructure over time. This means that fixed structures are replaced with flexible solutions that enable integrating new technologies without structural changes.

Our ongoing research of retrofitted learning spaces indicates that designing new learning space with the users and with specific goals in mind can support the change in educational practices. For example, multipurpose learning spaces with various different kinds of learning areas can diversify learning methods and increase collaboration and enhance the use of technology (Mäkelä et al., 2015).

The challenge for the educators and teachers is to align the physical settings and instructional strategies to provide optimal learning spaces in the ICT-infused era for diversity of students and for their balanced personal growth and development. The use of ICT for teaching must be pedagogically driven. Therefore, it is important to think about how new technology can replace or improve prevailing and anticipated educational practices. The following points are among the relevant design questions:

- What instructional methods work well with the physical settings available for the teaching session?
- What the use of ICTS is now and how they are supposed to be developed in the future? Goal of learning? Why to use?
- Where to focus in design? What kind of new approaches does technology enable (e.g. doing same things in new ways or doing something creative)? What kind of interaction is then preferred or supported?
- What type of learning activities do particular physical settings (must) enable?
- What kind of interactions do the virtual settings enable?
- How the use of ICT changes interaction between students and between student and teacher?

The object is twofold: the settings and the method. What will be done in which way in which kind of settings for what purpose? In an optimal case, the learning session is organized in such a way that both the settings and the instructional method fit well together and thereby, enhance possibilities to draw the best outcome of a learning session.

REFERENCES

- Barrett, P., Davies, F., Zhang, Y. & Barrett, L. (2015). The impact of classroom design on pupils' learning: Final results of a holistic, multi-level analysis. *Building and Environment*, 89(2015), 118-133
- Burke, K. (1945). *A Grammar of Motives*. New York: Prentice-Hall.
- Clark, H. H. (2005). Coordinating with each other in a material world. *Discourse and Society*, 7(4-5), 507-525.
- Clark, H. H. & Wilkes-Gibbs, D. (1986). Referring as a collaborative process. *Cognition*, 22, 1-39.
- Dane, J. (2009). Deakin University Immersive Learning Environment (DILE): an evaluation. In (Eds.) D. Radcliffe, W. Hamilton, D. Powell & B. Tibbetts, *Learning spaces in higher education: Positive Outcomes by design*. Proceedings of the Next Generation Learning Spaces 2008 Colloquium University of Queensland, Brisbane, 61-66.
- Diessel, H. (2006). Demonstratives, joint attention, and the emergence of grammar. *Cognitive Linguistics*, 17 (4), 463-489.
- Dillon, P., Wang, R., Vesisenaho, M., Valtonen, T. & Havu-Nuutinen, S. (2013). Using technology to open up learning and teaching through improvisation: Case studies with micro-blogs and short message service communications. *Thinking Skills and Creativity*, 10, 13-22.
- Ferdig, R. (2007). Editorial: Examining social software in Teacher education. *Journal of Technology and Teacher Education*, 15(1), 5-10.
- Garrison, D. R. & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7(2), 95-105.
- Gilbert, J. (2007). Catching the knowledge wave. *Redefining knowledge for the postindustrial age*. Education Canada 47(3), 4-8.
- Gordon, J. Halasz, G., Krawczyk, M., Leney, T., Michel, A., Pepper, D., Putkiewicz, E. & Wisniewski, J., (2009). Key competences in Europe: Opening doors for lifelong learners across the school curriculum and teacher education. CASE Network Reports No. 87. Warsaw, Poland: CASE, Center for Social and Economic Research.
- Gibson, J.J. (1977). *The Theory of Affordances*. In Shaw, R. & J. Bransford (Eds.) *Perceiving, Acting, and Knowing: Toward an Ecological Psychology*. Hillsdale, NJ: Lawrence Erlbaum, 67-82.
- Goffman, E. (1964). The neglected situation. *American Anthropologist*, New Series, 66 (6) Part 2: The Ethnography of Communication (Dec. 1964). Blackwell Publishing, 133-136.
- Griffin, P., McGaw, B. & Care, E. (2012). *Assessment and teaching of 21st century skills*. New York: Springer.
- Hartson, H. R. (2003). Cognitive, physical, sensory, and functional affordances in interaction design. *Behavior and Information technology*, 22 (5), 315-338.
- Hillier, B. & Hanson, J. (1984). *The Social Logic of Space*. Cambridge: Cambridge University Press. Reprint edition 1989.
- International Telecommunication Union (2016). *ICT Facts and Figures 2016*. Retrieved April 16, 2016, from <http://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx>
- Jensen, E. (2005). *Teaching with the Brain in Mind*. 2nd edition, revised and updated. Alexandria, VA: ASCD.
- JISC (2006). *Designing spaces for effective learning: a guide to 21st century learning space design*. Bristol: JISC. Retrieved April 16, 2016, from <http://www.jisc.ac.uk/media/documents/publications/learningspaces.pdf>
- Kaisto, J., Hämäläinen, T. & Järvelä, S., (2007). *Tieto- ja viestintätekniiikan pedagoginen vaikuttavuus Pohjoisessa Suomessa*. Oulun yliopisto. E98.

