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Interaction design, pedagogical practice, and emancipation

In November 2007, the Research platform M3 [man medium machine]/the School of Communication, Technology & Design at Södertörn University College arranged, in collaboration with the ITU, Oslo University, a two-day workshop on the theme Interaction Design in Pedagogical Practice. There were 15 position papers submitted to the workshop, representing 15 different universities from four countries. Out of these, we now have the privilege to publish four of them in this special issue of the Nordic Journal of Digital Literacy, together with a debate article. They are, in their own respect, modest witnesses, of the need for this dialogue between interaction design and pedagogical practice.

Interaction design, understood as the practice of shaping conditions for interaction by means of digital media, is having an increased influence on pedagogical practice. Digital media hold great promise in relation to human learning and development in a wide range of areas, and pedagogical practice is in extensive need of an update (to use tech-jargon) in order to meet the needs and expectations of the New Millennium Learners (Pedró, 2007).

One example of this merging is the recommendations on key competences for lifelong learning from the European Parliament and Council, where digital competence is proposed as one of eight key competences. As for what is considered "essential knowledge, skills and attitudes" it is stated that:

> Digital competence requires a sound understanding and knowledge of the nature, role and opportunities of IST [Information Society Technology] in everyday contexts: in personal and social life as well as at work. This includes main computer applications such as word processing, spreadsheets, databases, information storage and management, and an understanding of the opportunities and potential risks of the Internet and communication via electronic media

> (e-mail, network tools) for work, leisure, information sharing and collaborative networking, learning and research. Individuals should also understand how IST can support creativity and innovation, and be aware of issues around the validity and reliability of information available and of the legal and ethical principles involved in the interactive use of IST.
>
> [European Commission, 2006]

Interaction design will most certainly become increasingly important in relation to pedagogical practices. At the most obvious level, it is clearly the case that behind every interactive application there is some kind of explicit or implicit interaction design work, involving what users can and cannot do with the application. In relation to this, the Gibsonian concept of affordance (Norman, 1988; Gaver, 1991) is often brought up, suggesting how human action can be directed by the semiotic cues presented to her. At a more complex level, the design of any given artefact used by humans will in one way or other influence her conceptualization of not just the artefact, but also the surrounding world as well as herself. In educational settings, digital media are all the more important building blocks in the process of constructing personal as well as social knowledge. This is one major reason why digital competence is a key competence, since digital media change the conditions for learning. By using and appropriating digital media the user shapes new possibilities for herself as a citizen. It is therefore of utmost importance to understand the relationship between the design of interactive digital media and human action and development. The need, therefore, to go beyond our pre-conceptions about learning and knowledge, implies a need for a transformation of theoretical understanding, helping us to challenge what we (think we) know, and to be open to what we do not know.

The meeting between interaction design and pedagogical practice raises a range of important questions. What common themes and problems can be jointly addressed in interaction design and pedagogical practice? What are the core differences between the fields? How do we deal with the usage of a similar vocabulary, while we do not share a common discourse that creates mutual understanding of the concepts? Such a critical discussion is, of course, a long process, hopefully attracting a large number of practitioners and scholars. The workshop and this special issue highlight a number of important questions and provide significant contributions to this process. After introducing the articles and what we see as their primary contributions in relation to this discussion, we will raise a couple of related questions that we think are in need of further elaboration at the intersection of interaction design and pedagogical practice: in what ways do the two fields characterize themselves as being emancipating (a core concept in both fields), and in what ways are heteronormative power structures recognized in interaction design and pedagogical practice? We will initially define emancipation as the process of becoming free from controlling influences or structures of, for example, traditional hierarchies or

beliefs. Heteronormativity, an abbreviated version of normative heterosexuality, is the assumption that heterosexuality and heterosexual norms are universal or at least the only acceptable conditions. Variations from this standard for identity are marginalized. This includes variations from the normative gender categories male and female and associated roles in society.

