



Inkeri Hakamies

“Real Museum Work” and Information Technology – Does not Compute!

Abstract

The Finnish museum field transformed in many ways in the latter half of the 20th century: administrative structures were reorganised, new professional titles emerged and museological and conservational education was developed. These changes and their effects have been addressed in research (see e.g. Pettersson & Kinanen 2010), but there is one practical change that has remained understudied: the computerisation of museums’ day-to-day work.

The empirical material for this paper consists of oral interviews with Finnish museum professionals, produced as part of a national museum history project in 2005–2011, and writings in the Finnish museological journal *Museopolitiikka*. Based on the material, I analyse the empirical concept of “real museum work” as a social practice that is understood through certain material elements, competences and shared meanings, and ask how the introduction of information technology has affected it. How is “real museum work” understood in the interviews, and how do computers relate to it?

Keywords: Museums, social practices, work practices, change, information technology, computers, digitalisation

© Inkeri Hakamies

<https://orcid.org/0000-0003-2251-3782>

ETNOLOGIA FENNICA Vol. 46 (2019), 36–60. <https://doi.org/10.23991/ef.v%vi%i.74238>

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).



VERTAISARVIOITU
KOLLEGIALT GRANSKAD
PEER-REVIEWED
www.tuv.fi/en/etnologia



Introduction

Both museums and the surrounding societies went through significant changes in the last decades of the twentieth century. These changes in practices also affected the ways museums are defined. Indeed, museums have gone through many stages of reinventing their function and role in society over the decades: They have transformed from places of preserving cultural heritage to “strong community anchors” (Borowiecki, Forbes & Fresa 2016, xx).

Any changes in the museum field are naturally linked with changes in society. According to Manuel Castells, a sociologist and researcher of information society, the last decades of the twentieth century saw the transformation of our material culture “by the works of a new technological paradigm organised around information technologies” (Castells 2010, 28). If information technology was the paradigm-changer of the twentieth century, then according to the editors of the book *Cultural Heritage in a Changing World*, the factor that has perhaps had the most profound effect on society in the twenty-first century is *digitalisation* (Borowiecki et al. 2016, xix). Digitalisation has changed the nature of global relationships and made it possible for members of the public to express themselves and to be linked to one another, and there has been more and more pressure for museums and other heritage institutions to find new ways to be more inclusive and communicate with their audiences. Digitalisation is one of the “epochal changes” that has reshaped the ways that “cultural heritage is made, held, collected, curated and exhibited or simply exists”. (Borowiecki et al. 2016, xx.)

According to Ross Parry, a scholar of digital heritage and a historian of museum media and technology, the discourse of (digital) technology is often fixated on the “culture of ‘now’ and ‘what’s next’”, and it neglects the past (Parry 2010a, 5). Yet, as Parry reminds us, innovations do not appear from nowhere, and it is the motives and endeavours of the previous generation of museum professionals that have led the way to museum’s current digital practices. (Parry 2010b, 12). One starting point for the history of digitalisation is in the 1970s, when the “technological system, in which we are fully immersed at the dawn of the twentieth century, came together” (Castells 2010, 53). Castells (2010, 54) claims that the whole “information technology revolution” was born in the 1970s. During that decade, the microprocessor and microcomputer were invented, and the first commercial microcomputer was introduced. During the 1970s, the US Defense Department’s Advanced Research Projects Agency also developed an electronic communication network, which would later become the current Internet. (Castells 2010, 54.) These innovations also made information technology available to museums, and in Finland, computers entered museums in the 1970s and 1980s (Ekosaari 2008, 4).

Although the new possibilities of information technology and digital media have been popular topics in museum studies, they have mostly focused on the “culture of now”, giving museums practical advice. The emergence and initial adoption of computers and information technology in the museum field has remained comparatively understudied, and the history and story of museum computing has not been given the same academic scrutiny as the rest “of our curatorial and museographical past” (Parry 2007, 6–8; see also Ekosaari 2008, 1–2). This “epochal change” has been rather neglected in Finnish studies of museum history as well, with a couple of exceptions: in his article, Asko Mäkelä (2005) introduces the main timelines and challenges of Finnish museums’ early digitisation projects. Maija Ekosaari (2008), who has personal experience in the field, has also studied Finnish art museums’ use of information technology in her master’s thesis. However, the book *Suomen museohistoria* (Finnish Museum History, Pettersson & Kinanen 2010) – which was intended as a concise representation of the most important developments in the Finnish museum field – does not cover the topic at all.

This article does not provide historical records of Finnish museums’ digitalisation processes, nor does it address the current state or ongoing developments in the field. Instead, I will explore the experiences of museum professionals and the emotions that were aroused by computerisation. The material studied in this paper consists of recorded interviews with museum professionals that were produced as part of a Finnish museum history project between 2005 and 2011. The era reminisced in the interviews covers a time period from the 1960s to the 1990s, and therefore the focus of this article is also on the beginning of museum computerisation in Finland.

When reading the interview material, my attention was drawn to the empirical concept of *real museum work*. It seemed clear that it was not a neutral term: the interview partners evaluated different tasks and actions within museums, defining what is “real” museum work and what is something else – computer work often falling into the latter category. According to Parry (2007, 2), the reason for computers’ “bumpy road” to museums might lie in the incompatibility between the concept of a *museum* and the concept of a *computer*. In this paper, I focus on the tensions between information technology and the concept of *real museum work* – which of course also reflects ideas about what a *museum* should be. I have chosen to use the term *information technology* (IT) as a hypernym that covers a variety of virtual and digital tools that usually materialise in the form of a *computer*.¹ Based on the interviews, I analyse the

1 However, when used in other literature or when referring to the Internet era or practices, the term *digital technology* is also used. For more ways to define *technology*, see e.g. Castells 2010, 28–29.

concept of "real museum work" as a social practice with a shared meaning, and study how it has been affected by the introduction of new material – and digital – elements. The research question is two-fold: how is "real museum work" understood and defined by museum professionals, and how does information technology relate to it?

Interviews with museum professionals

This paper is part of my ongoing doctoral research, in which I study oral history of the Finnish museum field. The study focuses on social practices related to museums and examines what kinds of cultural meanings they carry. The main empirical source consists of recorded interviews with museum professionals. The interview project was part of a Finnish museum history project, which was coordinated by the Finnish Museums Association and implemented together with the Finnish Heritage Agency, the Finnish Museum of Natural History, the Finnish National Gallery and the Departments of Museology at the Universities of Helsinki, Jyväskylä and Turku.