- Kendon, A. (1990). *Conducting Interaction: Patterns of Behavior in Focused Encounters*. Cambridge University Press.
- Köse, U. (2010). A blended learning model supported with Web 2.0 technologies. *Procedia Social and Behavioral Sciences*, 2(2), 2794-2802.
- Lievonen, M. A. (2015). *Interaction Space in Technology-Enhanced Workplace: Methods for Usability Studies*. PhD thesis at Royal Holloway University of London. Retrieved April 16, 2016, from <https://pure.royalholloway.ac.uk/portal/files/24199920/2015lievonenmaphd.pdf>
- Lievonen, M., Rosenberg, D., Doerner, R., Kuehn, G. & Walkowski, S. (2009). Augmented Reality as Means for Creating Shared Understanding. In Norros, L et al. (Eds.) *ECCE 2009 - European Conference on Cognitive Ergonomic: Designing beyond the Product - Understanding Activity and User Experience in Ubiquitous Environments*, 161-168. VTT Symposium 258. Helsinki.
- Lippman, P. (2013). *Designing collaborative spaces for schools*. Learning Environments [Digital Edition | Feature]. Retrieved April 16, 2016 from <http://thejournal.com/Home.aspx>
- Malpas, J. (2002). The weave of meaning: holism and contextuality. *Language and communication*, 22, 403-419.
- Mascolo, M. F. (2009). Beyond student-centered and teacher-centered pedagogy: Teaching and learning as guided participation. *Pedagogy and the Human Sciences*, 1(1), 3-27.
- Monahan, T. (2000). *Built pedagogies & technology practices: Designing for participatory learning*. Proceedings of the Participatory Design Conference. Palo Alto, CA: CPSR.
- Mäkelä, T., Lundström, A. & Mikkonen, I. (2015). Co-designing learning spaces: Why, with whom, and why. In S. Nenonen, S. Kärrä, J.-M. Junnonen, S. Tähtinen, N. Sandström, K. Airo & O.Niemi (Eds.) *How to co-create campus? Tampere, Finland: University properties of Finland ltd*, 196-211.
- National Board of Education (2014). *Opetussuunnitelman perusteet [The new core curriculum for basic education]*. Retrieved April 16, 2016, from http://www.oph.fi/download/163777_perusopetuksen_opetussuunnitelman_perusteet_2014.pdf.
- Oblinger, D.G. (2006). *Learning Spaces*. Washington D.C., Educause.
- Phillips, R., McLaren, C. & Dakin, J. (2013). Principles and standards for modern learning space design. In *Teaching and Learning Forum 2013: Design, develop, evaluate - The core of the learning environment*, Murdoch University, Murdoch, W.A. Retrieved April 15, 2016, from <http://researchrepository.murdoch.edu.au/13606/>
- Rorabaugh, P. (2012). Hybridity pt. 1: Virtuality and empiricism. *Hybrid Pedagogy: A digital Journal of Learning, Teaching and Pedagogy*. Retrieved April 16, 2016 from <http://www.digitalpedagogy.com>
- Roth, W-M. (2004). Perceptual gestalts in workplace communication. *Journal of Pragmatics*, 36 (6), 1037-1069.
- Stommel, J. (2012). Hybridity pt. 2: What is hybrid pedagogy? *Hybrid Pedagogy: A digital Journal of Learning, Teaching and Pedagogy*. Retrieved April 16, 2016 from <http://www.digitalpedagogy.com>
- Tomasello, M. (1999). *The Cultural Origins of Human Cognition*. Harvard University Press.
- Tomasello, M. (2009). *Why we cooperate*. Cambridge, Mass, London England: The MIT Press.
- Turner, P. (2005). Affordance as Context. *Interacting with Computers*, 17 (6), 787-800.
- Tversky, B. (2008). Spatial cognition: Situated and embodied. In Robbins, P. & Aydede, M. (Eds.) *Cambridge handbook of situated cognition*. Cambridge: Cambridge University Press, 201-216.
- Tversky, B., Bauer Morrison, J., Franklin, N. & Bryant, D. J. (1999). Three spaces of spatial cognition. *Professional Geographer*, 5 (4), 516-524.
- Vesisenaho, M. (2009). Tarvitaanko tieto- ja viestintäteknologiaa opettajakoulutuksessa? [Is information and communication technology needed in teacher education?] In K. Savolainen, T. Keinonen & S. Pöntinen (Eds.) *Kestävä kehitys ja tieto- ja viestintäteknikka perusopetuksessa*. Joensuun yliopisto, 52-62.

- Vesisenaho, M., Valtonen, T., Wulff, A., & Kuittinen, E. (2016). Using Video Conferencing and Video Recordings for Upper Secondary Distance Teaching: Teachers' View Points. In INTED 2016 Proceedings: 10th International Technology, Education and Development Conference. IATED, 8582-8589.
- Zitter, I. & Hoeve, A., (2012). Hybrid learning environments: Merging learning and work processes to facilitate knowledge integration and transitions. OECD Education Working Papers, No. 81, OECD Publishing.

Authors

Dr Mirja Lievonen has background in Architecture. Her research interests focus on interaction space and built environments, most recently on technology-enhanced workplace and learning spaces from human communication and spatial design point of view.

Dr Mikko Vesisenaho (Adjunct professor, senior researcher) is specialized in human centered technology enhanced education, ICT4D and learning spaces. Currently he works at the Department of Teacher Education at the University of Jyväskylä, Finland.

Anette Lundström (Master in Education, ME) works as a PhD student at the Department of Teacher Education at the University of Jyväskylä. Her research has focus on co-creating usable and flexible learning spaces that meet the needs of the users. Other research interests are centered on issues of 21st century skills, web contents for children and interactive technology in education.