Introduction to the articles

In the first of the articles, Arvola and Artman set out to understand the potential of the studio as a pedagogical learning environment. Based on studies of how interaction designers act and think in two different studio settings, they discuss the learning process in relation to cooperative and individual work. The article raises important questions about how to develop creative learning environments, a question of relevance not just for design educations, but for any education. Furthermore, it contains an important theoretical and methodological question, although it is not specifically addressed: How should we study the process of learning? What *is* this thing that we call learning? How is it manifested? What tools do we need to register "learning"?

Karlström, Cerratto-Pargman and Knutsson discuss the relationship between digital literacy and design, using the example of tools for second language learning. The article illustrates that we tend to not just rely on digital technologies (like grammar checkers), but also on how actors become involved in the shaping of our thinking (which an activity theorist most likely would agree with). This is not the same, we think, as the notion of technological determinism. Still, it is we as humans who construct meaning. However, this meaning is influenced by the tools we use. This underscores the fact that the development of digital literacy relies on a critical approach towards not only the tools we use, but also their implications in work, school and everyday life.

In her article, Svabo concentrates on a specific group of technology users: children at a museum. After reading the article, the question of how findings like these translates to children as a whole remains. Just as with the other articles, this calls attention to the fact that in order to deepen the knowledge about what could be called "use heterogeneity", the vague category "user/s" needs to be reflected on. Perhaps the most striking part of Svabo's article, however, is the attention paid not to the digital media of the museum, nor to the exhibition as such, but to a pamphlet. This pamphlet becomes a means of mediation between the user/visitor and the exhibition/museum. Again, we see how artefacts affect the meaning-making process, as well as our actions; hence, artefacts are creators of meaning, in need of interaction designers with not just technical fluency or creative and critical skills, but also methodological as well as theoretical breadth *and* depth. Or, if that is too much to ask of a single person, how can we incorporate all this into one design process?

Tholander and Fernaeus formulate four challenges for the design of digital tools that aim to support children's possibilities for expressing themselves in everyday casual situations. In their emancipatory ambitions of a practical design, they make us aware of the fact that much technology is designed for work or learning, i.e. a notion of "the useful" or what is profitable. Once again this is an illustration of how the words we use tend to direct not just our attention, but also our values and opinions. As with any other field, interaction design practice has its canon constructing its paradigm. Hence, the challenge presented by Tholander and Fernaeus is also a methodological and theoretical one, pointing at the need to challenge ourselves and our pre-conceptions. The ambition of the workshop, and now this special issue, has been to address this very point; to challenge by way of dialogue. Curiosity and open-mindedness are of key importance in such a dialogue.

The question about studio-based learning, as addressed by Arvola and Artman, is further developed by McGee in the concluding debate article. This issue is particularly relevant to our own practice since the School of Communication, Technology and Design, to which the editors of this special issue belong, is, at the time of writing, moving to new facilities and needs to address how to make best use of them in its pedagogical practice. Without doubt, it is highly important to seriously, as well as continuously, discuss and extend these learning environments in order to best support the students in their development. McGee uses a theorist-practitioner approach when discussing interactive digital media research studios. He also directs attention to the burning question of higher education: What experiences are important for fostering critical and reflective thinking? What do the students need to know, and what do they need to master? What knowledge, be it theoretical or practical, or any combination of the two, is relevant at the break of the 21st century?

The articles in this special issue are to varying degrees expressions of reflective practice (Schön, 1993; 1997), and both interaction design and pedagogical practice are fields where reflection and discussion are highly valued. One important area to further develop our discussion is the power structures of the societal context where not just interaction design and pedagogical practice meet, but also where both find their "users".