The interviews were conducted by various volunteer interviewers, who were also from the museum field. They were usually biographical and semi-structural: there was a template question sheet to be used in the interviews, but depending on the agendas of the interviewers, other topics were also discussed. The interviewees were museum professionals who started their careers in the mid-twentieth century, and who were retired or at retiring age at the time of the interviews. They had mostly worked in Finnish national museum organisations and represented the scientific or managerial museum staff, with a few exceptions. Altogether, there are 52 interviews, and they are archived in various organisations and listed in the project's database.² The original language of the interviews is Finnish, and all translations in this article are by the author. The interviewees have given their consent to the use of the material for research purposes and to the publication of quotes from the interviews under their name. The interviewers, however, were not explicitly asked for such consent, which poses some ethical problems. As an ethnologist, I am interested in how the interviewer and interviewee construct information in a dialogue (see e.g. Hakamies 2016), and therefore the interviewers' part is also analysed. Due to this challenge, and because I do not want to draw unnecessary attention to the personas of those involved, all the interview participants will appear anonymously in this paper.

² <http://museohistoria.museoliitto.fi>, accessed 10 October 2017. Some of the interviews listed in the database were conducted before the museum history project. Maija Ekosaari (2008) has also made use of the interview template in her study, but the interviews she conducted have not been added to the database. Thus, the database is not complete.

The selection of interviews analysed in this paper is based on preliminary thematic analysis, and it includes nine interviews where computers or information technology are somehow discussed. All the interviewees began their careers in the museum field in the 1960s or early 1970s, and they worked in national organisations. It should be stressed that this sample does not represent the whole of the Finnish museum field, and the experiences of those working in smaller museums may have been very different. The fact that all the interviewees presented here are women is a coincidence but reflects the gender split of the entire corpus. However, it also brings up an interesting point: even though technology is often regarded as a male-dominant field (see e.g. Suominen 2003, 118), in this material, the ones who remembered and talked about using computers at work were women.

The topic of computers was not specifically emphasised in the interviews, so the material used in this study is admittedly scarce. Conducting further interviews that would focus solely on the technological issues in museum work would be beneficial for future research, but if put under a spotlight, the whole role of information technology might look very different: it might also become overemphasised (see e.g. Suominen 2003, 136–137; Pöysä 2003, 149). I find the interview material at hand useful, because it presents the topic in a broader context: in these interviews, the theme of information technology was discussed rather spontaneously and as part of museum work, and in my view, this also reflects how important the topic was to the discussants. If an interviewee brings up computers without the interviewer asking about them, they must have played some role in her work as a museum professional.

In order to gain a wider picture, and to add a contemporary voice from the time when information technology appeared in the museum field, I have included some complementary literary material, which I have treated as empirical material and analysed alongside the interviews. This body of material consists of short articles published in *Museopolitiikka* (Museum politics), a journal by museum professionals for museum professionals published between the years 1982–1993 by an association called *Museopoliittinen yhdistys*. The name already hints that it had an active role in developing the museum field and museum politics, and the journal assumed the role of an independent press in the museum field. The style of the articles published in the journal is often polemic and provocative. The writers pay attention to issues that need improving, and they mostly advocate change. I have also found the autobiography of Tuula Arkio (2015), a former director of the Museum of Contemporary Art Kiasma and the Finnish National Gallery, to be a useful source.³ This

3 The original language of all the research material is Finnish. All translations are by the author.

composition could be described as a *bricolage* of material and methods, not uncommon in the field of ethnology and cultural analysis (e.g. Ehn 2014, 61–62).

Practising practice theory

The theoretical motivation for my study arose from the framework of *practice theory*. According to the sociologist Andreas Reckwitz, social practices include forms of bodily and mental activities, “‘things’ and their use” and background knowledge, such as “know-how, states of emotion and motivational knowledge”. Reckwitz considers practices to also include routinised ways “in which bodies are moved, objects are handled, subjects are treated, things are described and the world is understood”. In his opinion, “a practice represents a pattern which can be filled out by a multitude of single and often unique actions reproducing the practice” (Reckwitz 2002, 249–250).

Orvar Löfgren (2015, 176) has noted that ethnologists tend to start their analysis with “the how” rather than “the why” of social action. As practice theorists, ethnologists study *how* practices are carried out, *how* they are attributed different meanings or *how* they transform. The question of transformation is particularly interesting, because often practices and their meanings become more visible when there is a significant change to them, or a risk of “losing” them. A change in practices also reflects a change in culture and society. As Laura Stark puts it, “practice theorists see social change as caused by shifts in everyday practices”, and thus, “changing practices have social consequences” (Stark 2009, 16). For example, encountering “new objects on the social scene” can shape human activity and create new practices that may shift power from one group of people to another (Stark 2009, 16; see also Combi 2016, 4).

The sociologists Elizabeth Shove, Mika Pantzar and Matt Watson (2012, 9, 23) also focus on changes in social practices and want to add “a material dimension” to the otherwise social theories. In this, they rely on Theodore Schatzki (2002, 106), a sociologist and well-known scholar of practice theory, who claims that “practices are intrinsically connected to and interwoven with objects”. In their analytical model, Shove, Pantzar and Watson (2012) treat practices as a combination of three elements: material elements, meanings and competences. In their analysis, they examine the “life” of these elements: how they are linked with each other, and how those links break over time when practices and their cultural or social meanings are reshaped (Shove et al. 2012, 21–25). Inspired by this, I will especially follow the material elements of “museum work”.

This study is also related to the field of history of information technology, and specifically to what is sometimes called the *humanistic approach* to infor-

mation technology. The field focuses on different social and cultural phenomena around new technologies and their users, who are considered active actors and give meaning to technology (Saarikoski 2004, 22–23; Uotinen 2005, 18). Studying technology is thus not just about studying technology. As Professor of Digital Culture Jaakko Suominen (2003, 228) depicts, the technological change of the late 20th century was not only technological or caused by technological innovations, but it was also a cultural change. For example, the ideal of a home computer was also tied to transforming ideals of domestic life (Suominen 2003, 228). In the same vein, in this text, the ideal of computerised or digital museum work is seen as tied to changing culture and different ideals of work and museums.

The elements of “real museum work”

One of the original goals of the interview project was to map how the museum profession has changed in Finland, and naturally museum work was one of the focal points. However, as mentioned earlier, museum work did not always appear as a neutral term, as some actions were valued higher than others and everything carried out within the walls of a museum was not considered “real museum work”. Thus, “museum work” itself could be considered a social practice that can be done *right* or *wrong* and includes certain know-how, bodily and mental activities, and ways of understanding the world (or museums). Practice theory and the model of practice-as-elements has inspired me to look at how museum work as a social practice is constructed in the interviews.

