

Gender Sensitive Media Composition through Participatory Design: Evaluation Concept for the Development of an Online Role-Play Game for Girls

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Abstract: A number of indicators point to a high potential for computer games in the context of education. Yet, with regard to the usage of technology, a gender gap exists showing a poor usage of computer games by females. Reasons for this are that the computer games contents' don't correspond to the interests of females, or are designed by stereotypical conceptions. Hence, design approaches that reflect the interests of females and break stereotypical gender models are needed. This paper presents the participatory design of an online role play (SITCOM) with the target group of girls being continuously involved in the development process. The results of the continuous evaluation were the basis of the entire design process. Methods of data gathering were group discussions, interviews, questionnaires, and usability tests. The results indicated that the approach was successful in meeting the demands of the target group and breaking down traditional gender stereotypes.

A number of indicators point to a high potential for computer games in the context of education. While a comprehensive picture of the effects of computer games in the context of learning and teaching is not available at this point, positive effects on motivation and on the acquisition and improvement of skills and competencies of learners have been mentioned (Egenfeldt-Nielsen, 2005, Becta 2001). Computer games can be a significant element in a constructionist understanding of learning. Games encourage experimentation and active engagement, resulting in tangible learning experiences (Schachtner, 2006). In contrast to behavioural and mechanistic concepts, with regard to a gender perspective computer games to offer opportunities for the neutralization of dualistic and stereotypical concepts that solidify existing gender conditions. According to current views, gender as a social construct is

continually reinvented by social interactions and hence represents a continuous process of adjustment and change (West & Zimmermann, 1998, Coulthard & Castleman, 2007).

While computer and video games are an inherent part of today's youth culture, there exists a gender gap regarding usage. Reflecting gender differences in the use of technology as a whole, a high usage by boys and a much lower utilization rate by girls can be observed (Medienpädagogischer Forschungsverbund Süd-West, 2006). Apart from the previously described presumably positive effect of games within the context of teaching and learning, a number of authors view computer and video games as important tools for facilitating access to information and for communication technologies in general. The playful interaction with technology might therefore have far-reaching effects on the acceptance of technology (Jones et al, 2006; Agosto, 2003). Supportive of this view are studies that concluded that playing computer and video games may enhance computer competencies (Cassell & Jenkins, 1998; Wilson, 2003). Salient reasons for the poor usage of video and computer games by girls and women are the facts that the computer games contents' do not correspond to the interests of females, or are oriented by primarily stereotypical conceptions (Gorritz & Medina, 2000) and are primarily developed by male game developers (IDGA, 2006). From a gender perspective, girls should be able to resonate with the computer culture, and to find software that reflects their interests. Girls should be in the position to shape games and software and to equally be users of these technologies (AAUW, 2000, p. xiii). Schinzel (2007), based on the deliberations of Cecile Crutzen, argues similarly in that she stresses the need to break down the dichotomy between programming and usage. Within this context, Messmer and Schmitz (2004) describe their approach as follows: "Instead of adapting the user to the technology, our approach in gender and ICT aims at adapting technology to the user-oriented demands" (p. 249).

Hence, design approaches that reflect the interests of girls and women need to be applied. So far, primarily implicit representation techniques are referred to in the development of computer games (Rommès, 2006). This amounts to resorting to traditional conceptions of women's and men's preferences and hence implies stereotypical conceptions. From a gender perspective, participative design approaches are preferred, which involve the target groups in the very early stages of project development. However, this approach is employed rarely so far. Reasons for this might be time pressures on product development and the lack of empirical and methodical competencies (Rommès, 2006). Jones et al (2006) recommend that a participative approach that is based on a qualitative foundation with the focus on individual consideration of the target group is preferable. This entails addressing precisely the age of the target group and focusing the research based questions and issues on relevant factors of computer games for girls and women.

SITCOM: an Online Role-Play for Girls

A participative design approach was realized with the development of the SITCOM (Simulating IT Careers for Women) career game. Girls and young women between the ages of 12 and 16 were continuously integrated in the development of the game.