Artefacts, design and human action

The debate about the contingent benefits of external tool use in the pedagogic endeavour has a long history. Plato's dialogue in Phaedrus is an often-cited example, where Socrates argues that the written word "will create forgetfulness in the learners' souls" as "they will trust to the external written characters and not remember of themselves."[1] Media will, in short, alter the way we learn as well as what we learn. Furthermore, Socrates argues in this dialogue with Phaedrus, which is of interest in relation to the notion of digital compe-

tence, that mastering the tools of an art only means that you know the basics. To actually understand and practice the art you need to learn its purpose and value in society. Or, in other words, develop a critical approach.

As different kinds of digital artefacts become more and more influential in pedagogical practice, it is important to discuss the intersection of the design of digital artefacts and pedagogical practice. We will do this, by focusing on the emancipating ambitions of the two practices. What does emancipation mean in the two fields? In what way are they emancipating? As an illustration of the concept of emancipation in the two practices, we will focus on the ways in which heteronormative power structures are recognized. Again, let us stress that we ask questions, rather than provide answers. The examples we use are chosen for the sake of argument. They are not necessarily fully representative of the fields, neither are we critical of the referred works: our aim here is to start a discussion based on our experience. It is likely that we may miss important as well as interesting contributions already made in these fields. Nevertheless, we will argue that there is a need for further and deeper discussion in this area.

The use of tools in human learning practices did not of course arise with digital technology. Tools for painting, and later on writing tools, have been around for more than 30,000 years; one of the earliest examples that we know of are the drawings of horses from the Chauvet Cave in France. These early paintings are examples of how the use of tools helps humans to organize their lived experiences, and also how information can be separated from time and place. Of course, the cave paintings are bound to a certain place. But we need little fantasy to see how similar symbols are being painted on pieces of wood or skin. Our argument is that the media we use transform our understanding of not just the world around us, but also our understanding of ourselves and our capacities. The abacus as well as the alphabet – perhaps the most remarkable tools ever used – have now been around for about 5,000 years. Humans using tools as "extensions of our consciousness" (McLuhan, 1964) is hence nothing new, regardless of whether or not they are physical or mental (psychological) (Vygotsky, 1978; Wertsch, 1991). This is not to say that tools do not differ in their character. Digital media *is*, in its essence, something else than analogue media. Its *meaning*, however, is still a human construct.

If we jump to more modern times, one of the first uses of (what was to become) the computer in education was the simulated training of aircraft pilots during the 2nd World War (Hernwall, 1998). This kind of machine-based training was initially developed by Sidney Pressey in the 1920s, with the aim of improving the learning outcome of students. In 1954 Skinner presented his first teaching machine, following the ideas of behaviourism. This can be said to be the precursor of computer-assisted instruction in the 1980s, basically building on operant conditioning. During the 1960s, the teaching machine, together with programmed instructions, turned out to be highly popular, although it never became as widespread as its advocates argued (and hoped) for. This gap between utopian

expectations and factual profits seems to be a recurrent trend in respect of media use in education. In the 1980s Papert (1980) argued for how programming an icon (the Logo "turtle") to move on the screen could support children's arithmetic understanding, while also making the school more relevant. Later on, Papert (1993) was a bit more resigned, stating that the school was more or less a lost cause. And this was before what was to be named "the Internet revolution". In the late 1990s, computer games became another captivating rabbit-hole, magically endorsing learning, as playing is fun. These were followed up by web 2.0 and the idea that we as users collaborate in order to create content, share information, and so on.

Even though we still see little of the marvels of the proponents, contemporary digital media become more and more important in formal education, and also more and more widespread. There are of course several reasons for this. The technology becoming more accessible in terms of cost and usability is most likely an important reason for this shift in understanding of the qualities of digital technology, together with a deepened understanding of how to make use of it. Today, the use of computer technology to enhance people's possibilities for learning is commonplace. This can be seen, for example, in the form of distance education, e-learning, multimedia visualisation tools, etc. An initial observation regarding the use of technology for learning – from intelligent tutoring systems to e-learning applications – is that there are, implicitly or explicitly, assumptions made about how humans learn and how technology should be designed to match the learning process. Accordingly, this has led to the fact that the dominating psychological theories of learning during different time periods have been paralleled by trends on how to design technology for learning. But, as we will see below, modern theories about the conditions for human learning and development are not limited to the psychological or cognitive aspects, and they have never been. One field of particular interest in relation to the theme of this article concerns the power structures present in any learning situation. The most obvious power structure is where there is at least one person (assumed to be) in possession of knowledge, and at least one who is not. Furthermore, the design of the learning environment, gender relations, economic recourses, ethnicity, and so on, all have a critical influence on the outcome of any learning process. But the importance of power structures such as these is often neglected in the practice of interaction design, which is a bit strange, as the user is presented as being central in interaction design theory and practice.

