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Rethinking communication in virtual learning environments through the concept of Bildung

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Abstract

The aim of this paper is to discuss the transformative relationship between the self and culture, or Bildung, while considering new technology such as virtual learning environments. It adopts a technocultural educational perspective; the digital world is an extension of the physical world, and as such an extension of humanity. It is the basis for developing identities that are constantly being re-addressed through new encounters with the world. Communication is a central theme in theories of Bildung. From a technocultural standpoint, communication is the space, or interface, where Bildung takes place. In virtual learning environments, there are different ways to communicate, both synchronously and asynchronously. These environments offer communicative spaces where the self is transformed through several actions because of communicating with the software or with other people. The paper suggests rethinking what communication means in education when it is mediated through digital technology. Virtual learning environments make new teaching practices possible that include digital sources and collaborative assignments through intelligent interactions in simulations or social media. Supporting students is crucial for them to learn how to use, understand and navigate these spaces.

Keywords: Technocultural education, Bildung, synchronous communication, asynchronous communication, virtual learning environments

Introduction

This paper strives to offer what David M. Berry (2011, p. 9) calls a humanistic understanding of technology, or rather a pedagogic understanding of Bildung in virtual learning environments. The paper adopts the philosophical approach found in the essay Technocultural Education by Lars Løvlie (2006) that focus on the idea of education in a digital society. The main assumption is that the world is changing with digital technology and education with it. It adopts a technocultural educational perspective where the digital world is considered an extension of the physical world, and as such an extension of humanity. It is the basis for developing identities that are constantly being re-addressed through new encounters with the world.

There are different perspectives on digital technology in education, ranging from highly optimistic to grossly pessimistic (Grosswiler, 2013). According to Løvlie (p. 3), technocultural fear is common when new technology is introduced, and usually passes once the technology is embedded into the everyday lives of

people. Furthermore, there are tensions and controversies in the research field of digital technology and education related to conceptual, theoretical, and methodological disagreements (Harasim, 2012; Livingstone, 2012; Selwyn, 2011, 2016/2017). According to Neil Selwyn (2016/2017), 40 years of research cannot confirm that education gets better through digital technology. Keeping in mind that 'better' is rarely defined clearly. Although digital technology may improve certain aspects of education research proving this is yet to be validated. Sonia Livingstone (2012) accounts for certain cognitive processes that are being measured, without comparing surrounding factors, or critically examining what is being tested. However, what should be equally interesting to assess, according to Livingstone, are skills such as creativity, playfulness, and empathy.

The freedom and power of the user are generally mentioned as positive effects of digitalization (van Dijk, 2012; Grosswiler, 2013). However, Selwyn (2016/2017, p. 34) notes that the hype of digital media in education is usually based on views of the private sector. The discourse in these narratives is that formal educators cannot be trusted, and that someone else, whoever that might be, should shoulder the responsibility of education and revolutionize it. The views of the private sector are not necessarily compatible with democratic, relational, and social aspects of education. They rarely address questions of inequality, or socio-economic factors among students, which make it more difficult for certain students to learn through digital technology. Educationalists, throughout history, have maintained the importance of a public educational system for many reasons; reducing inequalities among students is one of those reasons (Hug, 2017; Kroksmark, 2003/2011; Siljander, 2016).

Original theories of communication generally position the sender, the message, and the receiver as key factors when transmitting information (van Dijk, 2012, p. 9). Interaction and control are central to the communication revolution; through digital technology the traditional power balance between sender and receiver is questioned - the user can control the digital message, unlike information provided through electronic media such as television or radio (van Dijk, 2012; Grosswiler, 2013). This relates to challenging hierarchies in education through digital technology that Livingstone (2012) and Løvlie (2006) discuss. Livingstone highlights how ICT, to some people, mean tools that should be used to uphold traditional teaching practices. She writes (2012, p. 11), "it is vital that society decides how radical to be in aiming merely to improve or wholly to redesign the power relation between teachers and pupils, classroom and home." Livingstone suggests more research is needed on how digital technology can break down hierarchies in classrooms; teaching methods including student collaboration through digital media is offered as one example of this.

