PROJECT EQUAL-IST: GENDER EQUALITY IN INFORMATION SCIENCE AND TECHNOLOGY

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Abstract. Men dominate the ICT sector in Lithuania as well as all over the world. The demand for ICT and engineering professionals is so high that it cannot be fully satisfied. Therefore it is important to encourage women to choose their Career in ICT field and break the stereotypes that cause the low rate of women joining the field. The paper analyzes the issues that women face in Informatics Faculty of KTU. It was observed that women feel a lack of concern of their career path compared with their male colleagues and the challenge to plan their career while conciliating work and personal life. This article aims to conclude the action plan, taken under the EQUAL-IST Project, for Informatics Faculty of KTU to encourage women to choose a career in ICT.

Keywords: EQUAL-IST, ICT (information and communications technologies), stereotypes, gender equality, mentoring network, career planning

INTRODUCTION

Women face various problems that cause prevention from entering the ICT sector in Lithuania. Most of the issues are related to cultural views and the gender-based distribution of employment. These barriers create a massive gap between women and men working in the academic field of ICT.

There are even more significant gender differences in the fields of study chosen in higher education: in OECD countries, fewer than 1 in 3 engineering graduates and fewer than 1 in 5 computer science graduates are girls. This is likely because of stereotypes and expectations, rather than performance differences in math and science. For example, at age 15 far fewer girls (4.7%) than boys (18%)—even among the top performers—reported that they expect to have a career in engineering or computing.

In Lithuania, a distribution between men and women studying in the field of ICT is similar to the tendency all over the world. Taking into consideration all three levels of post-secondary education (vocational; college and university studies) the significant difference can be seen between boys and girls studying in the field of ICT and engineering. [1]. In the vocational level, only 2.6% of girls choose engineering or computing studies while 41.6% of boys consider it as their future profession. The similar situation is observed at the college level as well, where 1.6% of girls choose engineering studies while at the same time the percentage is 37.19% for boys. The situation is a little bit better at the university level, where 4.4% of girls and 30.3% of boys study engineering [1]. However, these numbers show the vast gap between the choices of girls and boys. The demand for ICT specialists is enormous, but there are not enough graduating students who could fulfill the demand of employers.

Taking it a little bit further, *even when girls do graduate from scientific fields of study, they are much less likely than boys to work as professionals in these areas, more often choosing become teachers. Data from a subset of OECD countries show that, among graduates with science degrees, 71% of men but only 43% of women work as professionals in physics, mathematics, and engineering. As a result, across OECD countries, only 13.7% of the inventors who filed patents are women* [2].

Informatics Faculty at the Kaunas University of Technology seeks to change the situation and encourage women to choose their Career in ICT field. In addition, it aims to break the stereotypes and eliminate obstacles that cause the low rate of women joining the ICT field.

1.1 THE EQUAL-IST PROJECT

The EQUAL-IST Project [3], [4] is a Project funded from the European Union's Horizon 2020 Research and Innovation Programme and aims at introducing structural changes to enhance **gender equality in Information Sciences and Technology (IST)** Research Institutions. The project aims to address ERA (European Research Area) objectives about gender equality by supporting seven Research Performing Organisations (RPOs) from Northern, Southern and Central European countries, as well as one CIS (Commonwealth of Independent States) country in **developing and implementing tailored Gender Equality Plans** (GEPs). All RPOs forming the EQUAL-IST project consortium has prepared (and currently are at the phase of implementation) GEPs, and they have also ensured the support in GEPs implementation from the respective highest management levels.

The project combines gender mainstreaming and decisive actions on three primary levels:
1. HR practices and management processes,
2. Student services and institutional communication,
3. Research design and delivery.

For addressing and solving issues of horizontal and vertical segregation in research and administrative careers, work-life balance, gender imbalance in student enrolment, and gender neutral/blind approach to IST research, the EQUAL-IST project aims at **influencing organizational structures, discourses, and behaviors**.

In addition, the EQUAL-IST project promotes a **participatory approach towards creation of gender equality policies**, ensuring at the same time the active dialogue with and involvement of decision-makers at the participating RPOs. Having already set up, the dedicated crowdsourcing online collaborative platform, the project supports both RPOs' initial internal assessment and the GEPs design process. The toolkits, guidelines, and methodologies developed during the EQUAL-IST project, as well as lessons learned, will be disseminated in Europe and other CIS countries.