Berg and Lie rhetorically ask if technological artefacts have gender (Berg & Lie, 1995). Of course they do, as they are man(!)-made. It is primarily men who work with technology; technology is historically (culturally) understood as being masculine. Technologies used by women (or any other marginalized group/category) are understood as being something else than technology (i.e. telephones, sewing machines, microwave ovens), and the notion of the user being male (a white, heterosexual, middle-aged, middle class, westerner) is seldom questioned. This negligence of gender being present in any artefact

tends to confirm gender stereotypes and "build on stereotypical gender differences" (Faulkner & Lie, 2007, p. 169), as with the pink Sony PS2 game console. Who is it for? What kinds of games can be played on a pink PS2 – and does this differ between girls and boys? Perhaps a more multi-dimensional example might be Volvo's Your Concept Car (YCC), entirely designed by women for women. To what extent does the Your Concept Car question gender stereotypes – and to what extent does it reinforce them? Are the YCC and the pink PS2 examples of designs that "do gender" – or do they create new opportunities for gender identities?

Are these kinds of critical questions present in interaction design processes? And, if so, are they important questions in interaction design processes? We argue that they are important, and we further argue that they are, to a large extent, absent today. Issues of ethnicity, class and age of equal importance in this respect. Some of these categories are addressed in terms of economic concerns and target groups, but they are seldom addressed in a critical sense. All of these should be regarded as important analytical categories in relation to the common political-ideological vision that exists in many western societies today of an IT-society for all.

Pedagogical practice and power structures

Turning to the pedagogical practice and the rather comprehensive research on formal and in-formal learning settings, there is a deep as well as widespread knowledge, that power structures are present in almost every learning situation. Just a few examples: studies on gender and speech acts show that men/boys speak more, in other ways and have a different understanding of gender positions in the conversation space, and these patterns are also repeated in online communities (Herring, 2001). Another example of these power structures is that school tends to give power to children from the middle classes, whereas children from the working classes tend to be marginalized. This is largely an effect of *how* the teacher acts (the one with power), and *what* competences are considered important. It has also been suggested that one reason for digital media not being accepted in the school environment, is that it is associated with popular culture. The school on the other hand, the argument goes, should stand for the values embraced by cultural heritage, the fine arts, and not least, printed books. Besides gender and class, attention has been paid to ethnicity as an analytical category in relation to formal education, and also to the possibilities of digital media and information and communication technology in this respect.

The outcome of an activity, where conditions are designed (regardless of whether it is designed by an interaction designer or a teacher), is deeply dependent on heteronormative power structures. Experience tell us that power structures are important within pedagogical practice, and also that they are appreciated as such within both pedagogical the-

