

'Imagine all the people and technology': The students' learning potential when reflecting and producing gender sensitive images

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Abstract

The participatory Sparkling Science project 'Picture.it' (2009-2010) working with high school students of different secondary vocational schools, is particularly interested in juveniles perception of images on people and technology in print documents. A detailed analysis of selected pictures enables high school students to reflect images with regard to gender representations. The cooperative work of students and researchers generates a common basic knowledge to be used when creating their own gender sensitive images of people and technology. In addition to that, students are closely collaborating with peers specialized in photography and multimedia art in a transdisciplinary learning approach.

This continuous exchange process of the perception of printed images might lead to a better understanding of the 'mutually constitutive relationship between gender and technology' (Wajcman 2000: 460). Last but not least the consideration of different school backgrounds, each one assumed to be a 'girls' or a 'boys' school, will also shed some light on the youths' learning potential during the production process of gender sensitive pictures.

Keywords: gender sensitive pictures, people and technology, project design, students' learning potential.

Introduction

In everyday life, young people are exposed to a tremendous amount of pictures of people and technology in digital and printed media which function as constructing elements of how they imagine the world of technology. The current Sparkling Science project 'Picture.it' (2009-2010), carried out at the IFZ- Inter-University Research Centre for Technology, Work and Culture Graz, is particularly interested in young people's perception of images of people and technology in printed documents. The following paper will be based on this participatory sparkling science project. First some background information on the project will be given, leading to the main projects objectives and the particular scientific approach that has been chosen to successfully implement gender sensitive produced images on people and technology in general. Furthermore the projects process is explained by introducing the methods of cooperation between researchers and students according to two main project phases: a) workshop phase and b) production phase of gender sensitive images of people and technology by the students themselves. This particularly focuses on applied workshop concepts and the current project phase in which students cooperatively produce gender sensitive images. As the project is still in progress some remarks on benefits and obstacles of the underlying participatory project design will be made. The paper will shed more light on the project design by reflecting high-school students' participation, the project conditions when designing criteria on gender sensitive images and its implications on the cooperative production process. So far I am not able to address and analyze finished pictures produced

by students yet; but nevertheless the latter part of the paper focuses on the heterogeneous students' population, their previous knowledge and its effect on the students learning potential within the project. Finally the reader will be presented a project outlook and preview of the online database.

1 Project background and state-of-the-art

'Picture.it'¹ entitled "*young people develop and design gender sensitive pictures of people and technology. A participatory technology research project to compile a non-sexist image database*" is based on a lack of non-stereotypical images of engineers, engineering professions, people and technology in general. This project is going to provide an online database including gender sensitive images of people and technology. The database will be filled with self-created pictures by students of three different regional vocational schools. The participating secondary vocational schools cover different specifications: HTL Bulme, Graz (technical), HLW Schrödingerschule, Graz (home economics, tourism), HTBLVA-Ortweinschule, Graz (multimedia and photo art).

The students take over the production of images by their own and contribute to the main project's output which is in line with sparkling science programme's general goals and objectives: "*Scientists work side by side with young people on over 100 research projects in which the young colleagues are not just involved as observers but where they actively take over and work independently on parts of the research.*" (Sparkling science programme online, 27.4.2010).

On the content level the project relies on arguments claiming that the majority of existing images on engineers and technical products more or less reinforce stereotypical concepts of women and men. As Wetterer (2008) has pointed out gendered everyday knowledge is essential on how doing gender is performed. Additionally to that Wächter (2009b) has published in a European Commission's WIST (Women in science and technology) report, results of her analysis of Websites and print materials used in several companies and universities targeted at scientists and engineers. She claims that it is important to consider aspects of diversity in representations of gender and engineering as she has identified a gender bias even in 'good practice' examples of her empirical research.

Against this background is primarily interested in raising high school students' – women's and men's – awareness and potential to critically reflect current pictures of people and technology. The involvement of female and male students follows a diversity approach to provide all students at once to become familiar with gender sensitive representation of people and technology. The students' critical awareness about gender dimensions is helpful because even at a young age when children enter schools, they already have certain perceptions on how 'real' girls and 'real' boys have to act. These approaches are interacting with other people's perceptions or organisational structures in schools, strongly effecting children's actions. Following this argumentation children on the one hand can be seen as actors acting upon the basis of their previous knowledge about the gender categories. Although, on the other hand, as members of an organisation (school), the institutions inner structures are bringing about a dualistic system of gender (Paseka 2007:52). Moreover it is quite important to note in this context that teachers regard their approach and actions within school as gender neutral and this 'myth of gender neutrality' (Paseka 2007: 61) more or less prevents a critical reflexion of individual gender roles and educational approaches. At the

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same time it unconsciously reproduces and reinforces existent patterns of femininity and masculinity (ibid. 61).