The project aims at fostering permanent institutional changes through the design and implementation of Gender Equality Plans and is expected to have the following impact:
- Increase in the number of RPOs (Research Performing Organisations) and RFOs (Research Funding Organisations) implementing Gender Equality Plans.

- Contribute to the achievement of the ERA (European Research Area) objectives, by increasing in the long term the number of female researchers and, advancing their careers mobility, and, consequently, their research intensity.
- Provoke improvement in the social value of innovations by integrating the gender dimension in research programmes and content

1.2 GENDER EQUALITY PLAN BY KAUNAS UNIVERSITY OF TECHNOLOGY, INFORMATICS FACULTY

1.2.1 Current challenges

Factors that prevent women from choosing a career in ICT sector can be divided into three categories: cultural traditions and stereotypes; internal barriers; external barriers (see Table 1) [5]. Stereotypes cause a low rate of women interested in the ICT field. These stereotypes indicate that women are likely to stay at home after maternity leave and that men are better leaders than women. In addition, women are perceived in society as having "un-technical" mind and less talent for informatics and engineering. The sector is dominated by men; it is believed that women lack the knowledge necessary for the industry. At the same, time women are not perceived as capable of performing tasks which are mostly attributed to men. The "Old-boys' network" culture creates a work environment which is inconvenient for women (late work hours, club attendance, heavier workloads). ICT sector is characterized as a sector requiring fast adaption of skills, not having a stable workplace and a section in which the women role models are always absent. These requirements might be challenging for women to match [5].

Following a summary table of the problems that prevent women from entering the ICT sector:

TABLE 1. PROBLEMS THAT PREVENT WOMEN FROM ENTERING THE ICT SECTOR (EUROPEAN COMMISSION, 2013)

Problems that prevent women from entering the ICT sector	
Cultural traditions and stereotypes:	1. Cultural ideas about women's role in society
	2. Stereotypes around the sector
Internal barriers:	3. Reticence to talk openly about gender issues
	4. Lack of self-confidence
	5. Difficulties in negotiating in the sector
External barriers:	6. Strong male dominance and discrimination
	7. "Old-boys network" culture
	8. Complexity of conciliating personal and professional life
	9. Lack of models in the sector

Previously mentioned problems can also be identified in the Lithuanian example. The European Commission (2015) confirms that girls', gifted to science, vocational orientation is influenced by prevailing stereotypical attitudes in society. Girls do not have model roles of female scientists; thus, society does not encourage girls to choose a career of a scientist. In addition, girls do not see the profession of scientist to be attractive or prestigious [6].
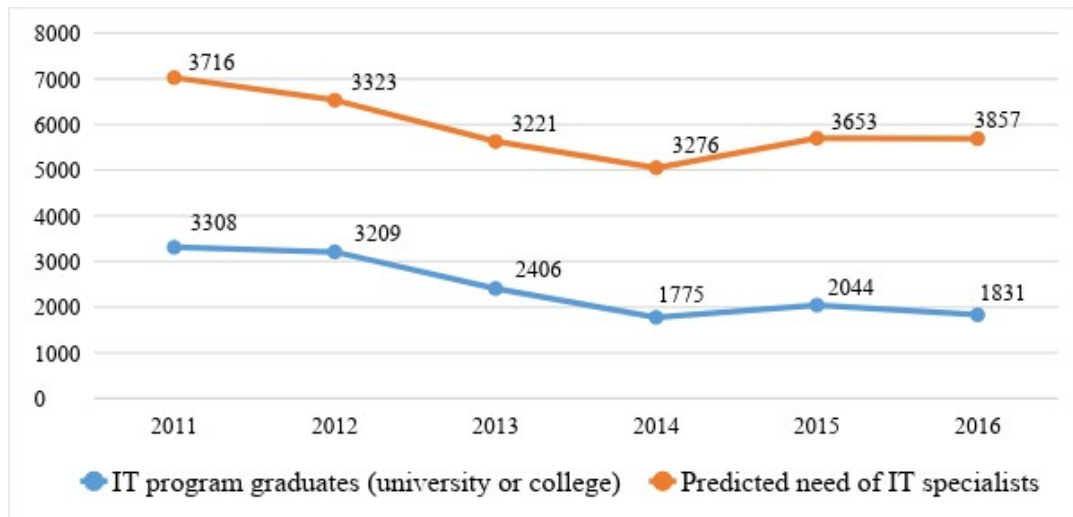

