

## **Informal modes of technology learning and its gender implications**

**Anita Thaler, IFZ**

**Schlögelgasse 2, 8010 Graz, Austria**

### **Abstract**

*Technology and education are multiple intertwined. On one hand, technology has its place in education, for instance in computer-based courses. On the other hand, education has its place in technology; didactics of engineering education could be taken as one example. However, beside these two arenas, where the role of pedagogy as well as the role of technology are made explicit and comprehensible, there are further elements of technology and education, which pervade our everyday's lives, and although they are not as explicit, they have influencing effects. Therefore, the distinction of informal and formal as well as intentional and incidental learning is crucial (Dohmen 2001). Additionally, the genderedness of technological knowledge is important as well, I will explain in this paper how the concept of 'gender knowledge' (Wetterer 2005, 2007, 2008) can be used in the context of technology learning.*

### **1. Introduction**

Technology had effects on everyday's lives before technology became „pervasive“, „embedded“ and „ambient“, and since technology became more and more indispensable in households, jobs and in communication, pedagogical needs and educational research questions are emerging (cf. Bammè 2007). Where do we learn to deal with everyday's technology? Where do we learn to decide for one and against another technology or for one and against another technological product? Where do we learn what we need to join in a conversation, to co-decide and criticize? The search for these learning places is closely connected to the question of learning modes. So, how do we learn? And lastly the question arises: What will be learned in all those different learning places? This is an epistemological as well as a normative question. What kind of technology knowledge will be learned at different places? Is it gendered, and how? And what should be learned, what should be included in technology education, what should technological competence contain? What must we as humans of a technological civilisation know to live a good and self-determined life?

In this paper I will take a first step and give a short overview of useful concepts to understand informal technology and gender learning processes. This is especially relevant for the context of the 9<sup>th</sup> IAS STS conference as my paper serves as a theoretical framework for the session "Learning gender, learning technology".

## 2. Learning modes

*„Learning is not only understood as consciously cognitive processing, but moreover as unconsciously psychological and emotional processing as well. That comprises holistic, conscious and unconscious, intentional and incidental, theoretical and practical processing of all forms of stimuli, impressions, information, encounters, experiences, threats, demands, symbolic presentations, virtual environments etc. which approach human beings and will be perceived by them.“* (Dohmen 2001, p. 11, translation Anita Thaler)

With this broad definition of learning Günther Dohmen (2001) describes all sorts of learning; most of all informal learning modes. Intentional and incidental learning are explicitly named and the later one is in turn closely connected to the term of ‘implicit perception’ (Bettina Lemke, 2003). Implicit perception is in psycho-analytical terms called ‘unconscious perception’ and means that although someone’s attention is not focused on an activity it can leave neuronal traces. Thus, implicit perception can be seen as the neuronal basis for incidental learning of so called ‘tacit knowledge’ (Michael Polanyi 1966/1985). Tacit knowledge on the other hand is known as ‘implicit knowledge’ as well. It means “that we know more than we can tell.” (Polanyi 1966/1985, S. 14, translation Anita Thaler) For instance when we operate computers many tasks are implicit, we do not have to think about each step we do. And the point is, we learned many of these steps not intentionally, but moreover casually.

Thus, we do not only learn – sometimes (or often) – informally (not in organised classrooms, courses etc.), but moreover we learn – sometimes (maybe often as well) – incidentally.

## 3. Learning technology

Technology learning can either be seen as a process of learning technological skills or it can be discussed as a comprehensive concept of ‘technological competence’ (Oskar Negt, 1968, 1998, 1999, 2008). In this paper the second perspective is preferred, where technological competence is defined closely connected to other competences (identity and equality competences, ecological, historical and economical competences) as a basis which every human being should handle (ibid.). This comprehensive concept describes an emancipatory understanding of education, which enable human beings to live a self-determined live.

Thus Oskar Negt says about technological competence, that it is “... *not only technological qualifications in the sense of skills, but moreover a knowledge about societal consequences of technologies*” and he understands “*technology as a societal project*” (Negt 1998, S.35, translation Anita Thaler).

Now the question is: Can technological competence be learned informally? Karen E. Watkins

and Victoria J. Marsick (1992) gave a useful distinction for two different types of informal learning. They say there is a learning type “action with reflection”, that means intentional, informal learning and another learning type „action without reflection“, which is incidental, informal learning. That means that the main difference is not whether somebody learns something formally in school or in an e-learning course, or informally at home or at the job, but it is important if somebody is learning intentionally (“I want to learn something!”) or incidentally (e.g. learning while computer gaming). My deduction is that if technological competence needs reflection about societal impacts etc. then this reflected technological competence can be learned informally, but very probably not incidentally.