2 Project objectives and chosen scientific approach

Three main scientific goals have been highlighted to be important for this participatory project approach. Firstly, a shared analysis of currently available pictures focusing on gender relations. Secondly, using social scientific methodological instruments (image analysis, empirical field work) and taking into account photo-technical expertise in students' working groups. Additionally to that, the produced gender sensitive images are based on cooperatively defined gender sensitive criteria in representations of humans and technology in any sense. Thirdly, based on the scientific programmes outline students take over the production of a relevant online database on non-sexist images of people and technology.

Within the project an interdisciplinary approach will be applied in order to follow the projects scientific objectives. This means one can highlight the inclusion of different disciplinary background knowledge (social sciences, educational science, psychology etc.). Furthermore different actors (teachers, photographers, scientists...) are contributing individual practical knowledge to the research process. The current project is also based on feminist knowledge on gender segregation in engineering professions. Only few women can be found in higher engineering professions or traditional male dominated fields of engineering (mechanical engineering etc.). Anita Thaler (2006) and Christine Wächter (2007, 2009a) have claimed in several single and collaborative publications (Thaler & Wächter 2009) that there is a need for sustainable change in male dominated engineering culture in order to provide an institutional and organizational framework for successful engineering students.

'Picture.it' is intended to address teenagers to raise awareness and interest in choosing further engineering education. One of the project's motifs is to sensitize high school students in their perception of images representing females and males engineering working cultures. This motif is underlined by an empirical study which has shown that young people still have rather stereotypical views on images about professionals in science, engineering and technology in their minds. The authors have claimed a need *'for more diverse occupational information about career possibilities in the respective fields'* (Dahmen/Thaler 2009: 7). Gender sensitive pictures produced in 'Picture.it' may also contribute illustrative material for such an engineering information material. Apart from that the project might lead to a broader understanding and imagination of non-stereotypical engineering contexts within the project's students' population. The involvement of different vocational schools, consisting of one rather female and the other predominantly a male student population, may bring about interesting results when reflecting and comparing their approach towards these images.

Finally the students are asked to produce gender sensitive images on people and technology themselves and within this project phase the inclusion of practical knowledge by photo-technologically experienced students (HTBLVA-Ortweinschule) provides a rather constructivist educational working atmosphere. This can be best described as a dynamic process where students ask questions, solve problems and/or critically reflect their work (cf. Klein 2006) without dominating expert over practical knowledge. Such a participatory approach of technology construction has already been successfully conducted in other project contexts as well (Hofstaetter et al. 2009).

3 Applied cooperative methods between researchers and students

A short description of the different project phases is needed in order to understand the applied cooperative methods of the involved actors groups. The project's concept relies on two major phases: a workshop phase including two workshops held in each participating vocational school; a production phase in which students are asked to produce gender

sensitive images in studios or outdoors in accordance with the students chosen contexts on representation of people and technology.

The following explanation of the workshop concepts may contribute to a better understanding of the cooperative methods between students and researchers applied within picture.it. The first workshop was set up to theoretically examine the terms 'gender' and 'technology'. In three to four school hours students and researchers were exchanging previous knowledge about the representation of gender and technology including contemporary expert know-how in gender studies issues. The project team defined the workshop's goal in broadening the students' understanding of the relevant terms and to gain and reproduce shared knowledge on gender issues in science and technology studies. The second workshop including an image analysis and production of gender sensitive criteria's, was designed as a preparatory tool for the upcoming project phase. The students were asked to apply image analysis, a well-known research method. The workshops intend was to encourage students to critically analyse and comment on a variety of images in printed documents. In preparation for the workshop phase students had been encouraged to collect images from a variety of different sources (youth magazines, school news papers, sports magazines, brochures, news papers, flyers etc.). In addition to that, the students' contributed inputs to establish a catalogue of gender sensitive criteria in images.

