MIT-MUT: Encouraging Girls to engage in ICT and Entrepreneurship through Social Learning and Gamification

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Abstract: In Austria and throughout Europe women are still underrepresented in the field of information and communication technologies (ICT), and this is particularly true for female entrepreneurs. At the same time, according to economic forecasts, an increasing skill shortage is to be expected in the Austrian ICT sector within the next few years. This paper describes the efforts of the ongoing MIT-MUT project to encourage girls to engage in ICT and entrepreneurship.

MIT-MUT wants to address this issue before girls make a first decision and take initial steps towards their future vocation. Entrepreneurial skills should be promoted early, ideally in school, to enable easy progression to entrepreneurship, but existing projects are mainly aimed at older girls who have already chosen a technical or job-specific school or training scheme. The target audience for MIT-MUT is girls of twelve to fourteen. In order to motivate these girls to choose career paths in the ICT-sector and to encourage them to be active as entrepreneurs, individuals who take part in the project are supported in realizing and developing two key competences defined by the European Union for lifelong learning (2006/962/EG) – computer skills and entrepreneurial skills.

At the core of the project is the development, testing and evaluation of an internet platform ("Social Enterprise Network"). Social learning, game-based learning and gamification will be embedded in the platform. On the Social Enterprise Network (S.E.N.), participants are involved in a game while being guided through various topics regarding entrepreneurship, and are encouraged to reflect on their own ICT skills. These skills will be focussed on through mini games (along with other methods). Beyond that there will be space for the girls to bring in their own ideas and realize them in teams, which is an important aspect of entrepreneurship. Another significant element will be the involvement of female role models who already are entrepreneurs in the ICT-sector. The S.E.N. will provide both contact channels to these role models and information about working in the ICT sector.

Keywords: ICT, entrepreneurship, gender, social learning, game-based learning, gamification

1. Gender and Career Choice

Throughout Europe women are still clearly underrepresented in the ICT sector. In Austria the proportion of female technicians is below the average of the European Union (EU). This is particularly true for entrepreneurs in the ICT sector. (austrian council 2008) The lack of women in the ICT sector is alarming for the labor market and a threat to the economic competitiveness of Europe. As the former EU commissioner Vivane Reding points out:

> *"We are facing serious skill shortages in […] the ICT industry. There are frequent calls by top industrialists for more efforts to attract more young people into the sector, but very little has been done to interest one half of the population: young women. This is a mistake […]." (European Commission 2008)*

When we talk of career choices we take as read a certain concept of gender. We understand gender to consist of socially constructed gender roles and gender relations which are not attributable to the biological sex; every individual (re-)creates and consolidates gender roles in everyday interactions. Since we can understand gender roles as social constructs, we know that we can play a role in changing and forming them (Gildemeister 2008).

In the project MIT-MUT we take a look at the origins of the imbalance in the ICT sector and entrepreneurship and assume that they are based on gender stereotypes. Well documented parameters in this regard are social background, insufficient information about occupational areas, the lack of role models and more difficult conditions for women in male-dominated professions. School plays a very important part in career choices and has the potential to break stereotypes. Therefore MIT-MUT closely cooperates with schools throughout Austria.

The goal of MIT-MUT is to broaden the perspective of young girls and encourage them to engage in ICT and entrepreneurship. With a competence-oriented approach we want to support twelve to fourteen year old girls in developing and realizing their “digital competence” and “sense of initiative and entrepreneurial skills”. These competences are defined as two of eight key competences for lifelong learning by the EU (European Parliament and the Council 2006). While these areas of competence are similarly pronounced for girls and boys, the self-assessment of girls regarding their competences in the field of ICT is mostly lower than that of boys (Bos et al 2014).

2. Empowerment and Career Guidance through Game-based and Social Learning

An educational perspective has long been present in the study of digital games, and an integrative approach can therefore build upon a solid theoretical and empirical foundation concerning the nature of digital games (e.g. Salen & Zimmerman 2011; Bogost 2007), as well as their pedagogical potential (e.g. Gee 2007; Prensky 2001). Far beyond their obvious success as entertainment media, digital games have increasingly gained attention as facilitators of learning processes and education. The potential benefits of digital game-based learning (GBL) applications and strategies have been explored thoroughly (Annetta 2008; Bers 2010), as have their limitations (Wagner 2008; Linderoth 2010). Various initiatives are promoting educational gaming as a suitable tool to face the educational challenges of the digital age (Salen 2011; Pivec 2012). Computer Games are no longer a niche product. Games are in the centre of society and have had an enormous impact on the entertainment market during recent years. Turnover in the US in 2012 was more than 13 billion euros, and more than 510 million people play worldwide in social networks. The three top-listed games on Xfire/Forbes are played for more than 2 billion hours a year in Europe and North-America.