#### **4. Gender knowledge**

As technology is a ‘gendered arena’ (cf. Wajcman 1991, Mellström 1995, Faulkner 2000a, 2000b, Wächter 2003, Thaler 2006, Paulitz 2007), it is important to look at gender implications of technology learning processes.

The concept of ‘gender knowledge’ (Döllig 2005, Wetterer 2005, 2007, 2008) tries to explain why, although we think we already reached gender equality, still so many inequalities exist. Angelika Wetter (2008) says that only on a semantic level people tend to think we already reached gender equality, but in reality practises of gender hierarchies and gender segregation still exist. She talks about a „latent and incorporated knowledge“ – which we could also call implicit knowledge – where „traditional gender positions“ are conserved, whereas on a rhetoric level a gender equality discourse is prevalent (Wetterer 2008, p. 85).

But how is that fact important for technology learning?

#### **5. Learning technology and learning gender**

The present paper explained so far that technological knowledge and skills can be acquired formally and informally, and that learning can happen either intentionally or incidentally. Another interesting point is that gender can be learned incidentally parallel to all technology learning processes. That means whenever technology is learned, gender knowledge can be casually acquired as well.

One case of incidental gender learning parallel to formal and intentional technology learning (e.g. engineering education at universities) is well-known as ‘hidden curriculum’ (Zinnecker 1975), a phenomenon which is not only applicable to technology learning. It describes the fact that additionally to designed subjects other matters can be learned, for instance which behaviour is positively appraised by teachers; and some of these additional matters are related to gender. The crucial point is that gender knowledge has not to be made explicit neither for teachers nor for learners, as hidden as the curriculum is happens the learning.

Another case is less obvious and not much discussed until now. It is the case of incidental

gender learning while technology is learned incidentally as well. That means both, technology and gender knowledge, are learned incidentally. This comprises for instance learning in spare time with media like watching movies, writing and reading weblogs, reading magazines and books or playing computer games. In previous research it could be shown that for instance youth media, like magazines and soap operas, show a lot of technology images (cf. Thaler 2009, Thaler & Dahmen 2009, Thaler et al. 2009). But although there are on a quantitative level as many females as males connected to technological topics and items, on a qualitative level there are gender differences visible, which underline the masculine connotation of technology (ibid.).

The consequence of this incidental learning of technology and gender means that both knowledge types are first of all not reflected implicit knowledge types; and knowledge which is not reflected shapes – in the example of this paper – our thoughts and attitudes about gender and technology. That could be one explanation why so many stereotypes about gender in general and about genderedness of technology still exist.

To sum up, the proposition of this paper is that just now, as technology pervades our everyday lives, a lot of informal learning places for incidental learning technology arise; more precisely: learning places, where implicit technological knowledge can be learned. Thus, on the one hand formal learning becomes more important for reflecting that technological and gender knowledge. And on the other hand informal technology learning should be further researched; maybe this can explain the persistence of the male connotation of technology?

## References

- Bammè, Arno (2007). Die Neuordnung des Sozialen durch Technologie. Marburg: Metropolis.
- Dohmen, Günther (2001). Das informelle Lernen. Die internationale Erschließung einer bisher vernachlässigten Grundform menschlichen Lernens für das lebenslange Lernen aller. Bonn: BMBF. In: [http://www.bmbf.de/pub/das\\_informelle\\_lernen.pdf](http://www.bmbf.de/pub/das_informelle_lernen.pdf) [12. 2. 2008].
- Dölling, Irene (2005). „Geschlechter-Wissen“ – ein nützlicher Begriff für die „verstehende“ Analyse von Vergeschlechtlichungsprozessen? In: Zeitschrift für Frauenforschung und Geschlechterstudien 23, S. 44-62.
- Faulkner, Wendy (2000a). Dualisms, Hierarchies and Gender in Engineering. In: Social Studies of Science, 30, 5, 759-792.
- Faulkner, Wendy (2000b). The Power and the Pleasure: How does Gender 'stick' to Engineers? In: Science, Technology, & Human Values, 5, 1, 87-119.
- Lemke, Bettina (2003). Nichtbewusste Informationsverarbeitungsprozesse und deren Bedeutung für das Lernen Erwachsener. In: REPORT Literatur- und Forschungsreport Weiterbildung/2003: Gehirn und Lernen, S. 71-83.
- Mellström, Ulf (1995). Engineering Lives Technology, Time and Space in a Male-centred World. Linköping: Studies in Art and Science.
- Negt, Oskar (1968). Soziologische Phantasie und exemplarisches Lernen. Zur Theorie der Arbeiterbildung. Frankfurt: Europäische Verlagsanstalt.
- Negt, Oskar (1998). "Lernen in einer Welt gesellschaftlicher Umbrüche." In: H. Dieckmann & B. Schachtsiek (Hg.). Lernkonzepte im Wandel. Die Zukunft der Bildung. Stuttgart: Klett-Cotta. S. 21-44.
- Negt, Oskar (1999). Kindheit und Schule in einer Welt der Umbrüche. Göttingen: Steidl Verlag.
- Negt, Oskar (2008). Die Lernherausforderungen im 21. Jahrhundert – Was müssen Menschen heute wissen, um sich in dieser Welt der Umbrüche orientieren zu können? In: Christina Schachtner (Hg.). Learning Communities. Das Internet als neuer Lern- und Wissensraum. Frankfurt, New York: Campus Verlag, S. 43-55.
- Watkins, Karen E. & Marsick, Victoria J. (1992). Towards a Theory of Informal and Incidental Learning in Organisations. In: International Journal of Lifelong Education, Vol. 11, Nr. 4, Oct./Dec., pp. 287-300.
- O'Brien-Malone, Angela & Maybery, Murray (1998). Implicit learning. In: Kim Kirsner, Craig Spielman, Murray Mayberry, Angela O'Brien-Malone, Mike Anderson & Colin MacLeod (eds.). Implicit and Explicit Mental Processes. London: Lawrence Erlbaum Assoc Inc., 37-55.
- Paulitz, Tanja (2007). Geschlechterforschung und Technikwissenschaften. Konstruktionen von Wissen in Fachkulturen des Ingenieurbereichs. In: Zeitschrift für Frauenforschung und Geschlechterstudien, 4, 2007, 23-42.
- Polanyi, Michael (orig. 1966, dt. 1985). Implizites Wissen. Frankfurt a. Main: Suhrkamp Verlag.