From March till May 2010 students of all three secondary vocational schools and project team members were conducting the second major project part of producing gender sensitive images by themselves. In this project phase high school students have left behind their individual school class context and were collaboratively working together in mixed teams with students from other vocational schools. One quite important aspect in this context is the heterogenous group setting as all involved students bring in different educational background (technical, home economical, and photo technical vocational training). Last but not least there is a variation in age of participating students (HTL Bulme: 17-18 years; HTBLVA-Ortweinschule: 17-18 years; HLW Schrödingerschule: 15-16 years). Speed dating was used in a preparatory event for mixing together groups of students' and also asking them to choose one engineering context they are in favour with. Four contexts had been provided: engineering school/education, engineering jobs, leisure time and household. The images to be produced in the second project phase additionally have to fit under the headline of 'me and technology'. This working title is meant to offer high school students a possibility to reflect their own gendered position in the context of gender and technology. It might also lead to a possible deconstruction of their individual gender identity. For example when asking themselves such questions as 'Who is using technical products/performing engineering jobs?'

The establishment of mixed students' teams from different vocational students together with photo-technical experienced teenagers offers a great opportunity. Bearing this in mind pupils' can rely on and interact with the students' photo-technical expertise knowledge. Additionally to that these students attending HTBLVA-Ortweinschule are encouraged to provide their expertise as a peer advisor without simply acting as producer/photographer. Moreover one can point out another positive effect for the young photographers in training. In general they are able to reflect their own reproduction of stereotypical or non-stereotypical gender relations in photographs of funded projects.

4 Possible Benefits and Obstacles of the participatory project

Having already argued about specific aspects of applied cooperative research methods between researchers and high school students in 'Picture.it' I would like to add some remarks on benefits and obstacles of the participatory sparkling science project. Aspects of the project's process can analysed at two levels: a) project design and b) students learning potential.

The following argumentations are derived from an on-going reflection during the entire project duration. Some preliminary results can be drawn from this accompanying research process, as the project is still in progress.

4.1 Project design

Starting with the project design it was highly important to achieve a similar level in the participating vocational classes while reflecting represented images of people and technology. This includes a clear understanding of differences between stereotypical representations and examples of 'good practice' for example symmetric positions of female and male engineers, balanced competencies, diversity of people (age, ethnicity, etc.). The projects outcome, a database consisting of gender sensitive images of people and technology, depends to a great extent on the establishment of a catalogue on gender sensitive criteria. The contents of the second workshop included a students' image analysis and the elaboration of gender sensitive criteria. The workshops output and previous expert knowledge on gender issues by the project team have equally provided input for the catalogue. The described catalogue includes two general principles for the production of images, described as *symmetry* and *non-stereotypical aspects of gender*. *Symmetry* of gender is guaranteed if the model's gender can easily be changed without turning the setting to be odd. This aspect is mainly noticeable in body language and positions of models. Additionally symmetry is represented through non-hierarchical relationships between the actors of the picture. *Non-Stereotypes*: stereotypes are deconstructed by showing women and men in non-traditional contexts (of engineering); for example Non-stereotypical representations may include hierarchical relationships, if women are represented in higher positions, as they are usually underrepresented by numbers in this (engineering) context. Furthermore several relevant categories for gender sensitive images had been defined:

- a) Selection of people (diversity, 'real' people)
- b) Correlation between people (arrangement, proportion)
- c) Perspectives (illustrating people by bottom-up, top-down or front perspective)
- d) Positions, facial expression and clothes (position in general, standing or seated, position of head, extremity, emotions, smile, gaze, clothes)
- e) Context and content (acting models versus objects, chosen context, interaction of people and technology, selection of artifacts and desexualisation).

These categories can be used to transfer theoretical knowledge on non-stereotypical gender representation into practice, when each group of students needs to create their individual image on people and technology. Just before producing these images the students had to hand in concepts of their chosen technical context and setting. These concepts included descriptions of the setting's idea (What kind of technical context; the number and gender of persons involved; indoor or outdoor setting) and photo-technical details (camera and light setting).

In addition to that if each different vocational background of the participating students' is considered, one can claim some photo-technical pupils try to achieve a balance between creative and normative gender sensitive approaches. This becomes obvious because at the initial workshop phase all students have been informed about one main objective for the production of images representing people and technology. Pictures are meant solely to be produced for illustration purposes. Some picture concepts have shown that the participating photo-technical students tended to refer to a rather 'creative' concept in comparison to the illustrative purpose of pictures. To conclude this argument an ongoing reflection of objectives for the production of gender sensitive images is needed.