Livingstone proposes including a perspective of how digital technology might transform educational practice. That correlates with the aim of this paper which is to discuss the transformative relationship between the self and culture, or *Bildung*, while considering new technology such as virtual learning environments. *Bildung* changes with historical contexts (Gustavsson, 2003; Løvlie, 2006). Løvlie states that when new technology is introduced in education, or the context of education changes - the concept of *Bildung* will have to change as well. This paper introduces *Bildung* in virtual learning environments as a dimension to consider in education. From a technocultural standpoint, communication is the space, or interface, where *Bildung* takes place. In virtual learning environments, there are different ways to communicate, both synchronously and asynchronously. These environments offer communicative spaces where the self is transformed through many actions because of communicating with the software or with other people. Therefore, the paper suggests rethinking what communication means in education when it is mediated through digital technology.

The complicated concept of Bildung

According to Siljander and Sutinen (2012, p. 3), the concept of Bildung has a long history dating back to hellenic writer Cicero, where the soul needs refining through philosophy. Another strand of thought is the Judeo-Christian idea that humans were created in the image of God; Bildung should be realized through a creative process that leads to an undefined goal. Gustavsson (2012, p. 311) also places the concept within a European realm, but adds that similar concepts are found in African, Chinese, and Persian cultures.

Burman and Sundgren (2012, p. 8) confirm that Bildung is hard to define, however, it is a personal process, it is something that happens and is directed from within an individual, it is not something that can be clearly directed by someone else, or defined in terms of skills or competencies. At the same time, it is not something that someone can do alone, some form of communication with other people is needed; this is where formal education usually comes in as a means for this.

Siljander and Sutinen (2012) identify two aspects of Bildung. First, it is a creative process where the individual develops through several different actions, and where the individual can also shape the surrounding cultural environment. Second, it is a process where the individual seeks to better herself or himself, perhaps by setting an example or acting like a role-model. The authors add that this is not something that an individual can do without an education, thus they confirm the role of formal education discussed above.

Burman and Sundgren (2012, p. 9) suggest three traditions of Bildung. A German one, based on Johann Herder and Wilhelm von Humboldt, and the idea that the individual processes of Bildung are connected to scientific development. An anglo saxon tradition, or liberal education, represented by Martha Nussbaum, which entails critical self-reflection, empathy, and an ability to understand and take part in global issues. The third tradition mentioned, is rooted in the concept of popular or liberal adult education typical for the Nordic countries, but it is not relevant in this paper. Some researchers connect the European and American traditions (Gustavsson, 2012; Siljander & Sutinen, 2012). Active citizenship is important for Nussbaum - modern Bildung can be understood as more than simply a reflective and individual process. It is something that happens through actions with a more specific purpose than perhaps previous theorists such as von Humboldt would allow (Konrad, 2012). Bildung can also mean a study of the past according to the hermeneutic tradition of Hans-Georg Gadamer, the individual sets out into the unknown and returns home with past and present horizons merged - as a result she or he has a deeper understanding of the world (Gustavsson, 2012).

The critique against Bildung include problems to define the concept (Siljander & Sutinen, 2012), as well as the matter of who is supposed to be cultivated, and what this process of Bildung entails (Løvlie, 2006). Kaveh (2012) raises several critical questions regarding Bildung. Around 1900, it was directed at conforming certain groups in society to certain ideals that were not being critically examined. These groups of people were generally excluded from political power, and their view on Bildung was rarely included; middle or upper class ideals of reading classic literature, to become a cultivated citizen, were not necessarily of interest to the working class that regarded changing political and economic power balances important. According to Kaveh, the ideal for this cultivated person was found among the middle class, that lead to a less than open and inclusive process.

Kaveh (2012) points out that Bildung needs to be contextualised; it should be understood from a cultural perspective, and from a political and economic point of view, therefore, the Ancient Greek version of Bildung is not the same as the one rooted in the rationality and independence proclaimed by the

Enlightenment. Kaveh suggests that Bildung can be understood as a dialogue between different classes in society to understand each other. It raises attention to the communicative and democratic processes entailed in the concept, which is of importance from a technocultural standpoint discussed below.