It was the goal of the nine project partners ¹ of the Socrates (Minerva) project SITCOM to utilize the potentials described above, and to develop a role play that would foster an interest in pursuing education and careers in the fields of technology and natural sciences. Girls should be given the opportunity to become acquainted with the wide range of careers available in these fields, to consider advantages and disadvantages, and to also realize the benefit of these professions to society as a whole.

This role-play allows girls and young women to become acquainted with six typical careers in technical and (applied) scientific careers. Six professions, and hence six games, were developed: landscape designer, mathematics teacher, environmental engineer, architect, network administrator, and IT project manager. Each story represents a condensed workday in the lives of the women protagonist. The girls can adopt various identities and have the opportunity of getting to know the respective careers in an interactive role-play. Players complete realistic tasks and make decisions that are relevant for the respective professions. A list of links to educational institutions, biographies of women in technical and scientific occupations, and didactic materials for teachers and vocational counsellors were made available on an internet platform (<http://www.sitcom-project.eu>).

Method: A Participatory Design Approach

In order to explore the needs of the target group in relation to content, architecture, and design of the game, a needs analysis was initially conducted. Based on these results, the basic concept of the SITCOM career game was developed. The continuing development process was accompanied and evaluated by the target group. Following the evaluation by the target group, the game was evaluated by teachers and vocational counsellors with regards to its suitability in educational settings. Finally, external experts conducted an evaluation in order to determine whether the game was age appropriate. In the following, emphasis will be laid on the description of the individual steps of the evaluation process with the target group (see Table 1).

Steps of the Evaluation Process with the Target Group in the Development of the SITCOM Game

Needs Analysis

A needs analysis was the initial task for the development of the platform. The needs of the target group relating to content, architecture, and design were explored. Central questions related to the development of the game's contents were the perceptions of 12 to 16 year old girls about professions and educational paths in the fields of natural and engineering sciences. Equally important was to gain an understanding of the factors that would motivate, or

¹ Coordination: Danube University Krems (Austria). Project Partners: Academy of the Humanities and Economics Lodz (Poland), Business and Management School Pau Casals (Spain), Danmar Computers (Poland), ORT (France), FiaTest (Romania), Romanian Society for Lifelong Learning (Romania), Webducation Software Planungs- und EntwicklungsGmbH (Austria), Western Greece Development Center (Greece). Project Duration: 2004–2006.

discourage girls in the pursuit of these careers. Relating to the architecture and the design of the game, the factors that needed to be considered for creating a game that would be attractive and appealing for the target group, were examined.

On the basis of a qualitative approach, 21 workshops were conducted in the partner countries: Greece, France, Austria, Rumania, Poland, and Spain. In order to assure comparability, both organisation and method of the workshops were standardized. In addition, a pre-test workshop was employed in order to recognize potential problems and to adapt the concept of the workshops, if necessary. A total of 261 girls of various schools types took part in these workshops. Data gathering consisted of group discussions that were recorded for subsequent analysis.

Target group Girls 12–16a	Central questions	N	Method
1. Needs analysis	<ul style="list-style-type: none"> ▪ Conducive/hindering aspects of IT-careers ▪ Knowledge about IT-careers ▪ game behavior ▪ Characteristics that make games interesting 	N=261	Group Discussion
2. Executive Summaries (N=9)	<ul style="list-style-type: none"> ▪ Recommendations for the career game ▪ General impression of the story ▪ Anticipated enjoyment factor ▪ Interest in history and tasks ▪ Interest in the given career ▪ Recommendations 	N=89	Group discussion
3. Graphic Design	<ul style="list-style-type: none"> ▪ Design of the protagonist and the actors 	N=9	Interview ²
4. Usability-Test	<ul style="list-style-type: none"> ▪ Navigation ▪ Ease of operating ▪ Registration ▪ Personalization 	N=5	Tests
5. Individual implemented games (N=6)	<ul style="list-style-type: none"> ▪ Impression of the games ▪ Fun factor ▪ Tasks: Degree of difficulty, novelty and manner ▪ Attitudes towards the Protagonist and the profession ▪ Recommendations for improvement 	N=77	Semi-standardized questionnaires
Further Evaluation steps	Centrag Questions	N	Methodik
6. Teacher, Vocational Counselors	<ul style="list-style-type: none"> ▪ Versatility in education ▪ Possibilities for Improvement 	N=19	Interviews
7. External Evaluation	<ul style="list-style-type: none"> ▪ Age adequacy 	-	Expert ratings

² In addition, an opinion poll within the projection consortium was conducted (N=31).