Figure 1. The supply and demand of IT professionals in the market of Lithuania. (Infobalt, 2011)

The growing demand for IT professionals requires a qualified labor force. Figure 1 presents a need for IT professionals (the predicted need is marked with red; the IT graduates marked in blue). However, a big part of students who choose ICT studies did not graduate (50% in university and 56% in college) [7].

In Europe, only 29 women out 1,000 acquire a Bachelor degree in ICT. In comparison, men acquire a Degree in ICT three times more (95 men out of 1,000 hold bachelor degree in ICT) than women. Likewise, it is important to mention that only 13,8% of women with bachelor degree work in ICT sector, compared to the 21,1% of men (5 times more), who work in ICT sector after gaining bachelor degree [5].

Furthermore, women manage about 19.2% of people working in the ICT sector while in other fields, women manage 45.2% employees [8]. Almost all over the world in the professional arena, women encounter more significant obstacles than men in holding positions of authority. [9, 8]. Lithuania, in this case, is not an exception. According to the survey represented by Zaleniene, Krinickiene, Tvaronaviciene and Lobacevskyte existence of unequal gender distribution in positions of authority in Lithuanian higher education universities system (the year 2013 and 2015) can be reaffirmed [10]. Women usually hold positions in lower administrative and research level contrary to the majority of men who usually dominate the higher levels [11]. A job in ICT field offers the possibility to have a flexible work schedule or opportunity to work from home. Despite various benefits that work in ICT field ensures, EU statistics show that women are outnumbered by men in advanced research degrees (Ph.D.) in computing and engineering

by 60% [12]. For this reason, it is essential to create an action plan that would encourage girls to choose technical and engineering sciences at school and later choose studies in the STEM.

1.2.2 Identifying challenges

The results of Gender Equality Audits have shown that the situation of Gender Equality in the Informatics Faculty of KTU is imbalanced and need serious improvements. Later actions on Crowd Equality Platform [13], where the ideas on how to improve the situation were described, presented and given for productive discussion which then ended with voting of the most promising initiatives for promoting gender equality and diversity. The voted ideas were introduced to the Leader Board of Informatics Faculty.

The meeting with HR Management group and Researchers showed that two challenges required much of attention. The first one was that women feel **a lack of concern of their career path compared with their male colleagues.** Since ICT is shown as a male field of activity, women are not supported sufficiently in their integration to the field and their academic activities. Those young women express a need to get some specific support from their older colleagues. Especially while they are facing difficulties in their career, or they have troubles with deciding the actions, that should be taken to improve their career paths. Another challenge arises when women face problems **while planning their career**. The meetings with HR management group and interviews showed that women feel a little bit confused about what they want to do with their career and how to plan it right. The main challenges of planning a career appear when they start planning a family or expecting a baby as these situations keep a woman away from her active career for a while. Also, women feel some boundaries and do not know how to overcome them (mostly it is related to limited career opportunities in the institution).

The primary two solutions identified during the meeting with focus groups, and the interview are: 1) a mentoring network for Women; 2) helping women to create their career roadmap.

These two solutions aim to help women integrate in a better way into ICT field and become more confident about their career path. Also, it will ensure the support for women who are facing difficulties in their professional path and encourage them to take action into their hands.

TABLE 2. CHALLENGES RELATED TO THE GENDER EQUALITY ISSUES IN THE UNIVERSITY

	Challenge Title	Objective(s) to address the Challenge
Challenge Main Area **HR and Management Practices**	Challenge 1 – Lack of support to female students at KTU to retain them into ICT academic careers	Objective 1 – Create mentoring Network for Women Ph.D. students at KTU
	Challenge 2 – Women struggle with creating a clear career vision	Objective 2 – help women to create their career Roadmap
	Challenge 3 – Women are not involved in decision making at the Faculty	Objective 3 - Involve women in organization decision-making process by supporting women leadership
Teaching and Students Services & Institutional Communication	Challenge 4 – The lack of visibility of women in IT	Objective 4 – Present more good practices of women working in IT
Other Gender Equality Issues	Challenge 5 - Lack of men involved in Gender Equality Actions	Objective 5 – Encourage men to stand for Gender Equality

A Gender Equality Plan was prepared as a result of prolonged and intensive discussions, extensive researches and analysis of data in need to create a plan that perfectly fits the situation of Informatics Faculty at KTU. The primary information for the discussions and research was taken from the Gender Equality Audits, which were carried out in 2016 due to the need to indicate the Gender Equality situation at Informatics Faculty at KTU.