“Museum work” was most clearly defined when the interviewees described what it is *not*: it is not doing paperwork or sitting in meetings, and it is not done by “consultants who just work at a desk” (Curator 1). As one interviewee describes, this sort of work felt pointless to her:

Interviewer: So then you're already pretty far from actual museum work-

Interviewee: Yes you are, and it can't be like a dead institute, and it can't just run on that, that we do as we have always done, I don't mean that, but... But it just started to feel rather beside the point. (Curator 1.)

In fact, in the interview material, “real museum work” was often described through negation. There are several cases in the interview material where “real” or “proper” museum work is described as building exhibitions or cataloguing museum objects, but for one reason or another, the interviewees were not capable of participating in these activities themselves: they could not find time for it, or they were not in a position to do so. For example, one interviewee,

who had worked on developing the museum sector in the Office of Museum Affairs of the National Board of Antiquities (NBA)⁴, explained that she sometimes felt an outsider in the museum field because she did not “do any... museum work, catalogue objects or something like that” (Museum Director 1).

It seems that the material elements were of defining importance to “museum work”. As one curator put it, the whole basis and “starting point” of the NBA and the National Museum were the “museum collections, and everything else related to that” (Curator 1). Thus, the actions that count as “real museum work” were directed at the material museum collections. One of these actions was cataloguing; a somewhat monotonous job that many of the interviewees remembered as their first step to a museum career. As one interviewee, who was reminiscing about her work in the Picture Collections of the NBA in the 1960s, described it, cataloguing in the main register was very manual, in the full sense of the word:

I catalogued. And when I was the Picture Collection's caretaker, then mainly, also then I mainly catalogued. Others did all kinds of other things there, there was also so much else, but – and sometimes, some collection was like, that someone else also catalogued... Because the catalogues were written by hand, and made on file-sized sheets, and when they were done, they were bound together. And so, several people could do it simultaneously, because they just took a bunch, they were always like five sheets of paper, one inside another, and then, then you catalogued. (Museum Director 2.)

Another way of maintaining collections was building a filing system of index cards. Maija Ekosaari (2008, 25) describes how the tangible index cards became almost as important as the objects themselves: especially conservators would add samples of materials to the files and write their notes in the margins. They were handled with or without gloves and became physical evidence of all the research done on the objects (Ekosaari 2008, 25).

According to Ross Parry (2007, 35–36), a typical way of keeping collections in order before digital systems was to build a taxonomy by proximiating objects to one another in the storage. Thus, when a collection was interrogated, “a curator was not at a desk looking at a screen, or in front of a filing cabinet, but instead was physically moving within that collection” (Parry 2007, 35–36). Indeed, before the central warehouse was built, the collections of the National Museum were (partially) located in the museum building and within a hand’s reach for curators. Familiarising oneself with the collections and learning how to “hold the objects in your own hands” (Curator 1) was a sort of rite of passage to museum work and the working community, and

4 Now called *The Finnish Heritage Agency*. In Finnish *Museovirasto*, lit. *Museum Bureau*.

this was learned through cataloguing and doing inventory of the collections (Curator 1).

According to these descriptions, museum work seems a rather bodily action: it was done “by hand” and involved *Fingerspitzengefühl* – specific know-how at your fingertips. Thus, introducing new ways of handling objects was taken as severe criticism of the old working practices:

The new generation of conservators has introduced a totally new way of overpacking that infuriates us older conservators. - - Partly, it's maybe some sort of insecurity about one's own abilities to handle the artefacts, how you deal with artefacts, how you touch them, how you move them... And then I would say that you don't trust the other person's professional skills, the older ones', with years of experience - - Of course the museum object is unique, and you have to respect it, but normal common sense is quite enough. (Curator 2.)

As Shove et al. (2012, 22–25) remind us, the material elements of a practice are also tied to immaterial meanings and competences. The meaning of “museum work” is also better understood when one looks at the relationship between its material elements and related competences: being able to handle museum objects in a certain way has a specific meaning to those involved with the practice. By comparison, Orvar Löfgren (2014, 119) claims that the ethnographic fieldwork that was carried out in the twentieth century “forged” a part of the modern-day ethnologist's habitus. The fieldwork created craftsmanship – skills that could not be taught formally – and a “brotherhood” of researchers. Being able to use the fieldwork tools, like cameras, was also important for constructing an ethnological fieldworker's identity (Gustavsson 2014, 193). Perhaps, as the fieldwork tools and methods have carved ethnologists' identity, museum professionals and especially curators need a hands-on relationship with museum objects to support their professional identity (Hakamies 2017, 148–149).

Suzanne Keene (2011, 2) poetically describes that objects used to be “the centre of our world in museums” and their meaning was “held on catalogue cards, in files, in people's heads”. Especially in the interviews with museum curators, this museum professionals' “expert knowledge” was frequently discussed. In the National Museum, curators were often assigned a special sector within the collections, such as glassware or porcelain (Curator 1), and generally mastering the substance knowledge was considered very important: being an expert of a specific field made the job meaningful (Architect). These curators might be described as “semi-independent stars” (Keene 2011, 85). Truly mastering a field also meant that the experts did not need any technical devices to process their knowledge. Of course, before adopting computers, this

was practically inevitable, as the following example from the NBA’s Picture Collections shows:

Customer service was very busy, and we all had to do that. For example, people showed up, and they wanted certain kinds of pictures, and when there was no... There were no computers, but it was all in your head. There was a name index. And in a way, it was the only index there was. So, if someone wanted some other kinds of pictures, they were like grouped, the pictures, in a way; portraits, events and objects, and so on, so you had to know the pictures. (Museum Director 2.)

To summarise, “real museum work” can be understood as actions that are aimed at or based on material museum collections and require certain competences or skills. The skills are both intellectual, containing expert knowledge about the collections, and bodily, meaning tacit knowledge about how to treat and handle the museum objects, or how to fill and use the handwritten catalogues or index cards. A questionnaire regarding disposals in the Finnish museum field showed that the role of tacit knowledge about “general information within collection management” is still significant in the twenty-first century (Robbins 2017). Still, many of the interviewees described “museum work” as a thing of the past and complained that modern times do not respect the core of museums anymore (Curator 2). However, as the next section shows, “real museum work”, which was so dependent on individuals, might not have been very sustainable in the long run.

