“TEACHING YOUNG WOMEN IN THE WORLD OF TECHNOLOGY – HUNGARIAN-ICELAND COOPERATION” PROJECT SUMMARY

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ABSTRACT

This study is a brief summary of the project "Young Women's Education in the Technology World - Hungarian-Icelandic Co-operation", guides through the objectives of the project in different segments of the implementation. As such, it differs from traditional forms of studies based on statistics, however it may be timely and useful in its topic. The Hungarian Skool2 and the Icelandic Códer civil society in the study support girls and young women in technology studies and career building. Their aim is to provide technical training, knowledge, skills development and support, which narrows the gap between girls and boys generated by gender stereotypes, which also appears in technology education. At the same time, instead of knowledge and teacher-centered learning, they favor student activity, discovery learning and sence of achievement methods. This was supported by Óbuda University Center for Engineering Education. Óbuda University was involved in the project as a Project Partner, dedicating a teacher expert who participated in the study trip, reviewed the teacher training material and produced a professional summary and publication (represented by the author of this study.)

KEYWORDS

Technological education, girl’, young women’s education, gender stereotypes

1. INTRODUCTION

The importance of technological knowledge is becoming more and more emphasized in all segments of the world of education. Related studies pointed out many years ago that one of the main tasks of education is to prepare participants to get used to technology in the world of technology and to provide a learning environment that is adapted to the needs of the Y and Z generation. According to Aarsand, "Digital chasm is a space where generations can meet and do something together." (Aarsand, 2007, 14.)

Literature speaks about digital natives and immigrants. The former is the generation of people who have been in the vicinity of the digital and communication devices, such as computers, MP3 players, iPods, and mobile phones since their early childhood, and handling with them does not cause any trouble for them. In fact, they deftly use them and have interest and also a need to apply them in their own learning and during daily activities. (Prensky, 2011)

This provokes teacher to feel antipathy and distrust toward school-related activities, as they cannot influence them, and they cannot fully know about the gained information and can not consider them. This is also important because of the Netgeneration research in 2010 (White, 2010) does not justify children's high-level digital usage and their ability to use the tools consciously. As a facilitator and mentor, the teacher can also participate in the process, since the teaching of digital literacy, the analysis and interpretation of information and resources remains the responsibility of the school.

An additional identified feature of the digital generation is that it is capable of multi-channel communication. This ability makes them suitable for the various cooperative and collaborative social. According to the study by János Ollé (Ollé, 2011), digital citizenship is one of the tendencies of participating in online society, as Internet use is based on information literacy, which is also an integral part of offline society, in terms of economic opportunities, the civil sphere and due to the possibility of participation in

political public sphere. In this sense, this approach is an extension of traditional citizenship to the digital world. However, this approach makes daily Internet access to be principal, so those offline citizens with different internet access have unequal chances. Therefore the digital chasm, resulting form it does not only generate interpretations, but it can also be interpreted as a consequence of social differences. In bridging the digital chasm, public education play a major role, as it must also provide students with active use while providing accessibility, helping them to successfully enter the workforce.

At the same time, women in this area are underrepresented even during the study period. The efforts of the EU *Digital Jobs* and the *Girls in ICT* initiative also point out that most of the employees of the next few years will be absorbed by IT-related areas. *Girls in ICT* is the global effort of the International Telecommunication Union (ITU) to encourage women to pursue IT and engineering, thus helping to achieve gender equality.

Most development programs aim basic education, but support of those who want to learn further is emerging. (UNICEF 2003; UNESCO EFA 2015)

Even in developing countries such as Tanzania, special attention is paid to increase the equal opportunities of girls in their level of technological knowledge. I saw one of this example years ago in a language educational training center of a small town in Kilimanjaro and during my fieldworks, I was convinced that the integrating "ICT" is in progress, I met the "International Girls ICT Day" program in Dar es Salaam organized by the government and the UNESCO. (UNESCO, Tanzania, 2014)

The Hungarian and Icelandic Skool Kóder NGOs set out similar goals and started its implementation actively.

The University of Óbuda participated as a partner in the project "Teaching Young Women in the World Of Technology - Cooperation between Hungary and Iceland".

2. BODY OF PAPER

2.1 Data collection, background of methodology

My task in the projekt was to look through the training materials and do revision, to participate in the study trip and to make this study and publish it. I was watching the pedagogical, educational side with the eye of the educational expert.

For collecting information I mainly used the observation method, but I didnt only use passive observation but I actually took part in activities, I used the participant observation methhod which was easy with the programs and the friendly personality of the participants.

This made it easier to not only to observe and get information but to be a colleague and be part of it but still staying objective. It was similar to my previous field works where I have been working with the method of cultural antropology and took part in activities, but the field work itself was shorter this time.

In antropology you stay at one field work for a longer time, so the locals start trusting you and its natural for the locals that you are living among them, this time was a bit different, but becasue they tried to get me participate trust was not an issue.

My other method was interviewing which I used in two cases. First with the teachers of a primary school then with two professors from Rejkyavik Technical College.

2.2 The goal-system of the projekt

With the foundation of EGT and the Norvegian Bases the Hungarian-Icelandic co-operation was established- the so called education of young women in the technical world. The long term goal of this projekt is to encourage women to be involved into technical world and to help the teachers and educational professionals to improve their educational materials in these subjects, also to build their experience into their own work and to increase knowledge.