ory and practice. The field of interaction design may acknowledge the existence of such power structures, but seldom addresses them directly. Here, intersectionalist theory helps us to pose critical questions about power and power structures. The intersectionalist perspective (Lykke, 2003; McCall, 2005; de los Reyes & Mulinari, 2005) assumes that there are several intersecting power structures at play. These different power structures do not form additive categories, but there is a dynamic interaction between different asymmetric power dimensions (Lykke, 2003). Accordingly, users cannot be said to be a group. Taking gender, class, ethnicity and nationality into consideration, the group "users" become as elusive as "Europeans" or "students" (see also Bannon, 1991). The hierarchical power structures are not fixed entities. Just as they are challenged, they change depending on time and space. Looking at how Norwegian tweens (aged 10 to 12) use information and communication technology in their everyday practice, Hertzberg Kaare (et al., 2007) found that "[n]ew communication technologies offer good conditions for developing children's peer culture, while the family-oriented culture has become weakened" (ibid, p. 621). Somewhat ironically, parents aiming to strengthen parental control often buy the technology. How these tweens use communication technologies illustrates not only that hierarchical power structures are dynamic and flexible, but also that the appropriation of information and communication technology has important consequences for power hierarchies, much in line with Donna Haraway's seminal cyborg manifesto (Haraway, 1985).

Before coming back to power structures and emancipation from them, we wish to clarify our conceptualisation of the notions of interaction design and pedagogical practice a bit further, as well as the intersection between the two.

Intersecting interaction design and pedagogical practice

The two fields, interaction design and pedagogical practice, are both design-oriented fields of practice. Whereas interaction design is the practice where interactive digital media products and services are created, the pedagogical practice is about designing learning environments. The former field focuses on the interaction with and through the product or service, while the latter has its primary interest in the learning subject. Pedagogic research (rather than pedagogic practice) is a social science and hence, according to Habermas' view of social science, emancipatory in its ambitions. Pedagogics, or educology as the scientific discipline has also been named (Papert, 1988; Qvarsell, 2000; Hernwall, 2007), studies the conditions for learning, development and socialisation, in formal as well as in information learning settings. The focus of pedagogical practice is on optimizing these conditions for learning, given the uniqueness of the situation. Using a similar vocabulary, interaction design focuses on the shaping of conditions for interaction by means of digital products and services. A bit more extensively, we define interaction de-

sign as the shaping of conditions for humans' interaction with, through and by means of a designed (often digital) artefact (Arvola, 2005).

Theories of the processes of learning are often roughly categorized into three historical traditions (Gardner, 1985; Säljö, 2000; Wilson & Myers, 2000), firstly behaviourism (1900–1960s), secondly information processing psychology (1950–today), and thirdly socio-cultural or situated theories of learning (1970–today). These traditions all differ in their views on human thinking and knowledge. This is reflected in the different approaches to how learning technology should be designed from those theories. Koschmann (1996) describes the development of four different paradigms for the design of technology for learning, the first being Computer Assisted Instruction (CAI), which is based on behaviourism and information process psychology. The second paradigm involves so-called Intelligent Tutoring Systems (ITS), with roots in Artificial Intelligence and information processing psychology. The role of the tutor in this tradition is to ensure that the student receives and understands a well-defined piece of knowledge. The third paradigm, the Logo-as-Latin approach, views knowledge as constructed by the individual learners themselves and not as something that can be defined and inscribed in a system and then transferred to the learner. This constructivist perspective has led researchers to try to build tools that allow students to construct their own models of their personal knowledge. The fourth and most recent paradigm is Computer-Supported Collaborative Learning (CSCL) and the related field of Interaction Design and Children (IDC). In these perspectives, socially-oriented approaches to learning and human action are brought to the fore, thus suggesting that in designing and studying technology for learning, it is the social aspects of the situation under consideration that should be taken as primary. From these approaches, technology for learning may take a number of different forms. It is problematic to view a particular application as being an example of a particular research tradition. Instead technology for learning and interaction must always be characterized within its context of use.

Interestingly, the notion of design also seems to be becoming more popular in educology and the pedagogical practice. "Design for Learning" (Rostvall & Selander, 2008) is the name of an anthology (in Swedish), discussing what they name a "design perspective", formulating questions on how, in what way, and with what means knowledge takes shape. In this perspective, the representational form is significant for how the subject will come to understand objects, information, and knowledge. And also, how the subject will design her own understanding of what is to be learned. The socio-historical context, the learner and her abilities, as well as the tools (in the broad sense) used, are all important in not just *what* will be learned, but also *how* this learning will unfold. Hence, for us, learning as well as interaction can be understood as taking place in the intersection between the individual and her resources, and the external environment (with persons, history, material objects, representational forms, traditions and norms, etc.). Tools and media, especially

digital tools and media, have a great influence on our learning and understanding, as they augment us and form prostheses that transform our embodied and mindful construction of our world (e.g. Clark, 2003; McLuhan, 1964).