Bildung in a technocultural light

Løvlie (2006) suggests that one problem has always been the antithesis of man and machine - humanity is considered opposite to machine; from a technocultural approach, the digital world is an extension of the old world, and digital features can be considered extensions of humanity. He states that John Dewey takes a different route than the European traditions of Bildung discussed above. Dewey introduces the concepts of intelligent people, tools, and animals; intelligence is defined as interactions of different kinds. "For Dewey the "I" is not a spectator of the world but a participant in a relational and interactive world." (Løvlie, 2006, p. 4). Løvlie explains that the subject, or the human, is the relationship, which he relates to theories of Friedrich Hegel. That is why the technocultural version of Bildung breaks paths with previous theories; it is not looking for a way back to a fixed and fuller identity, Bildung means being in a state of constant change, always open, turning towards the world, not inwards towards the human subject. Where "I" as a physical being end and the machine begins is not relevant from a technocultural perspective. Human and machine intelligences are deeply connected and interact in many ways.

The distinction between human and machine make even less sense now when humans communicate and interact with intelligent machines sometimes daily. Machines are getting more intelligent by the minute; the algorithms are getting more complex, and computers can perform complex interactions on their own, thus they no longer need humans to interact (Berry, 2011; Malone & Bernstein, 2015).

Digital information online can take the concept of intelligence even further. A logical step forward is to consider collective intelligence, which Malone and Bernstein (2015, p. 1) define as "interconnected groups of people and computers that are collectively doing intelligent things". According to Berry (2011, p. 7), "computer code enable new communicative processes" that make collective thinking possible. Are we, as Berry proposes, seeing the beginning of a collective intellect through wikis and other collectively shared sites? Berry (p. 8) writes about digital assemblages: "Technology enables access to the databanks of human knowledge from anywhere, disregarding and bypassing the traditional gatekeepers of knowledge in the state, the universities and the market." This is in line with the communication revolution that disrupts the position of the sender and the receiver; the receiver can impact digital information, transform it, and of course use it to disrupt the society, or challenge traditional ways of being through collective efforts (van Dijk, 2012; Grosswiler, 2013).

Berry (2011) implies that shared digital culture can lead to digital Bildung. Knowledge is no longer possessed by the few, but by the many digitally. However, much of present digital technology is made for individuals and used by individuals; this is not the same as the truly collaborative processes that Berry imagines, where groups of people are thinking critically together through computers. The nascent research field of collective intelligence offers mostly questions at this point (Malone & Bernstein, 2015).

The ideas of collective intelligence and intellect make interesting contributions to the pedagogical field of Bildung. Løvlie (2006) and Berry (2011) place emphasis on the process of Bildung. Cultivating several selves would probably be something quite different, if at all possible, than cultivating only oneself. The transformations between the self or selves in this case, and culture is what constitutes Bildung in a technocultural sense (Løvlie, 2006). From a

technocultural perspective technology merely returns humans to the natural state of being which is in a constant relationship with the world that also includes the machines. Developing together with other humans, with and through technology, could mean new ideas and new social practices at a faster pace than ever before (Berry, 2011; Malone & Bernstein, 2015).

Løvlie (2006, p. 12) attributes the concept of the cyborg to Donna Haraway, who uses it as a metaphor for the interconnected human and machine. Collective intelligence would probably be an equally unstable presence in the world, as the cyborg, but a presence nonetheless. Continuing the discussion initiated by Løvlie, this presence strives to openness to that which is different; it would be a paradox for collective intelligence to agree on simply one truth or one identity, humanity is not fixed in subjects with one identity, rather it is constantly being negotiated collectively in digital spaces such as virtual learning environments.