Moreover one factor in a successful cooperative working atmosphere is to avoid a lead of photo technical expertise in mixed students groups. For this reason the concept highlights the inclusion of all students in small groups performing every project activity together. Within the second project phase this includes designing the concept, shootings, and in some cases picture editing etc. Members of the project team who closely interact with the students need to carefully observe the dynamic processes in each group. If required the researchers set interventions in order to balance students' inputs and contributions.

4.2 Students' learning potential

The students' learning potential cannot be analysed in depth at this stage of the project, nevertheless three aspects in this area which are important for the projects successful progress can be highlighted.

The first learning potential refers to the students' insight in applied science and technology studies through active participation in the entire project. This is particularly the case when students are confronted with the project's initial idea responding to a lack of non-stereotypical pictures of people and technology in media. They are able to acquire knowledge when defining gender sensitive criteria in image analysis, producing concepts for non-sexist picture settings on people and technology, and finally establishing a scientific product of the project: an online picture database.

Secondly, pupils of each participating secondary vocational school are constantly asked to reflect and discuss their individual perception of images on people and technology in print media. Previous knowledge and critical reflection has become obvious during the workshop phase. Additionally to that after having analyzed the students' concepts one can identify the students' intensive examination of the cooperatively produced catalogue on gender sensitive criteria. This particularly applies to the symmetries of positions in female and male models and for example using non-sexist clothes. Furthermore these issues also played a role in the individual feedback by students' during photographic implementation phase. One positive aspect of this ongoing project is a noticeable increase of a better understanding of the '*mutually constitutive relationship between gender and technology*' (cf. Wajcman 2000). This includes an awareness of a recent gender study's view on complex understanding of gender and technology in a sense that neither category of masculinity, femininity or technology is fixed. The categories rather include a range of possibilities, which are acting with each other and are constantly producing themselves (ibid. 460).

The heterogeneous student population covers a variety of prior knowledge. This leads to different forms of knowledge transfer between researchers and teenagers throughout the entire project. According to vocational school this aspect can be described as following:

- a) HLW Schrödinger students: These students were stating in workshops to cover hardly any knowledge on gender issues at all. Within the entire workshop phase this group seemed to have gained knowledge on gender dimensions in represented images of people and technology. Apart from that they also had the opportunity to make photo-technical experience during an excursion at the Photography and Multimedia Art department at Ortweinschule, Graz.
- b) HTL- Bulme students: The inputs and comments on gender, technology and engineering products by the students are stronger connected to everyday engineering culture. At first sight it seemed that this group has reframed their rather stereotypical approach towards gender and technology. In the majority of workshop activities they have been less critical of stereotypical representations of men and women in print documents.

- c) HTBLA Ortweinschule students: Throughout the first part of the project this group has been demonstrating their photo-technical expertise, mainly by using specific technical terms such as contrast, depth and perspective of photographer. During the concept preparation within the students' mixed teams the vocational students of the photography and multimedia art department were mainly shifting motifs between producing gender sensitive images and a creative production process.

4.3 Project outlook

Finally this paper provides a preview of the main project's product. Recently the project team has attended the image production phase and has started to implement first results in a raw version of an online database. The database addresses companies, public/private facilities and educational institutions, which can download and use these gender sensitive images of people and technology free of charge.

This illustration provides a first preview of the online database which will be accessible for the general public in autumn 2010.