The Kaunas University of Technology has identified five challenges related to the Gender Equality Issues in the University. The table below (see Table 2) presented the Area, Title and provided Objective of each of the Challenge.

The rationale behind the decision of focusing on the Challenges mentioned above lay on the situation in the Kaunas University of Technology and the strategic goals the University governing bodies have set in the current years. The past few years, the university has paid much of attention to the improvement of work conditions and environment for women and other-disadvantaged groups. The University also seeks to ensure equal rights for every staff member. The selected Challenges represent the main focal points of the organizational changes, and they are agreed on an organizational level.

Great attention while selecting challenges was paid to career paths, as University has included Career planning of the staff in its long-term plans. However, that Plan is not detailed, and there is no particular attention paid to Women and their specific Career Path including breaks. For this reason, it was decided to select the challenge and participate in creating a particular "Career Planning action for Women" to help them have a clear Plan of their Career with an Action Plan in case they have to take a Break in their Career as

well as lack of women in decision-making positions. An overall important outcome and goal of the current GEP are therefore related to mainstreaming a gender approach into a strategic HR policy at the University.

1.2.3 Gender equality strategy

To ensure support for women, who are facing difficulties in their professional path, and encourage them to take action to their hands, an action plan was designed. For each challenge identified, the aim was set, and specific corresponding actions were identified. The actions aimed to fulfill both: tangibility and intangibility. Also, the actions were designed to reach a broader target group; outside Informatics Faculty.

The challenges, as well as the identified solutions and the actions towards them, are extensively listed below:

1.2.4 Challenge 1: Lack of support to female students at KTU to retain them into ICT academic careers.

Target group: Junior researchers and Ph.D. students as mentees and full professors or associate professors as mentors.

Solution: A mentoring network for Women seeking to become academics (researchers) will be created. The two types of mentoring will be suggested: online mentoring where Ph.D. students will be able to contact their mentors through an online mentoring platform and face to face mentoring sessions when female Ph.D. students will be able to meet their mentors in person. The network will connect young female Ph.D. students with experienced female researchers due to create mentoring relationships and help to overcome difficult situations that may occur.

Action plan to solve the issue:

• Action 1 – Involvement of female students in scientific Researches (2017-07/2018-06);

• Action 2 – Involvement of female students in teaching assistance and informal education activities (2017-07/2018-05);

• Action 3 – Creation of Mentoring network of Research Professionals and Ph.D. students (2018-02/2019-06).

1.2.5 Challenge 2: Women struggle with creating a clear career vision.

Target group: Junior researchers, Ph.D. students, full professors or associate professors, administrative staff.

Solution: Helping Women working in the Informatics Faculty to create their Career Plans and provide Career Counseling services while forming and filling in the Plans will open the opportunities to evaluate and encourage women to reach for their Career Goals as well as have a clear image of what to do if an unexpected professional break will happen. The goal involves all kind of Career Planning actions: individualized Template of Career Plan, individual sessions with Career Counselor and annual overview sessions with peer staff members.

Action plan to solve the issue:

• Action 1 - Creation of a long-term Gender Sensitive Career Planning Template (2017-07/2017-12);

• Action 2 - Adaptation of the Career Planning Template according to the specifics of IT specialties (2018-01/2018-03);
• Action 3 - Individual Counselling and Monitoring to Women in designing their Career Plans (2018-03/2019-03).

1.2.6 Challenge 3: Women are not involved in decision making at the Faculty

Target group: Junior researchers and Ph.D. students and full professors or associate professors, administration staff.

Solution: to involve women decision-making process by supporting women leadership in the Faculty of Informatics. At least ten women working in the Informatics Faculty will be invited to participate and develop their leadership skills.