Bildung in virtual learning environments

Virtual learning environments are interactive, communicative, collaborative, and digital; thus, they offer users a range of actions; they include text-based and immersive, visual digital environments. This make new teaching and learning practices possible that include other dimensions of learning than cognitive skills (Annetta, Folta & Klesath, 2011; Hilli, 2016). Virtual simulations have been used in military or nurse training where participants can analyse visual information, and practice how to handle different scenarios typical for the field (Carroll et al., 2015). In 3-D virtual simulations, participants can affect the outcome of the processes at hand which is important for their understanding of complex phenomena (Trindade, 2005). Through interactions with virtual learning environments, and through discussions with the teacher, misconceptions among students can be identified and rectified (Karlsson, 2012). Social media are another example of virtual learning environments; they make different forms of communication possible, both synchronous and asynchronous, and students can enhance communicative abilities and critical thinking skills through collaboration on social media (Beldarrain, 2006; Clark et al., 2015; Kreijns et al., 2003).

Virtual learning environments have been studied through educational theories focused on the learning process of the individual, such as behaviourism and constructivism. It has also been studied through social theories on learning focusing on collaborative processes, and the role of interactions with other individuals for learning (Annetta, Folta & Klesath, 2011; Harasim, 2012; Jones, 2007/2013). According to Petrina, Feng and Juyung (2008), a shift could be seen in the late 1990-2000s from cognitive research on learning and technology to regarding learning as situated in social and cultural practices. Although theories related to these approaches, for example communities of practice (Lave & Wenger, 1991), or activity theories (Engeström, 1987/2015), generally identify the importance of mediating artefacts, such as language and tools for learning activities; they do not, as the technocultural approach does, identify “the symbiotic relationship between man and machine” or the cyborg (Løvlie, 2006, p. 4). The transformation is in focus online where humans continue to find new ways of expressing themselves, and redefining themselves. That means fluid and constantly developing identities (Løvlie, 2006), in an equally fluid and ever-changing virtual learning environment (Hilli, 2016).

The student needs to make many decisions in a digital space to navigate forward, often through hyperlinks, and the learning process is not linear in the same sense as in a book; the student needs to find her or his own path online, which can be considered a form of explorative learning, and a curiosity to learn more engages the student (DePietro, 2013). The student is not only receiving information; she or he is an active participant in virtual learning environments, but this can cause confusion among students if they do not grasp the codes and communication online. According to Hannafin and Hannafin (2010), reading

digital texts is a cognitive challenge for many students. Students sometimes misunderstand the digital content, or they do not learn much about the course content since they are focusing on searching for digital information. Similar criticism has been raised against virtual simulations; students might misunderstand a complex process if they do not possess relevant previous knowledge, or if they lack feedback from teachers (Karlsson, 2012).

Digital technology offers new spaces for interactions and transformations among students. This is one way to interpret the symbiotic relationship that Løvlie discuss in the light of virtual learning environments. The software in virtual learning environments requires students to navigate the space, and take part in interactions independently, as a result they gain practical knowledge about software (Hilli, 2016). In the words of Løvlie (2006, p. 8), the student or cyborg, might become “a technocultural migrant, who can interpret signs, understand symbols of power, see through rhetorical games, engage in argumentation, and through all this is formed into a politically educated individual.” Løvlie describes an understanding of communication online, which can be translated into democratic abilities in a digital world.

Discussion

Researchers note that digital technology can be a disruptive force in the learning process (Harasim, 2012; Løvlie, 2006; Selwyn, 2016/2017). However, there are several reasons for considering what it means to embrace digital technology, as part of processes of Bildung, in the light of intelligent interactions. If online interactions are to be understood as intelligence as discussed above, it leads to prospects for virtual learning environments as communicative spaces that support processes of Bildung. Løvlie (2006, p. 4–5) calls the space ‘the interface’ and explains it as follows:

What’s the interface? The screen is an interface, whether we’re talking about the TV, the PC or the display on a mobile phone. The interface is the dividing line between person and machine but at the same time marks the spot where the person stands face to face with the machine. That is why interface is such a graphic term. ... The young owners do not necessarily identify with the mobile as a fetish, although it may offer an aura of freedom and power. Rather, their identity is linked to the mobile as distributed intelligence in a network in which they realise themselves in ongoing dialogues with others. Their identity is between rather than in the participants, identity is in the interaction. ... Interface is a boundary but not in the sense of a barrier or obstacle. A boundary faces two ways, it both unites and separates, it is face-to-face and Janus-face.