- Thaler Anita (2006): Berufsziel Technikerin? München-Wien: Profil Verlag.
- Thaler, Anita (2009). "Learning technology?" About the informal learning potential of youth magazines. In: Daniela Freitag, Bernhard Wieser & Günter Getzinger (eds.) Proceedings 8th Annual IAS-STS Conference on Critical Issues in Science and Technology Studies. Graz: CD-Rom. ISBN: 978-3-9502678-1-5. Download: [http://www.ifz.tugraz.at/index\\_en.php/article/articleview/1817/1/58](http://www.ifz.tugraz.at/index_en.php/article/articleview/1817/1/58) [28.10.2009]
- Thaler, Anita & Dahmen, Jennifer (2009). Science Education in Europe – Images, Approaches, Innovations. In: Freddy Malpica, Bill Tait, Andrés Tremante & Friedrich Welsch (eds.). Proceedings of the 2nd International Multi-Conference on Society, Cybernetics and Informatics. Volume I. July 10th - 13th, 2009 – Orlando, Florida, USA, 220-224.
- Thaler, Anita; Dahmen, Jennifer & Pinault Cloé (2009). European media images of science, engineering and technology. IFZ – Electronic Working Papers 2-2009. ISSN 2077-3102. In: <http://www.ifz.tugraz.at/index.php/article/articleview/1621/1/154> [16.11.2009]
- Wächter, Christine (2003). "Attracting Women into Engineering through Regional Technology Programs", in: A. Bammé, G. Getzinger, B. Wieser (eds.): Yearbook 2003 of the Institute for Advanced Studies on Science, Technology and Society. München-Wien: Profil Verlag (Technik- und Wissenschaftsforschung/Science and Technology Studies, Vol. 41), 258-270.
- Wajcman, Judy (1991). Feminism confronts technology. Cambridge: Polity.
- Wetterer, Angelika (2005). Gleichstellungspolitik und Geschlechterwissen – Facetten schwieriger Vermittlungen. In: Ulrike Vogel (Hg.): Was ist weiblich – Was ist männlich? Aktuelles zur Geschlechterforschung in den Sozialwissenschaften. Bielefeld. S. 48-70.
- Wetterer, Angelika (2007). Erosion oder Reproduktion geschlechtlicher Differenzierungen? Zentrale Ergebnisse des Forschungsschwerpunkts „Professionalisierung, Organisation, Geschlecht“ im Überblick. In: Regine Gildemeister & Angelika Wetterer (Hg.): Erosion oder Reproduktion geschlechtlicher Differenzierungen? Widersprüchliche Entwicklungen in professionalisierten Berufsfeldern und Organisationen. Münster. S. 189-214.
- Wetterer, Angelika (2008). Gender-Expertise, feministische Theorie & Alltagswissen: Grundzüge einer Typologie des Geschlechterwissens. In: Lydia Plöger & Birgit Riegraf (Hg): Geschlechterwissen und Geschlechterkompetenz. Zwischen Wissenschaft und Politik. Opladen, S.81-99.
- Zinnecker, Jürgen (1975). Der heimliche Lehrplan. Weinheim, Basel: Beltz.