The need for change

Although controlling all the collection data in one’s head was the mark of an expert, it seems there was also actual need in the museum field to develop the working practices. As David Williams (2010, 15) aptly describes, at first new museums tend to focus on building a collection, and the “mundane tasks of documentation and record keeping take a back seat”. But when the collections really started to grow, museums that were using traditional paper-based information management systems were overwhelmed. Preparing and controlling a card-based cataloguing system was laborious, and it could always only represent one particular way of ordering the collection. If one wanted to see the collection from a different perspective and to index it according to other criteria, it meant one had to copy all the index cards and build another parallel series (Parry 2007, 105; Ekosaari 2008, 24). The index files were one step closer to democratising and sharing information about the collections, but keeping up-to-date records on the objects and their locations was nearly impossible (Ekosaari 2008, 25; Williams 2010, 15).

The Picture Collections of the NBA also faced similar problems: the collections increased more rapidly than the personnel resources, customers did not always know what they wanted, and in the end, archivists would just carry "the boxes out for them, in front of them, and then they got to look through and search" (Museum Director 2). Naturally, the collections would suffer from this kind of use, and as Suzanne Keene (2011, 25) points out, digitisation and the use of surrogates – especially of two-dimensional objects – are important for collections preservation. In fact, the Picture Collections were among the first to search for new technical innovations to help manage the collections. Already in the 1960s, there was discussion about a punch card system, but it was found ineffective for use in the archive – and too costly:

And someone did a seminar presentation on the punch card system, and really demonstrated it, how fancy it was, when you put the spike through here and then the papers rose up, and you knew that they were.... What we missed was an index of persons, that you wouldn't have to browse through the cards like this, so much. That you could just feed them into the computer. And then someone tried to look into this for us, and in this case we would have had to bundle up all the orders from the previous month, so that we could have afforded it – it would have been so expensive, this, that we could only have run the names through once a month, and search for everything that we needed. (Museum Director 2.)

The Office of Prehistory of the National Museum also produced a report in the 1960s to explore the possibilities of using information technology for managing collections. It clearly states that a unified system would benefit everyone and minimise expenses, but the writers saw "IT" replacing only the index cards – not the main registers, nor "special index cards containing primary information and research findings" (Mäkelä 2005, 123). The report also recommends punch cards, and Asko Mäkelä has speculated that, as concrete and tangible cards, they would have been more understandable in the museum field than magnetic tapes. Using punch cards instead of manual index cards would have meant only minor changes to the customary working practices (Mäkelä 2005, 123–124).

The before-mentioned report did not cause any action, and one interviewee from the Picture Collections of the NBA, who was one of the *primus motors* of the digitisation of the museum field in Finland, described the progress as "very slow" (Curator 3). Throughout the 1970s, she tried to promote the issue through different forums, ordering templates of IT-based cataloguing forms from the United Kingdom and serving as a member in a working group that developed a standardised terminology to be used as part of an IT-based

cataloguing system. However, her colleagues were not interested and belittled the project: "Even at the point when the *Outline of Cultural Materials*, we had translated it into Finnish, and handed in a report and the translation to the general director, and the chairman in that event said that... that it was completely unnecessary" (Curator 3). According to her, some of the resistance might have been caused by personal issues and disagreements, but another reason might have been that a unified digital cataloguing system was seen as too restricting – perhaps using a common thesaurus to describe the objects undermined the unique expert knowledge that curators possessed? Still, the need for developing cataloguing practices was real, as her colleagues then also admitted:

But then, after a while, one person comes and says to me, 'look [name], you were right – we really needed this'. I said, 'I tried to tell you, but you just didn't get it, that we need one unified thesaurus. We won't survive if everyone just comes up with something on their own'. Like one of the working group members said: 'imagination will bring you far'. I said that we didn't just use our imagination before either, that also with a manual index you have a glossary and a system of categories, and we still need it. (Curator 3.)

Ross Parry (2007, 49) talks about the "twin innovations of automatisisation and standardisation" and claims that the idea of using term lists and thesauri to systemise museum collections was not only derivative of the use of automated cataloguing systems, but it also reflected the dominant philosophical traditions of the time. According to him, "the act of reducing collections to hierarchies, of imposing data control or standardising data entry, of containing documentation to specific codes and terms" was "a peculiarly late twentieth-century solution to the production of knowledge" (Parry 2007, 30). Parry (2007, 42–43, 45) also reminds us that in the English-speaking museum world, many of the specialists who were driving the digitalisation and computerisation projects in museums had a background in natural sciences or the new disciplines of computer and information sciences, and for them, adopting a categorising system similar to the *Linnaean taxonomy* was easy.⁵ Thus, the clash between the old and new ways of cataloguing museum objects was perhaps partly also a clash between humanistic and scientific practices of arranging knowledge. Ekosaari (2008, 8–49) also ponders whether some of the resistance to the cataloguing standards arose from the humanistic tradition and linguistically gifted curators, who wanted to define and use their own terms.

5 This was not so much the case in Finland (see e.g. Ekosaari 2008, 47), but the Finnish museum field was naturally affected by the developments abroad.

Perhaps the use of thesauri and unified standards as part of the cataloguing process might have also taken place without the computers, but in museological discourse, these two are often put together. Thus, those who opposed computerisation also often opposed unified standards and argued that the type and structure of information needed to understand and categorise different objects and collections in museums of different fields vary too much, and a unified system would not make sense (Chenhall & Vance 2010, 42–43). The counter-argument was that a standards-based information management strategy would be less expensive and easier to convert to a new system when the previous would become outdated, and it could "provide information to others in an effective manner" (Bearman 2010, 49–51).

In Finland, by the early 1980s, there was more official pressure to advance the computerisation of museum work. According to the interviewee cited above, the Ministry of Finance "forced" people in the administrative office of the NBA to obtain computers, but on the "researchers' side" the progress was slow, and the first computers were seen when "some people [brought] their own computers into their offices" (Curator 3). When different "office automats, printers etc." started to appear "here and there" (Heinonen 1984, 21), the museum field had to address the issue. In the early 1980s, information technology was already a common topic in *Museopolitiikka*, and it was seen as the best solution for developing cataloguing systems and the problems of keeping collections in order:

The filing of the material maintained in a museum is rarely up to date. By this, I mean IT-based filing. The reason for this is probably that adopting IT demands detailed planning. Fixing the shortcomings afterwards is difficult, sometimes even impossible. However, IT is the only sensible way of putting the now more or less chaotic catalogues and indexes 'in order'. On top of that, the files can be opened to common use quickly, providing plenty of information, and through relatively small efforts. Any cataloguing of collections started now should not be based on anything else but IT. (Haahtela 1983, 43.)