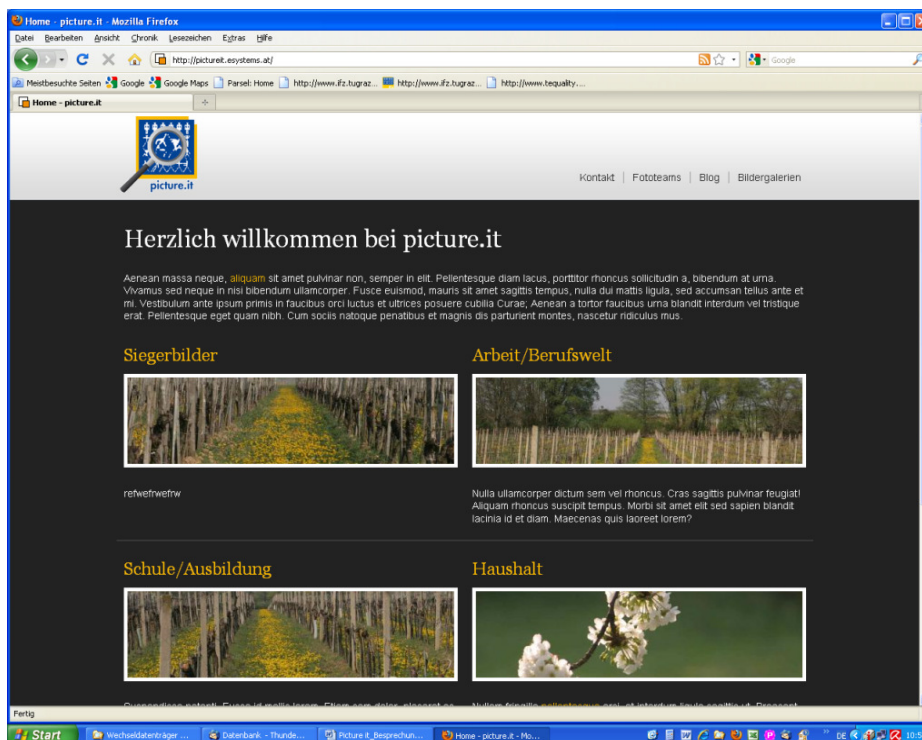


Illustration 1 Preview of 'Picture.it' online database, April 2010.

References

- Dahmen, Jennifer & Thaler, Anita (2009). Image is everything! Is image everything?! About perceived images of science, engineering and technology. In: Maartje van den Bogaard, Erik de Graf & Gillian Saunders-Smiths (eds.). Proceedings of 37th Annual Conference of SEFI. "Attracting young people to engineering. Engineering is fun!", 1st-4th July 2009, Rotterdam. CD-Rom. ISBN 978-2-87352-001-4. [Reviewed.]
- Hofstätter, Birgit/Eckel, Gerhard/Gasteiger, Birgit/Grießer, Hermann/Thaler, Anita/Wächter, Christine/Weitlaner, Ulrike/Zorn, Isabel (2009). 'Engineer Your Sound'. Partizipative Technikgestaltung im Klassenzimmer. In: *Soziale Technik* 2/2009, pp. 17-19.
- Klein, Julie T. (2006). Integrative Learning and Interdisciplinary Studies. *AAC&U; peer Review*, Summer/Fall 2005, p. 8-10.
- Paseka, Angelika (2007). Geschlecht lernen am Schauplatz Schule. *SWS-Rundschau* (47.Jg.), Heft 1/2007: 51-72.
- Sparkling science programme online, <http://www.sparklingscience.at/en/>, 27.4.2010.
- Thaler, Anita (2006). *Berufsziel: Technikerin?* München/Wien: Profil Verlag.
- Thaler, Anita & Wächter, Christine (Eds) (2009). *Geschlechtergerechtigkeit in Technischen Hochschulen – Theoretische Implikationen und Erfahrungen aus Deutschland, Österreich und Schweiz*. München/Wien: Profil Verlag.
- Wächter, Christine (2007). Nachhaltige Ingenieurausbildung. In: Leicht-Scholten, Carmen (Eds.). *Gender and Science. Perspektiven in den Natur- und Ingenieurwissenschaften*. Bielefeld: transcript Verlag, pp. 109-118.
- Wächter, Christine (2009a). Herausforderungen an eine zeitgemäße Technikbildung. Zentralverband der Ingenieurvereine ZBI Nachrichten 1-09, 53. Jg, Februar 2009, pp. 6-8.
- Wächter, Christine (2009b). Challenging Cultures of Engineering – How words, concepts, and images (de)construct engineering as a male domain. In: European Commission (Ed.): *Women in science and technology. Creating sustainable careers*, Brussels, pp. 69-81.
http://ec.europa.eu/research/science-society/document_library/pdf_06/wist2_sustainable-careers-report_en.pdf, 18.5.2009.
- Wajcman, Judy (2000). Reflections on Gender and Technology Studies. In *What State is the Art? Social Studies of Science*, Vol. 30, No. 3, (Jun. 2000), pp. 447-464.
- Wetterer, Angelika (2008). *Geschlechterwissen & soziale Praxis. Theoretische Zugänge – empirische Erträge*. Frankfurt am Main: Ulrike Helmer Verlag.