Creating opportunities

Let us now return to the notion of emancipation. Habermas (1981) concluded that emancipation should be the essential interest for the social sciences – which includes both pedagogics/educology and (at least partly) interaction design. Habermas argued that knowledge is gained through transformed consciousness, based on communicative action. For this transformation of perspective to take place, reflection is central as it might lead to self-emancipation. Emancipation is, in other words, reflection based on rationality, furthering life possibilities.

Even though one can easily criticise the practice of formal education for being out-of-date, non-relevant and even marginalising, the ambition of emancipation is a core value within pedagogical practice, perhaps best illustrated in the tradition of Freire (1970) and the liberation of the oppressed. A cornerstone for the democratic school is the assumption that every individual should be respected as a unique individual. This tradition can be seen in, for example, the Swedish curriculum from 1994 (Lpf 94) for the non-compulsory school system (Skolverket, 2006), where the following is stated as a fundamental value:

> The task of the school is to encourage all pupils to discover their own uniqueness as individuals and thereby actively participate in social life by giving of their best in responsible freedom.
>
> Skolverket, 2006, p. 3

With knowledge of the presence of hierarchical power structures in pedagogical practice such as those mentioned above, the Lpf 94 formulation sounds visionary (or perhaps self-righteous). With digital media now entering pedagogical practice, the situation is becoming all the more problematic as the field of pedagogical practice seldom has neither the tradition nor the tools to undertake a critical evaluation of the benefits and/or shortcomings of any particular digital artefact. The field of pedagogical practice is thus in the hands of the field of interaction designers or other IT professionals who create the digital learning tools. This situation is being further reinforced by the ambivalence of pedagogical/educological research in relation to tools supporting learning; accepted if they are traditional tools such as pen and paper or mathematical formula, but more problematic if they are computer software, Wikipedia or a mobile phone. One could say that the potential emancipatory qualities of digital media are overshadowed by the traditions of pedagogical theory in general, and especially the notion of the learning *subject*. It is almost as

if digital media is conceived as obstructing human emancipation. This reflects a hard-wired idea about technological determinism, in terms of technology leading to negative consequences.

Interaction design, on the other hand, has a more positive relation to the potential of digital media. Iversen (et al., 2004) illustrates this when saying that "through development of social responsible computer artefacts, the conditions for an emancipatory practice are established" (ibid., p. 172). Naming this the Utopian approach, it is a very different version of technological determinism compared to the one found in pedagogical practice where the solution lies in the technology. The role of the interaction designer is more or less a question of identifying "aspects of systems that can promote or undermine user autonomy" (Friedman, 1996, p. 18). The term "critical design" is used to describe design processes aimed at "identifying blind spots and opening new design spaces" (Sengers et al., 2005, p. 50) based on feminism and ethnical studies, etc. Used in this way, it is a strategy for designing better products as it is argued "that reflection on unconscious values embedded in computing and the practices [...] should be a core principle of technology design" (ibid., p. 49). Again, the technological determinism becomes obvious when it is asked how this approach can help to find and address blind spots, making it possible to make "design choices [that] may lead to improved quality of life?" (ibid., p. 49). Who are the ones having a better life? Does this critical design perspective include a critical stance towards its own practice, towards the pre-conceptions of the designer as well as the user? To some extent it does, but the close relationship between the conditions of humans and the development of technology is a complex one that needs to be discussed. A discussion present in Haraway's analysis of the meeting between human action and digital media (Haraway, 1985, 1991). This is a discussion that needs to be addressed in a systematic way within the field of interaction design, as the interaction designer without a doubt becomes an evermore important contributor in the design for human action. Even though the responsibility of the designer has been discussed (e.g. Nelson & Stolterman, 2003), it has not been discussed to any great extent in relation to power structures – neither as they are manifested in society at large, nor in how they become expressed in the design process. Again, core questions have been formulated within critical design that are worthy of much more thorough investigation: "As people adapt to the opportunities and constraints provided by our technologies, their everyday practices, feelings, even their identities and sense of self, may shift, often in unanticipated ways. As designers, we are left to wonder: what values, attitudes and ways of looking at the world are we unconsciously building into our technology, and what are their effects?" (Sengers, el al., p. 49) This is a question that becomes even more pressing as the products designed by interaction designers are ubiquitous in everyday life, working life and in pedagogical practice. Just think of it: what power structures are built into the learning management platform (LMS) you most frequently use? How are gender and ethnicity built into your