Without interface, there would be no difference between humans and machines - no space for intelligent actions. The relational aspect to consider extends the intelligence of the human; the interface makes it possible for humans to do and say things in new spaces in relation to others. Simulations and social media are examples of interfaces where these intelligent interactions can happen. The essence of Bildung is found in the transformative processes that take place online, between humans in communication, in the interface.

In virtual learning environments, communication is made possible through the software. The distinction between man and machine becomes irrelevant. There is no communication without the software, nor is there any communication without man. From a pedagogical perspective, online communication can enhance transformative processes among students. Synchronous communication is beneficial when brainstorming about a topic as a group or when teachers are providing feedback. Through asynchronous communication students have time for reflection and they can choose a convenient time to read material, take different perspectives into consideration or comment on a topic

(Annetta, Folta & Klesath, 2010; Falloon, 2011; Hrastinski, 2008). Different forms of communication might enhance the process of Bildung; they offer students different interfaces to communicate what they know, or want to know more about. The spaces for communication matter; if only verbal communication is used, shy students often remain silent. In written form, more students can participate and at their preferred pace and form of communication (DePietro, 2013).

Simply including online communicative spaces is not enough to foster communication or collaboration among students. According to Kreijns et al. (2003), teachers need to plan for and support collaborative and communicative activities to make students take part in them and learn through them. Furthermore, a combination of synchronous and asynchronous communication, such as asynchronous digital videos and synchronous online meetings, seem to support interactions between students, and between students and teachers; this in turn enhances the learning process among the students. However, in their study on teaching and social presence among 16 teacher students in an online course, they found that some students did not feel comfortable uploading video posts, and some participants only posted text-based comments in an online discussion.

Rethinking communication in virtual learning environments means supporting students to learn how to take part in different interactions and learn collaboratively; to do that, teachers need technical knowledge about the digital software and pedagogical knowledge about the learning processes online (Harasim, 2012). Teachers need to plan for how to support students learning when introducing new media that emphasizes independent activities by students (Karlsson, 2012). However, teachers are also technocultural migrants who need content knowledge, as well as, technological and practical knowledge about virtual learning environments. Harasim (2012, p. 86–87) mentions teacher training and professional development to support teachers, but there are “many mixed and mixed up messages and unclear demands” that make it difficult for teachers to include these spaces while teaching. Ideas of independent and active learners are embedded in the personal digital devices developed, when these ideas meet the collective efforts of education, conflicts of interest arise (Selwyn, 2016/2017).

The role of the teacher is as important as ever, although the learning process of the student is mediated through different multimedia (Harasim, 2012; Karlsson, 2012). Harasim identifies a lack of learning theories suitable for online environments as part of the challenges for teachers. Hannafin, Hannafin and Gabbitas (2009, p. 769) address other challenges for teachers, “Designers are unable to account for individual cognitive demands in advance since the context of learning is often spontaneous and the availability and use of resources evolving continuously.” When the individual meets the digital world, it advances independent travels in sometimes uncharted territory, a digital territory that is constantly changing (DePietro, 2013; Hilli, 2016).

Bildung, in virtual learning environments, implies knowledge to read and understand the digital space, an ability to navigate successfully in it. Synchronous and asynchronous forms of communication might make the reflective process diverse and inclusive within a group of students. Diverse because students are subjected to different interfaces where they face the world. Inclusive because they can take part on their own terms and often in their own time. It is in these spaces and in these relationships that the process of Bildung is expected to evolve. Furthermore, accepting this fluid and inconstant nature of the digital world is most likely essential for a technocultural migrant - for a cyborg.

Conclusions

This paper has discussed the transformative relationship between the self and culture, or *Bildung*, while considering new technology such as virtual learning environments. The paper has adopted a technocultural approach to education; *Bildung* is a personal, fluid and dynamic process that can be enhanced through online communication. It relates to the interactive and communicative aspects of virtual learning environments, that make it possible for students to be active while learning, as they are interacting with people, digital software, and digital information.