Action plan to solve the issue:
• Action 1 – A workshop on Leadership development for Women (2018-04/2018-05).

1.2.7 Challenge 4: The lack of visibility of women in IT

Target group: Female bachelor and master students, junior researchers and Ph.D. students, administrative staff.

Solution: It is important to present more good practices of women working in IT. 15 female Learners will get some knowledge in the three webinars about opportunities in the STEM as well as an extensive and detailed presentation of possible specialties. Also, they will hear what it is like to study IT and what issues female students faces during studies.

Action plan to solve the issue:
• Action 1 – A set of Webinars for Girls (2017-07/2018-04);
• Action 2 – An organizing a special session "Women in ICT" in International Conference on Advanced Learning Technologies (ALTA) (2017-07/2017-11);
• Action 3 – An organization of special session "Women in ICT" in International Conference on Information and Software Technologies (ICIST) (2018-09/2018-10);
• Action 4 – A creation of a social network for Women's Good Practice exchange (2017-09/2019-05).

1.2.8 Challenge 5: Lack of men involved in Gender Equality Actions

Target group: Junior researchers and Ph.D. students and full professors or associate professors, administrative staff.

Solution: To encourage men to stand up for Gender Equality. Men should feel responsible for changing the situation of gender inequality and fight for gender equality at work and home. Only the union of both genders can help to eliminate the gender inequality issue.

Action plan to solve the issue:
• Action 1 – A workshop with experienced professors for IF students on Gender Equality (2018-04/2018-05).

1.4 ACKNOWLEDGMENTS

time and shared numerous ideas while searching for ways to implement the best actions. Also, another valuable contribution was provided by the Informatics Faculty. Their insights in preparation of Gender Equality Plans's were instrumental and fruitful. Moreover, the time and thoughts of the Leading Board of the Informatics Faculty members (Dean of Informatics Faculty, Vice-dean for Science Affairs of Informatics Faculty and Administration Staff), on possible solutions and actions on the Faculty level has not only to be noted but underlined.

CONCLUSION

After discussions, research and Gender Equality Audits at Kaunas University of technology, two main problems that women face in ICT field in Informatics Faculty at the Kaunas University of Technology were identified. To eliminate those gender equality issues, an action plan which aimed to fulfill both: tangibility and intangibility, was concluded. In addition, the actions are designed to reach a broader target group outside the Informatics Faculty.

The action plan corresponds to the identified challenges for women in ICT sector. Five solutions were put forward. To eliminate lack of support to female students at KTU and to retain them into ICT academic careers, it is needed to create mentoring Network for Women Ph.D. students at KTU. Women have to get help in building their career Roadmap to abolish struggle in establishing a clear career vision. Women are not involved in decision making at the Faculty, therefore, it was suggested to include them in the organizational decision-making process by supporting women leadership. In order to repel the lack of visibility of women in IT, it is needed to present more good practices of them working in IT. Finally, men should be involved in Gender Equality actions to make the real impact on the environment at University.

The EQUAL-IST Project has already been and will continue to be, even after its completion, the key factor that will lead not only to the achievement of the above goals but will also successfully improve the social value of innovations by integrating the gender dimension in research programmes and to the society as well.

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PROJEKTAS EQUAL-IST: LYČIŲ LYGYBĖ INFORMACINIŲ TECHNOLOGIJŲ MOKSLUOSE

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Vyrai dominuoja IKT sektoriuje Lietuvoje ir visame pasaulyje. IKT ir inžinierių profesionalų paklausa yra tokia didelė, kad ji negali būti visiškai patenkinta. Todėl svarbu paskatinti moteris pasirinkti savo karjerą IKT srityje ir nutraukti stereotipus, dėl kurių mažai moterų prisijungia prie šios srities. Straipsnyje nagrinėjamos moterų problemos KTU Informatikos fakultete. Pastebėta, kad moterys yra labiau susirūpinusios dėl savo karjeros kelio, palyginti su kolegomis vyrais, ir iššūkiu planuoti savo karjerą derinant darbą ir asmeninį gyvenimą. Šio straipsnio tikslas - sudaryti KTU Informatikos fakulteto veiksmų planą, kurio imamasi pagal EQUAL-IST projektą, kad paskatintų moteris pasirinkti IKT karjerą.