The second issue of 1984 is solely dedicated to the question of "IT" in museums. As Jouko Heinonen (1984, 21) explains, the technologisation of office work in general had made the issue important sooner than the museum field and especially museum policy-makers had expected. Indeed, in the 1980s, the use of personal computers increased rapidly both at home and in the office. According to Petri Saarikoski, a researcher in the field of digital culture and media history, in 1984 17% of Finnish employees used information technology in their work, but already three years later the amount had

doubled (Saarikoski 2004, 184). By 1984, many municipalities had already adopted computers in their financial administration, and museums run by municipalities were also introduced to the new technology (Heinonen 1984, 21). One of the early examples of museums that adopted information technology in their collections management was the newly founded Pori Art Museum, which could make use of the Pori City administration’s central computer’s capacity and did not have the “burden of a decades-old cataloguing and archiving system that would have had to be respected” (Nummelin 1984, 23; see also Ekosaari 2008, 26–28).

The aforementioned *primus motor* of the digitisation project claimed that switching to IT-based cataloguing would not make any fundamental changes to the ways people worked, because manual cataloguing had also required the use of “a glossary and a system of categories” (Curator 3). It is also worth reminding that, in the 1970s and 1980s, “IT-based filing” did not necessarily mean a digital database, such as the ones that are in use today. In 1975 Chenhall described that the general idea of a computerised museum catalogue is that all the data on each object “is recorded one time only in the form of input to a generalized information system” and then, after organising the records, they are “(usually) printed on the high-speed printer to produce as many different catalogs as the different information needs of the museum require” (Chenhall 1975, 35). For some, the computer was still considered only a recording tool, and the final catalogue was in a printed, tangible form. Yet, writings in *Museopolitiikka* indicate that keeping IT-based records was seen as somehow significantly different: more organised, standardised and free of the burden of old traditions.

Changing the practice

As was anticipated, information technology did affect the way collection management was carried out, although opinions about how big an effect it really had varied. The appearance of table computers was certainly a visible and tangible change in the working environment. The next step was that “when this new IT equipment arrives, we [the employees] have to learn to use these new tools” (Curator 3). There were some who perhaps needed an extra push:

The new technology was taking over, but it was not always easy for us. When I obtained my very first computer, I stored it in the corner of my office for weeks, giving it a suspicious glance every now and then. Finally, Ulla Vihanta from the Exhibition and Public Relations Office walked into my office and said that we would now unpack it and I would have to learn to use it. (Arkio 2015, 109.)

Because the new tools also changed the system of cataloguing, the personnel had to be retrained to cope with the system: “when we adopt this international system, it’s a whole new system, so we arrange training sessions” (Curator 3). In the beginning, the manual of the new programme was also used as cataloguing guidelines, and the features of the used programme determined how objects were described and what context information was saved (Ekosaari 2008, 75). On the other hand, Keene (2011, 42–43) claims that the actions of managing digital collections and “actual” collections are rather similar: acquiring, storing, conserving, keeping secure, making accessible and displaying. Some of the interviewees might have agreed with this and at least afterwards felt that adopting new tools did not make a huge difference to the actual work:

Interviewer: Well, how has your work changed in the past 30 years or so? [pause] For example, the work related to the central warehouse?

Interviewee: Well, nothing very crucial... The only thing is what computers have brought with them and them becoming more common, and the *Musketti* database, a collections management system, these kinds of things, they have, of course, made it easier. And with the computers, like, before we used to make all the inventory lists by hand, and now we can make them on the computer. - -

Interviewer: Well, there you’ve had to study on the way, for example, how to use *Musketti* and computers in general.

Interviewee: Yes. But, the work itself hasn’t really, [changed] that substantially... [noise in the background]. It’s pretty routinised. (Curator 2.)

It would seem superficial to divide museum history into periods before and after computers appeared. Jaakko Suominen, who has analysed computer and technology discourses in Finland, claims that different decades did have rather clear trends and discourses, but also points out that these discourses were always dependent on the context. From the point of view of a single organisation or user group, the process of change might have happened differently and in a different time (Suominen 2003, 226). In the museum field, too, the shift to using computers happened gradually, and different organisations, offices and individuals adopted computers independently from one another and through different stages. While the Pori Art Museum explored computerised cataloguing early on, the chief curator of the Ateneum Art Museum wanted to keep manual records until 1991 to maintain “important traditions” (Ekosaari 2008, 15).

Thus, different individuals might have experienced the change in very different ways. In some accounts, the change that computers and other digital

devices brought to the day-to-day operations in a museum is quite clear. For example, before the Internet and emails, planning an exhibition required a lot of manual work:

I wrote letters and sent mail. There were no faxes, and long-distance calls were complicated and expensive, so you had to reserve enough time for communication. Because there were no copying machines, replicas of letters had to be made using carbon paper on a typewriter. It was difficult, especially if you happened to hit the wrong key and had to scratch all the wrong letters off from all the copies. The special eraser designed for this was rough and tore the paper, and the result was so untidy that in the end you had to rewrite the whole letter. Nowadays one can only wonder how such big exhibitions could be executed by only sending letters. (Arkio, 2015, 40.)

In the following example, the interviewee also makes a clear distinction between the time periods before and after computers. Admittedly, she might have also been affected by the interview situation: the interviewer was a student and clearly represented a different generation, to whom the interviewee had to explain what museum work was like when she was young:

We didn't have the Internet back then, you couldn't 'google' anything, like nowadays, nowadays everything is so terribly easy, but... Back then, we used books, and then, what is very essential is that we read journals, I have also still read journals, all the Americans, *Museum News* and *Curator*, and all of those, and also books, you had to read books. Because there was no teaching in museology. And I haven't really missed it later on, because the working communities teach you of course, and you also learn stuff by just talking to people. (Museum Director 1.)

Especially the latter excerpt strongly hints at a narrative in which the work done by older generations was much harder, and museum professionals were "self-made", whereas with the help of the Internet, anyone can be an expert. In this type of narrative, curators are perhaps afraid of being overshadowed by easily accessible online sources, and the general fear is that Internet users do not differentiate between official or institutional, research-based sources and other, less credible sources (Keene 2011, 78; Combi 2016, 10).