Virtual learning environments do not absolve the role of the teacher, rather they add new dimensions to consider when teaching in them; they make new teaching and learning practices possible, including studying digital sources, and collaborating through intelligent interactions in simulations or social media. However, students need support in virtual learning environments; they need to learn how to use, understand and navigate the spaces. Teachers might do well to include communicative online spaces where students can discuss explorations they make, and questions or problems that arise. A combination of synchronous and asynchronous communication seems to support the learning process; students can share and reflect upon what they have learned with others to avoid misunderstandings or feelings of frustration. And finally, collaboration and communication do not happen unless they are planned for; teachers need to include collaborative assignments for transformative processes of *Bildung* to take place.

The paper has suggested rethinking what communication means in education when it is mediated through digital technology. The paper has argued that when humans meets computers transformations take place, not only through interactions with other people, but also through the machine and software; this was understood as interfaces where humans face culture. As the digital world is an extension of humanity there is no question if digital technology should be part of education, the paper assumes it would be unnatural not to include it. From a technocultural perspective, technology merely returns humans to the natural state of being - in a constant relationship with the world - digital technology extends this notion to a global level.

References

- Annetta, L. A., Folta, E. & Klesath, M. (2010). *V-Learning. Distance Education in the 21st Century Through 3D Virtual Learning Environments*. New York: Springer.
- Beldarrain, Y. (2006). Distance Education Trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education*, 139–153.
- Berry, D. M. (2011). The Computational Turn: Thinking About the Digital Humanities. *Culture Machine*, 12.
- Burman, A. & Sundgren, P. (2012). Inledning. In A. Burman & P. Sundgren (Eds.), *Svenska bildningstraditioner* (pp. 7–25). Göteborg: Daidalos förlag.
- Carroll, M., Johnston, M. & Hale, K. S. (2015). Visual Perceptual Skills Training in Virtual Environments. In K. S. Hale & K. M. Stanney (Eds.), *Handbook of Virtual Environments. Design, Implementation, and Application* (pp. 1029–1042). Boca Raton: Taylor & Francis Group, LLC.

- Clark, C., Strudler, N. B., Grove, K. J. (2015). Comparing Asynchronous and Synchronous Video versus Text Based Discussions in an Online Teacher Education Course. *Online Learning Journal*, 19(3). <https://doi.org/10.24059/olj.v19i3.668>
- DePietro, P. (2013). *Transforming education with new media: participatory pedagogy, interactive learning, and Web 2.0*. New York: Peter Lang Publishing, Inc.
- van Dijk, J. (2012). *The Network Society. 3rd Edition*. London: SAGE Publications Ltd.
- Engeström, Y. (1987/2015). *Learning By Expanding. Second Edition. An Activity-Theoretical Approach to Developmental Research*. New York: Cambridge University Press.
- Falloon, G. (2011). Making the Connection: Moore's Theory of Transactional Distance and Its Relevance to the Use of a Virtual Classroom in Postgraduate Online Teacher Education. *Journal of Research on Technology in Education*, 43(3), 187–209.
- Grosswiler, P. (2013). *Old new media: from oral to virtual environments*. New York: Peter Lang Publishing Inc.
- Gustavsson, B. (2003). Bildning och demokrati Att förmedla det partikulära och det universella. *Utbildning & Demokrati*, 12(1), 39–58.
- Gustavsson, B. (2012). Bildningens traditioner i transformation. In A. Burman & P. Sundgren (Eds.), *Svenska bildningstraditioner* (pp. 309–327). Göteborg: Daidalos förlag.
- Hannafin, M. J. & Hannafin, K. M. (2010). Cognition and Student-Centered, Web-Based Learning: Issues and Implications for Research and Theory. In J. M. Spector, D. Ifenthaler, Kinshuk, P. Isaías, & D. Sampson (Eds.), *Learning and Instruction in the Digital Age* (pp. 11–23). New York: Springer.
- Hannafin, M. J., Hannafin, K. M. & Gabbitas, B. (2009). Re-examining cognition during student-centered, Web-based learning. *Education Technology Research and Development*, 57, 767–785. <https://doi.org/10.1007/s11423-009-9117-x>
- Harasim, L. (2012). *Learning Theory and Online Technologies*. New York: Routledge.
- Hilli, C. (2016). *Virtuellt lärande på distans. En intervjustudie med finländska gymnasie studerande*. Doctoral thesis, Åbo: Åbo Akademi University.