Table 1: Overview of the Individual Steps of the Evaluation in the Development of the SITCOM Career Game

In addition to the workshops and in order to avoid the reproduction of gender stereotypes, guideline interviews with 42 women between the ages of 19 to 29 were further conducted. These women were either employed in technical or scientific professions, or were pursuing such careers through education. Corresponding to the workshops with the target group, it was the goal of these interviews to analyze supportive and hindering factors in the pursuit of the given careers, and to get recommendations for the development of the game. Attention was given to the selection of participants in that an equal distribution of the represented countries (six interviews for each country) was selected and a wide range of (technical, engineering and scientific) professions represented.

The basic concept of the SITCOM career game was developed on the basis of these results (Zauchner et al., 2007). The game was designed as a role-play in which a condensed workday of a woman, in either a technical or a scientific occupation, was presented to the player. In addition to imparting knowledge relating to these occupational branches, an important goal was for participants to implement factors that would promote involvement in a given occupation within the game, and to counteract hindering factors that would preclude the pursuit of a given occupation.

Evaluation of Executive Summaries

On the basis of the initial draft of the SITCOM career game, summaries of nine stories (*Executive Summaries*) were developed. These stories portrayed women in a technical or scientific workday and were developed in collaboration with women in the respective professions. In the context of nine workshops, a total of 89 girls evaluated the *Executive Summaries*. In each workshop, approximately 8 to 16 girls participated. The evaluation assessed whether the plot fostered an interest in the profession presented, whether girls thought that they would enjoy playing the act, and whether the tasks were judged by the target group to be interesting. In addition, the overall impression of the plot was assessed and opportunities for recommendations and ideas were provided. Based on the results of these workshops, six of the nine plots that were judged by the girls most favourably were selected and implemented.

Evaluation of the Graphic Design

The decision relating to the graphic design of the game was made by the target group. Within the context of a workshop (N=9) the various designs for the protagonist and the corresponding additional figures were chosen. This decision was also supported by an opinion poll within the project team (N=31). In both cases, the decision clearly supported the final design of the game.

Usability Test

Following the implementation of a prototype of the career games and in order to assure unambiguous navigation and usability, a study was conducted in the *Usability Lab* of the Danube University of Krems. Five girls³ between the ages of 12 to 16 participated. The method of *thinking aloud* was employed in combination with the video-recordings. An expert team developed suggestions for improvements in navigation and usability. Modifications were primarily related to the simplification of the registration process and measures to improve navigation. The results were incorporated into the final design.

Evaluation of the Implemented Games

Following the implementation, each of the six games was evaluated by a total of 77 girls in the target age range between 12 to 16 years. Initially, in an orientation phase, participants became acquainted with the respective games and completed a semi-standardized questionnaire. The questions focussed on the following aspects of the games: like vs. dislike of the sequences, type of task, level of difficulty, novelty of the task, attitudes towards the profession and the presented protagonist, and suggestions for improvement (Table 1).

The results indicated that the participating girls liked the individual role plays and found the female protagonists personable and competent. Yet, in several cases, the degree of difficulty of the tasks was evaluated as inadequate. Also, many girls judged the sequences to be too long and the game too slow. Hence, the modifications on the basis of these results were related to comprehensibility and the degree of difficulty of the individual tasks and the sequence of cuts between individual scenes. A number of suggestions for improvement resulted in this phase, primarily related to navigation and database related technical problems.

Conclusion

An approach to design with a core component of including the target group constitutes a complex method for product development. This strategy, however, represents an initial step in breaking down dichotomies between developers and users, and meets the requirements that are posed from a gender perspective with regards to the software development process. The authors regard the inclusion of the users' perspective as a significant quality criterion. Transforming the ideas and recommendations by the girls enabled the development of a product that met the expectations of the target group. The success of the chosen approach manifests itself not only by the number of

³ It is assumed that with the current sample size up to 85% of all usability-problems can be identified

registered users (8700 within six months of completion) but also by the fact that the SITCOM project was awarded with the Comenius Seal 2006 within the context of the Comenius *EduMedia Awards*.