There is a new sort of "competition" for the interest of the audience, and computers and the whole culture of using computers have also reflected on how museum collections are "used" and how museums distribute their knowledge. The key idea of a digital information base is that knowledge can easily be shared with different audiences (Keene 2011, 24–29, 35–36). In the following example, an interviewee from the Ateneum Art Museum describes how

the shift from published literature (produced by experts) to other sources of information began:⁶

Interviewee: Back then, we still believed that these printed collection catalogues, that this computer world was still so new - - so we started this series [of edited collection catalogues in chronological order]. - - But it became evident that it was already behind the times, that we have computers, that you can still make books of the collections, catalogues, and else, but not like systematically, because the collections also grow all the time, so that it was behind the times - -

Interviewer: So, it was precisely in the latter half of the '80s, when this starts, and in the year 1990 comes *Windows*, and using the computer becomes so easy even for a lay person, it changes the whole world, and has changed.

Interviewee: Totally, yes, yes. But we didn't know it yet, when we started this series, and made the first part. (Curator 4.)

Shove et al. (2012, 71) point out that there is a tendency to perceive younger generations of "practitioners" as more motivated to do things differently and renew practices, whereas "old-hands, who define the core, are typically [seen as] stuck in their ways". However, the "old-hands" who know a certain practice also know from experience how it should be bettered and might be just as eager to learn to do things differently. Especially in relation to computers and technology, the "elderly" are often deemed inactive – a view that, for example, Anne Sankari's (2003) studies have challenged. In the following excerpt, the interviewer shares the misconception that older generations were not interested in technology and initially assumes that the interviewee would not have been interested in computers during her career. Throughout the interview, the interviewee suggests several times that she could show the interviewer images and other material on her computer, and finally the interviewer addresses this:

Interviewer: That is also interesting that apparently in your retirement days you have learned to use the computer.

Interviewee: No, I've done that before - - In the '80s. When the Academy of Arts got a computer and they wouldn't take me on the courses, I had my own tutor at home [laughs] My sons! - - Yeah, you know, they never had time except in the evenings after 10, and I was so sleepy – 'Come on, now!' And, one night, I remember we got excited about moving a pyramid until early hours! [laughs] Like, we played games, too... But the first one was the Macintosh Apple, rather nice. And [my son] had a – they first had the computers, the boys, had a Nokia, old, I think it didn't have a mouse either, it had

6 The Ateneum Art Museum published its first homepage in 1993 (Ekosaari 2008, 51).

function keys. And I had [a cheat sheet] on them on the wall, so that I'd remember what does what.... And now you don't need them at all... And you don't need the mouse either! I had a mouse, for many years, my arm started to get tired of it already. (Archivist.)

As mentioned earlier, the 1980s was the decade when Finnish homes and offices were generally computerised (Saarikoski 2004, 184). Thus, it should not be surprising that the archivist quoted above also learned to use computers at that time. The assumption made by the interviewer might have more to do with prejudices about age, but this example also reminds us that the computerisation of the Finnish museum field did not happen unanimously or overnight, and sometimes individual employees took the first initiative before the managerial level. This illustrates that different individuals took very different paths in adopting computers as their tools.

All in all, information technology and digital systems of managing collection data reduced the manual labour of museum work but also changed something in the relationship of museum professionals to museum collections. As discussed earlier, when doing "real museum work", curators had their objects and notes close at hand, but as a new material element, computers became an adapter between curators and museum objects. Instead of handling collections and tangible index cards and having a physical connection to museum objects, they were handling a computer mouse – and consequently suffering from tired arms – whereas the computer did the "handling" of information.

Regarding the competences related to "real museum work", being an individual and an expert became perhaps less important. According to Parry, previously curators had described objects in ways that were meaningful to them and complied with the conventions of their institution, but this "free-playing and expressive world of individual curatorship" was lost in order to "fit into the new standardised systems and data models that first accompanied museum computing" (Parry 2007, 47; 2010, 2). Suddenly, a whole new set of skills was required, and museum professionals might have found themselves relying on outside help in order to do their jobs.

Grasping or losing control?

Jaakko Suominen (2003, 228) suggests that the history of technological culture could be examined as a continuing tension between the utopia of control and the fear or losing control. In the case of the museum field, computers were seen to have a lot of potential. David Williams (2010, 17) has noted that in the United States, where the first museums acquired their first computers in the 1960s, computers had an "aura surrounding them" and were perceived as magical and endowed with "extraordinary scientific prowess".

According to him, museum staff "saw computers as electronic cornucopias, loaded with cures for the museum's every ill" (ibid.). In Finland, the utopian vision of the future included, for example, the idea that an electronic database could improve the data retrieval systems: it would process a vast body of archival data quickly and flawlessly and filter information for different users and different needs. It was also believed that when different object categories were made electronic and possibly shared through a network, museums could save on manual work and index cards, and updating objects' location information would be easier. The final goal of digitalising collections was that any object of any museum could be searched nationwide (Tuovinen 1984, 25; Heinonen 1984, 21–22).

But there were also some threats seen on the horizon. In his article in *Museopolitiikka*, Tapani Tuovinen is mostly positive towards the uses of information technology in the fields of heritage and archaeology, but also criticises the blind optimism towards computers. He presents his readers with a scenario in which computers have taken over human intelligence:

Perhaps we will quickly get over the initial phase of excitement, in which young male (exactly!) archaeologists forget their status and macho about with their computers like schoolboys – but regardless of one's developmental phase, a computer is a strong psychological influence. It is clear that computers are extraordinarily authoritarian: it is easy to believe any printout *only* because it came out of the Great Wonder Machine. (Tuovinen 1984, 25.)

The comment on young *male* archaeologists getting carried away with computers is noteworthy. Suominen remarks that information technology is often shown as a masculine field, even though a lot of the work done on computers has been carried out by women. For example, administrative work, often female-dominant, is more routinised and receives less public attention (Suominen 2003, 118). When microprocessors were introduced, there was a general fear in the labour market that the new technological devices would make some professions obsolete, especially in predominantly female sectors (Saarikoski 2004, 184). However, Suominen (2003, 176) believes that, since the end of the 1960s, women's technological expertise became more visible, and especially in "pink-collar" work fields such as libraries, women might have even taken a leading expert role in relation to information technology. As the material of this article shows, in the museum field, too, women were capable when it came to computers, and they actively and publicly promoted the use of information technology (e.g. Curator 3).