- Hrastinski, S. (2008). Asynchronous and synchronous e-learning: A Study of asynchronous and synchronous e-learning methods discovered that each supports different purposes. *EDUCAUSE Quarterly*, 31(4), 51–55.
- Hug, T. (2017). Openness in Education: Claims, Concepts, and Perspectives for Higher Education. *International journal of media, technology and lifelong learning*, 13 (2), 72–87.
- Jones, C. R. (2007/2013). Designing for Practice: A View from Social Science. In H. Beetham & R. Sharpe (Eds.), *Rethinking Pedagogy for a Digital Age. Designing for 21st century learning* (2nd edition, pp. 204–217). New York: Routledge.
- Karlsson, G. (2012). *Instructional technologies in science education: Student's scientific reasoning in collaborative classroom activities*. Department of Applied Information Technology. Doctoral thesis, Gothenburg: University of Gothenburg.
- Kaveh, S. (2012). Bildningsbegreppets ontologiska kluvenhet. In A. Burman & P. Sundgren (Eds.), *Svenska bildningstraditioner* (pp. 111–132). Göteborg: Daidalos förlag.
- Konrad, F.-M. (2012). Wilhelm von Humboldt's Contribution to Theory of Bildung. In P. Siljander, A. Kivelä, & A. Sutinen (Eds.), *Theories of Bildung and Growth. Connections and Controversies Between Continental Educational Thinking and American Pragmatism* (pp. 107–124). Rotterdam: Sense Publishers.
- Kreijns, K., Kirschner, P. A. & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in Human Behavior*, 335–353. [https://doi.org/10.1016/S0747-5632\(02\)00057-2](https://doi.org/10.1016/S0747-5632(02)00057-2)
- Kristensson Ugglå, B. (2008). Who is the Lifelong Learner? Globalization, Lifelong Learning and Hermeneutics. *Studies in Philosophy & Education*, 27(4), 211–226. <https://doi.org/10.1007/s11217-007-9074-y>
- Kroksmark, T. (2003/2011). *Den tidlösa pedagogiken*. Lund: Studentlitteratur.
- Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press.
- Løvlie, L. (2006). Technocultural Education. *Seminar.net. International journal of media, technology and lifelong learning*, 2(1), 1–19.
- Livingstone, S. (2012). Critical reflections on the benefits of ICT in education. *Oxford Review of Education*, 38(1), 9–24.

- Malone, T. W. & Bernstein, M. S. (2015). Introduction. In T. W. Malone & M. S. Bernstein (Eds.), *Handbook of Collective Intelligence* (pp. 1–14). Cambridge, MA: MIT Press.
- Nussbaum, M. (2010). *Not for profit: why democracy needs the humanities*. New Jersey: Princeton University Press.
- Petrina, S., Feng, F. & Juyun, K. (2008). Researching cognition and technology: how we learn across the lifespan. *International Journal of Technology and Design Education*, 18(4), 375–396.
- Selwyn, N. (2016/2017). *Skolan och digitaliseringen. Blir utbildningen bättre med digital teknik?* Göteborg: Daidalos förlag.
- Selwyn, N. (2011). Making sense of young people, education and digital technology: the role of sociological theory. *Oxford Review of Education*, 38(1), 81–96. <https://doi.org/10.1080/03054985.2011.577949>
- Siljander, P. (2016). *Systemaattinen johdatus kasvatustieteeseen. Peruskäsitteet ja pääsuuntaukset*. Tampere: Vastapaino.
- Siljander, P. & Sutinen, A. (2012). Introduction. In P. Siljander, A. Kivelä, & A. Sutinen (Eds.), *Theories of Bildung and Growth. Connections and Controversies Between Continental Educational Thinking and American Pragmatism* (pp. 1–18). Rotterdam: Sense Publishers.
- Trindade, J. F. (2005). Improving Physics learning with virtual environments: an example on the phases of water. *Interactive Educational Multimedia* (11), 212–226.