References

AAUW Educational Foundation (2000). Tech-Savvy: Educating Girls in the New Computer Age (online).
http://www.aauw.org/member_center/publications/TechSavvy/TechSavvy.pdf (09.07.2006).

Becta – British Education and Technology Agency (2001). Computer Games in Education Project (online).
<http://www.becta.org.uk/research/research.cfm?section=1&id=519> (15.12.2005)

Cassell, J. & Jenkins, H. (1998). Chess for Girls? Feminism and Computer Games. In: J. Cassell & H. Jenkins (Eds.), *From Barbie to Mortal Combat: Gender and Computer Games* (pp. 2–45). Cambridge: MIT Press.

Coultard, D. & Castleman, T. (2007). Approaches to Conceptualizing Gender. In: E. M. Trauth (Ed.), *Gender and Information Technology*, Vol. 1, (pp. 31–36). Hershey: Idea Group Reference.

Egenfeldt-Nielsen, S. (2005). *Beyond Edutainment. Exploring the Educational Potential of Computer Games*. IT-University of Copenhagen, Denmark, Dissertation.

Gorriz, C. M., & Medina, C. (2000). Engaging Girls with Computers through Software Games. In: *Communications of the ACM*, 43 (1), pp. 42–49.

IGDA – International Game Developers Association (2006). *Game Developer Demographics Report* (online).
<http://www.igda.org/diversity/report.php> (07.06.2007).

Jones, R. E. T., Terrell, I. S. & Connors, E. S. (2006). Addressing the Gender Gap in IT via Womens' Preference in Video Games. In: E. M. Trauth (Ed.), *Gender and Information Technology*, Vol. 1, (pp. 13–18). Hershey: Idea Group Reference.

Messmer, R., & Schmitz, S. (2004). Gender demands on eLearning. In: K. Morgan, C. A. Brebbia, J. Sanchez & A. Voiskuonsky (Eds.), *Human Perspectives in the Internet Society: Culture, Psychology, and Gender*, Vol. 4, (pp. 245–254). Wessex: WIT-Press.

Medienpädagogischer Forschungsverbund Südwest (2006). *JIM-Studie 2006. Jugend, Information und (Multi)media* (online).
http://www.mpfs.de/fileadmin/JIM-pdf06/JIM-Studie_2006.pdf (07.06.2007).

Oudshoorn, N., Rommes, E., & Stienstra, M. (2004). Configuring the User as Everybody: Gender and Design in Information and Communication Technologies. In: *Science, Technology, and Human Values*, 29 (1), pp. 30–61.

Rommes, E. (2007). Gender Sensitive Design Practices. In: E. M. Trauth (Ed.), *Gender and Information Technology*, Vol. 1, (pp. 675–681). Hershey: Idea Group Reference.

Schachtner, C. (2007). Virtual Spaces for Playing and Learning: Gender-Sensitive Reflections, Examples and Consequences. In: S. Zauchner, K. Siebenhandl & M. Wagner (Eds.), *Gender in eLearning and Educational Games* (pp. 11–24). Innsbruck: Studienverlag.

Schinzel, B. (2007). The Invisible Gender of the New Media. In: S. Zauchner, K. Siebenhandl & M. Wagner (Eds.), *Gender in eLearning and Educational Games* (pp. 25–29). Innsbruck: Studienverlag.

Wilson, B. C. (2002). A Study of Factors Promoting Success in Computer Science Including Gender Differences. In: *Computer Science Education*, 12, pp. 141–164

Zauchner, S., Siebenhandl, K., Gindl, M., Pegah, L., & Hirschberg, G. (2007). The Research Based Development of an Interactive Career Platform. In: S. Zauchner, K. Siebenhandl & M. Wagner (Eds.), *Gender in eLearning and Educational Games* (pp 293–308). Innsbruck: Studienverlag.