mobile phone? And what are the effects if these artefacts find their way into a formal educational setting? Gender, as with any other intersectional category, must be made conscious in any interaction design process, and especially so if it is to be used in pedagogical practice, as pedagogical practice is already recognized as a complex field of intersecting power structures. But, instead of pointing out the inadequacies of the two fields, let us finish off by presenting a couple of fields for future research.

Advancing the discussion

Both pedagogues and interaction designers are involved in a second order design problem, where they shape conditions for people, but are interested in secondary effects. The interaction designer shapes digital products and services, but aims to influence people's interactions with, and experiences of, digital products and services. The pedagogue shapes environments and activities for learning, but aims to influence people's competences and understanding of the world. The core interest of the interaction designer is often more or less neglected by the pedagogue, and vice versa.

In the meeting of interaction design and pedagogical practice it becomes crucial for interaction design to embrace these kinds of critical perspectives and theories, as the field of pedagogical practice has very little understanding of media in general, and digital media in particular. Here the field of pedagogical practice at large is in the hands of interaction designers. But do they have sufficient training, traditions or tools to carry out a critical evaluation of the benefits and shortcomings of a particular digital artefact in relation to emancipation, heteronormativity or intersecting power dimensions? Gender theory is so much more than having "women" as a category, or counting the number of users; a genuinely critical perspective is needed (c.f. Faulkner & Lie, 2007). Gender, and other structuring principles, must be articulated in any interaction design process, and especially so if it is to be used in pedagogical practice, which comprises a treacherous field of power structures.

Another important question is whether or not the technology contains any real emancipatory power. One is tempted to say "no", based on what we now know with regard to the utopian visions of the mid 1990s of humans freeing themselves from the heteronormative gender structures in real life, when meeting online (e.g. Nakamura, 2002). The power structures of our off-line world are, sadly to say, re-created online. And perhaps this was just a naïve vision, synonymous with the hopes associated with any other new artefact, that the Internet would turn the world into a better, and more peaceful, place. The same applies to the railways, the telephone, the television, the telegraph, and so on. But still, every artefact does affect us, how we understand ourselves, as well as how we understand the world we live in. If we, as a result of using digital media in a learning context, think of ourselves in new ways, is that emancipation?

As the fields of interaction design and pedagogical practice meet and share common interests, interaction design needs to move from the superficial idea of "design for all", to "use heterogeneity". This of necessity includes a critical examination of its own practice in all dimensions: Who designs what for whom, and in what context? What power structures are recognized, and how are they understood? To what extent are the specific user needs, interpretations and actions acknowledged? Pedagogical practice, on the other hand, needs to develop a way of critically examining digital artefacts/media, to be able to not just use digital media but also, and more importantly, to develop its practice. One step in that direction is most likely to appropriate digital media in learning practice as well as in learning theory, thus developing digital competence.

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Notes

1 Taken from Plato's dialogue "Phaedrus". Available from the Internet Classics Archive; http://classics.mit.edu/Plato/phaedrus.html

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