Generally, adopting (digital) technology did not create unemployment because when some occupations phased out, others were introduced, and the labour force was "enhanced in terms of required skills" (Castells 2010, xxii). In museums, the emergence of computers also created new fields of employment, but the recruited people were often information scientists or computer programmers, who did not have any curatorial experience (Parry 2007, 43). One of the fears that people in the Finnish museum field might have had was that information technology and the new engineers would be viewed as more valuable than the curators, who were dedicated to their own special fields:

Interviewer: So, how was it, were there new job titles in your time?

Interviewee: Well of course, the biggest change was... These, all professions related to IT management that came to the NBA. All these IT tech support persons, who covered all of the NBA, and everything related to that. But otherwise, not really, then in the 2000s we got the professional security guards, those services were bought from a private security company, we got cleaning professionals... Mostly these. Yeah.

Interviewer: Nothing related to museum work.

Interviewee: Yeah. But it wasn't because we didn't need more people, a publicist and so on, but because there was just no possibility to create more positions. Especially in the museum field, none at all. (Museum Director 1.)

One aspect that is neglected in the interviews is that adopting information and digital technologies introduced project work to museums. Because digitalising mostly advanced through project funding, the people doing the digital cataloguing could also only be employed for a project. As a result, a lot of information about the programmes, cataloguing principles and general collection management has been outsourced. This is also problematic for the "nomad" workers who cannot find permanent employment. (Ekosaari 2008, 54.)

While the interviewees were afraid of museum experts being superseded by engineers, they were also afraid of losing something essential to *museum work*. In the following example, computers had stolen the focus from the *substance* of the work:

Well, [I liked my job because I felt like an expert], because back then we talked about the substance. - - In my last years in the bureau I felt that now we don't talk about the substance at all anymore, now we talk about how these fancy new computers work or don't work and what's in them... And then the way of working has changed, you spend time with your screen and not with each other. (Architect.)

As one curator quoted at the beginning of this paper mentioned, outside consultants who only “worked at a desk” could not be considered to do “real museum work”. However, “working at a desk” and staring at a computer screen has become the reality in museums as well as in other work places. One interviewee from the art museum field was sorry that this has also changed the way of being in the office and with one’s co-workers:

I will always remember my conversations with [a colleague]... I think I even got a bump here in my neck because we were always squatting in front of a painting and talking, and then afterwards, when you compare, when we moved to Kansakoulukatu [the Ateneum Art Museum was temporarily relocated because of renovations], it was very strongly highlighted that – I never used to have my own office, and when I came to Kansakoulukatu and was about to retire, and I walk in through the hallway and everywhere I see a door open, like that, and everywhere there’s one of my colleagues sitting in front of a computer. So, in other words, I realised very clearly how earlier we used to discuss and put time into looking at the artworks and talking about them, and especially with [the before-mentioned colleague]. (Curator 5.)

Shove et al. (2012, 58–59) claim that the emergence of new elements to a practice and the disappearance of old ones are related, and technological innovations and the arrival of new elements may “undermine the value of established skills and knock rival artefacts and systems out of the way”. Working on computers required a new set of competences, and perhaps curators were afraid that their earlier skills would lose their value and meaning, and, finally, the embodied and tacit knowledge of how to do *museum work* would lose its relevance and disappear.

Conclusions

In this paper, I have analysed how museum work has been reshaped due to the introduction of information technology. Because “real museum work” is by definition tangible and object-oriented, it makes sense to follow the life of its material elements and see how the “tools of the trade” have changed. The most visible and effective change is the appearance of the computer: it changed how the work was carried out, and how people in the office and work field interacted with each other. Digital networks have brought the world together, but at the same time, they have created distance between curators and museum objects, as well as between colleagues.

I have treated “real museum work” as a social practice that is made of three elements – material, meanings and competences – and the relationships between them. When the material elements change, it also changes

something in the relationships between the other elements. In the case of museum work, digital cataloguing systems imposed a new epistemological structure that was based on shared standards, computer logic and taxonomies borrowed from natural sciences. Computers were a means to recruit curators to use shared standards (Parry 2007, 50). The evident tensions between "real museum work" and work carried out by computers have to do with the related competences. Using computers and computer programmes required new skills, and for some, this might have felt like an undermining of the established competences that had special meaning in the earlier practice. The humanists also had to make way for the new IT specialists and computer scientists, and understandably, people might have worried for their jobs and status in the work field.

As stated, interviews focusing solely on the theme of information technology would benefit future research, but the material examined in this paper already shows that computers and other technological tools have stolen a lot of attention in museums – some might even think too much. In some narratives, computers replaced human contact and silenced conversations about the "substance" of work.

Theoretically speaking, even if the elements of a practice change completely, the practice can still remain the same. In reality, people's experience might have been the contrary: the working customs developed rapidly in the last decades of the twentieth century, in museums and in general. For those who entered the museum field before computerisation began, the change that took place during their career was probably more overwhelming. For the "nomads" of the twenty-first century, who work on digitalising projects, the work they see in museums looks very different.

However different the practice may look, it seems that two things remain: museum work focuses on museum objects – whether done with the help of pens or computers – and it is done by people. In the computer age, too, museums have their own traditions, and only people "can make a computer perform so as to accomplish the needs of museums" (Chenhall and Vance 2010, 39).

AUTHOR

Inkeri Hakamies is a PhD Student of European Ethnology at the University of Helsinki. She is interested in museums as cultural phenomena, and how different museum practices are understood and evaluated within the museum field.

REFERENCES

Archival Material

Interviews

Finnish Heritage Agency, Helsinki, Finland

Ethnological Archives

Museum History Project:

Curator 1, recorded October 11, 2007

Curator 2, recorded October 10, 2007

Curator 3, recorded October 12, 2011

Museum Director 1, recorded October 26, 2011

Museum Director 2, recorded January 28, 2011

Architect, recorded October 28, 2008

Finnish National Gallery, Helsinki, Finland

Audio-visual Archive

Museum History Project:

Curator 4, recorded August 31, 2007

Curator 5, recorded January 30, 2007

Archivist, recorded March 23, 2007

Editor's note: The archival codes of the interviews are not included to protect the anonymity of the interviewees.

Bibliography

Arkio, Tuula. 2015. *Jyviä nokkimassa. Taide-elämää meillä ja muualla*. Helsinki: Siltala.

Bearman, David. 2010. "Standards for Networked Cultural Heritage." In *Museums in a Digital Age*, edited by Ross Parry, 48–63. Abingdon: Routledge.

Borowiecki, Karol Jan, Forbes, Neil, and Fresa, Antonella. 2016. "Section 1: Introduction." In *Cultural Heritage in a Changing World*, edited by Karol Jan Borowiecki, Neil Forbes, and Antonella Fresa, [xix–xxix]. Cham: Springer International Publishing. DOI: 10.1007/978-3-319-29544-2.