One of the main objectives of “MIT-MUT” is to consider gender specific problems pursuing ICT careers. Lippa (2005) found that there were large differences in women's and men's preferences for realistic occupations and moderate differences in their preferences for social and artistic occupations. His results also found that women tend to be more people-oriented and men more thing-oriented. How can we deal with these differences? Current research suggests that digital games are able to foster 'self-efficacy', defined in Bandura (1977, 2001) as interdependence between action and outcome. If an action is successful – regardless of the context being real or virtual – the connection between action and outcome fosters feelings of self-efficacy. This interaction cycle has been examined in various studies and been shown to be stable (Ryan & Deci 2000; Przybylski 2010). We will keep this concept in mind during the development of our concepts and applications.

When considering the potential impact of digital games the biggest challenge lies in the assessment and application of game-based learning in educational practice. In this regard, two aspects deserve specific attention: the reconciliation of game-based learning with contemporary models of education, and the building of teachers’ wider competencies. Some of the most promising concepts build on the principle of using game mechanics in educational contexts. Next to typical digital incentives like points or achievements, initiatives like “Quest2Learn” (www.q2l.org) transform the whole concept of school into a contextual and open learning environment which relies on an active role by teachers and students. Other interactive learning tools like the “Khan Academy” take a more pragmatic approach by providing a powerful knowledge management system which can be used both by learners and tutors. Multimedia platforms like “Watchado” (www.watchado.com), however, focus on role models who describe their daily job routines, and what they like about them. The Austrian initiative “technikqueens”

(www.technikqueen.at) follows a similar approach while also providing a web based platform filled with mini-games related to physics.

Social media is the second key to modern relevance with the MIT-MUT project. Prensky (2001) shows that today's youth (born 1989 and after) is born in the digital world. In Austria more than 98 % of 12-to-14-year-olds have access to the internet and can therefore be seen as digital natives (Austria Internet Monitor). For them the use of digital media, of all kinds, is a natural form of communication. But they are not only consumers: creating and sharing content with the peer group has become for many a daily routine. (Jenkins 2006). For this target group, collecting 'likes' on social media platforms like Facebook is essential. 'Likes' can be seen as a social impact score representing reputation within the peer group.

3. The MIT-MUT Platform

MIT-MUT will be a combination of a social network and a collection of single and multiplayer games presented in a serious context. Participants will get a profile on a Social Enterprise Network (S.E.N.) where they can communicate with each other and get certain assignments.

Over a period of six weeks the girls will work on portfolio-related tasks (multiplayer games). To fulfil these tasks they will act in teams as small companies. This way the girls will become acquainted with both different areas of responsibilities within a company and processes like developing and presenting ideas. The S.E.N. will provide a protected environment where the girls can practise and experience acting as a company.

On weekends there will be the option to play skills-based mini games (single player) that stand for certain important competences like dealing with work-life balance or risk management. The whole six week period is embedded within a narrative context which will be another crucial factor in developing a motivational impact on our users.

In the S.E.N. the girls will also find profiles of role models – women who work in the ICT-sector, particularly as entrepreneurs. In short videos they will talk about their professional life and their work experience. Certain role models will also answer questions directly from the girls via chat.

Summing up, by creating MIT-MUT we plan to:

1. Foster intrinsic motivation in relation to ICT related activities. Based on the social determination theory (Ryan & Deci 2000; Przybylski et al. 2010) the social learning platform will support an incentive system by providing instant feedback, featuring mini games relating to different work related competences, and through social media channels which provide socializing opportunities. These elements should create fun gameplay and intrinsic motivation.

2. Establish an active and supportive community. Following a study by Yee, the game hub will emphasise social motives like relationship, collaboration and teamwork. (Yee 2007)

3. Strengthen social, behavioural and cognitive competences. Our focus will be on competence gain including problem solving skills, and on delivering basic experiences concerning ICT related professions.

3. Future prospects of MIT-MUT

The core development of MIT-MUT will be ongoing until autumn 2015. During this phase the target group (girls as well as teachers) will be strongly integrated in the iterative design process. At the end of 2015 MIT-MUT will be introduced and played in ten Austrian schools, followed by an evaluation process to gain insights into the actual impact of MIT-MUT.

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