Castells, Manuel. 2010. *The Rise of the Network Society*. 2nd edition, with a new pref. Oxford: Wiley-Blackwell.

Chenhall, Robert, G. 1975. *Museum Cataloging in the Computer Age*. Nashville, Tennessee: The American Association for State and Local History.

Chenhall, Robert and Vance, David. 2010. "The World of (Almost) Unique Objects." In *Museums in a Digital Age*, edited by Ross Parry, 39–47. Abingdon: Routledge.

Combi, Mariella. 2016. "Cultures and Technology. An Analysis of Some of the Changes in Progress – Digital, Global and Local Culture." In *Cultural Heritage in a Changing World*, edited by Karol Jan Borowiecki, Neil Forbes, and Antonella Fresa. Cham: Springer International Publishing. DOI: 10.1007/978-3-319-29544-2.

Ehn, Billy. 2014. "Arjen yllätyksiä. Huomaamattoman etnografia ja kulttuurianalyysi." In *Moniulotteinen etnografia*, edited by Pilvi Hämeenaho and Eerika Koskinen-Koivisto, 59–78. Helsinki: Ethnos ry.

Eksosaari, Maija. 2008. *Tietokoneet museotyössä – Suomalaisten taidemuseoiden tiedonhallinnan historia ja nykytila*. Jyväskylä: Jyväskylän yliopisto, Taiteiden ja kulttuurin tutkimuksen laitos.

- Gustavsson, Karin. 2014. *Expeditioner i det förlutna. Etnologiska fältarbeten och försvinnande allmogekultur under 1900-talets början*, Nordiska museets handlingar 140. Stockholm: Nordiska museets förlag.
- Haahtela, Ilpo. 1983. "Museoiden muuttuva tehtävä." *Museopolitiikka*, 2–3: 1983, 43–46.
- Hakamies, Inkeri. 2016. "Tutkimuksen monet dialogit." In *Etnologinen tulkinta ja analyysi. Kohti avoimempaa tutkimusprosessia*, edited by Tytti Steel and Jukka Jouhki, 200–235. Helsinki: Ethnos ry.
- Hakamies, Inkeri. 2017. "Practice Makes 'Museum People'." *Museum & Society* 15(2): 142–152.
- Heinonen, Jouko. 1984. "ATK ja museot." *Museopolitiikka* 2: 1984, 21.
- Keene, Suzanne. 2011. *Digital Collections. Museums and the Information Age*. London & New York: Routledge.
- Löfgren, Orvar. 2014. "At the Ethnologists' Ball. Changing an Academic Habitus." *Ethnologia Europaea* 44(2): 116–122.
- Löfgren, Orvar. 2015. "Modes and Moods of Mobility." *Culture Unbound* 7: 175–195. Linköping: Linköping University Electronic Press.
- Mäkelä, Asko. 2005. "Digi tuli museoon." In *Museon muisti. Ritva Wäreén juhla-kirja*, edited by Tuukka Talvio, 121–136. Taidehistoriallisia tutkimuksia 31. Helsinki: Taidehistorian seura.
- Nummelin, Esko. 1984. "ATK taidemuseossa." *Museopolitiikka* 2: 1984, 23.
- Parry, Ross. 2007. *Recoding the Museum. Digital Heritage and the Technologies of Change*. Museum Meanings. London and New York: Routledge.
- Parry, Ross. 2010a. "The Practice of Digital Heritage and the Heritage of Digital Practice." In *Museums in a Digital Age*, edited by Ross Parry, 1–7. Abingdon: Routledge.
- Parry, Ross. 2010b. "Introduction to Part One." In *Museums in a Digital Age*, edited by Ross Parry, 1–7. Abingdon: Routledge.
- Pettersson, Susanna & Kinanen, Pauliina (eds.) 2010. *Suomen museohistoria*. Suomalaisen Kirjallisuuden Seuran Toimituksia 1265, Tieto. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Pöysä, Jyrki. 2003. "Tietokone – isäntä vai renki? Analyysi retospektiivisen muistelun rakenteista kilpakirjoitusaineistossa." In *Tietotekniikkasuhteet. Kulttuurinen näkökulma*, edited by Sanna Taija and Sari Tuuva, 149–190. Tietolipas 196. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Reckwitz, Andreas. 2002. "Toward a Theory of Social Practices. A Development in Culturalist Theorizing." *European Journal of Social Theory* 5(2): 243–263. DOI: 10.1177/13684310222225432.
- Robbins, Nina. 2017. "Museum collection disposal. The role of museological value discussions in collection management." *The Museum Review* 2(1). <http://articles.themuseumreview.org/vol2no1robbins>.
- Saarikoski, Petri. 2004. *Koneen lumo. Mikrotietokoneharrastus Suomessa 1970-luvulta 1990-luvun puoliväliin*. Nykykulttuurin tutkimuskeskuksen julkaisuja 83. Jyväskylä: Jyväskylän yliopisto.
- Sankari, Anne. 2003. "Tietotekniikan ihmevanhat?" In *Tietotekniikkasuhteet. Kulttuurinen näkökulma*, edited by Sanna Taija and Sari Tuuva, 73–92. Tietolipas 196. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Schatzki, Theodore. 2002. *The Site of the Social. A Philosophical Account of the Constitution of Social Life and Change*. University Park, Pennsylvania: Pennsylvania State University Press.
- Suominen, Jaakko. 2003. *Koneen kokemus. Tietoteknistyvä kulttuuri modernisoituvassa Suomessa 1920-luvulta 1970-luvulle*. Tampere: Vastapaino.

- Shove, Elizabeth, Pantzar, Mika, and Watson, Matt. 2012. *The Dynamics of Social Practice. Everyday Life and How It Changes*. London: Sage Publications Ltd.
- Stark, Laura. 2009. "Empowering Practices. Perspectives on Modernization in Finland 1860–1900." *Ethnologia Fennica* (36): 4–18.
- Tuovinen, Tapani. 1984. "Arkeologisen yleistietokannan näkymiä." *Museopolitiikka* 2: 1984, 25–26.
- Uotinen, Johanna. 2005. "Miten tietokone kesytetään? Informaatioteknologian merkityksellistämisen prosessit." *Tiedotustutkimus* 28(3): 16–26.
- Williams, David. 2010. "A Brief History of Museum Computerization." In *Museums in a Digital Age*, edited by Ross Parry, 15–21. Abingdon: Routledge.