Another important goal of the co-operation is to involve partners who has the same priorities in encouraging young women to participate in technologial studies and to improve the current connections.
The not so long-term plan of the projekt is to build the future tasks on colourful experiences and the educational methods of the two countires so useful decicions can be made.
Its a very important goal that the Association of Technical Education makes a good partner relationship with foreign partners, institutes and schools, so it can help in the future to share experience and knowledge.
A very highlighted goal is the pedagocical developement of the programs based on 21th century education and expectations.
The short- term goal of the projekt was to be efficient, participate in the programs and at meetings and share information.

2.3 Applicational partners

2.3.1 The Technology Education Foundation and Skool

Skool is the flagship project of Technology in Education Foundation, a Hungarian, independent nonprofit organization, started the programs in 2014. They offer various free programs to girls aged between 8 and 18. The main goal is to help them to get familiar with technical subjects and feel comfortable in technical world and to beat the stereotypes about women in tech world. They already have 1500 participants from 136 cities, participate in 10 weeks courses, summer camps or competition preparations.
Previous experience or knowledge is not needed to participate so its opened for everyone. These programs give basic education which can be used immediately and give strenght to girls in believing themselves and that they can have a future career in technological areas if they choose to.
The mission is to end the difference between genders in studying and it also adds to the development of social responsibility of Hungarian tech companies.
To put this into reality its very important that the education is based on projekts and experimental lessons and pedagogical side takes a big part.
The number of their volunteers is reaching 430 and more than 25 partners helped their work so far. Skool is experienced in working with international partners.

2.3.2 Trefort Ágoston Engineer -Pedagogical Centre (TMPK)

Óbuda University, with a history spanning over three centuries, is a modern, continuously developing institution that is beyond a traditional university. Our practice-oriented, high-quality BSc, MSc, and Ph.D. courses are delivered through innovative teaching methods, focus on the real needs of the economy, and allow for research, development, and innovation that is recognized worldwide. The mission is to educate the engineers and managers of the future that will serve science and the global community by developing and transferring knowledge at high standards.
TMPK is an indepentent part of Unversity of Óbuda, focused on teacher education. Engineer-pedagogical education is provided for every student at University of Óbuda. The goal of the Centre is to educate engineer-teachers and engineers to be great professionals.
It provides courses not only for full-time students but for those who already teach and have their qualifications. There is engineer educational training and also for those who already has their dipomas there is opportunity to get a higher level certificate and also, for any teachers from any areas there is an option to take part in postgraduate trainings.
One of the most important tasks is to help teachers and future teachers in self-developement, improving their knowledge and being able to renew as a teacher from time to time.
The main part of the trainigns are the methological cultural improvement, the digital educational material improvement and the online programs.
The trainings provide the essential knowlede in pedagogy and psychology, the base of these are pedagogical subjects taught by professionals.

2.3.3 Kóder

Kóder is one of the Icelandic partners which, similar to Skool tries to beat the limitations in IT and other technical areas so that women and children can get education without stereotypes.
Kóder was founded in February 2016. Its main goal is to give all children the opportunity to learn programming and creative problem solving regardless of class, gender or any other stereotypes. So far they have held classes for over 1000 students and built partnerships with libraries and schools in the capital area. Its end goal is to have programming put into the national elementary school curriculum.
They take on this issue by offering girl-only courses whenever possible as well as encouraging girls especially to participate in our courses. Kóder intended to show Skool how to build relationships with libraries in Hungary as well as share with them all the curriculum we've built for Raspberry Pi. This cooperation will allow both organizations to strengthen their position in each of their's local community.

Kóder has 5 well-defined goals
1.Knowledge in the area of technology and programming
2. Improving opportunities
3. Decreasing the limitations in studies and availbility of these subjects to make it equally reachable for everyone
4. Establish programming trainings in all Icelandic schools
5. Increasing the peresence of women in these areas

Besides their own trainings Kóder is co-operating with libraries and other schools.

2.3.4 Reykjavik Technical College

Reykjavík Technical College was established in 2002 after a merger between the countries two largest vocational colleges. Since then, the college has strived to bring innovation to the educational sector by offering fantastic opportunities in academic education for students on vocational tracks. Now, all students on vocational tracks are able to matriculate by adding only an extra semester or two to their studies.
Reykjavík Technical College is currently the largest teaching institution in Iceland, with over 2500 students and approximately 250 employees. The College is one of very few privately run teaching institutions in Iceland. This allows the college to experiment at a faster rate and to try out new and interesting ideas the goverment would otherwise not fund. Reykjavík Technical College is very dedicated to bringing more women into vocational fields. Most recently they ran a nation-wide ad campaign titled #KVENNASTARF which focused on interviewing women in fields dominated by men for them to share their experience in order to encourage more young girls to try their hand at vocational training.
The College is involved in the project as a donor country Project Partner, dedicating one teacher expert who will participate in the study trip and review the teacher training material.
During the project our partner was the informatical technology school inside of the institute where students can learn media and computer science.
During my field work I had a chance to meet two teachers and my conversation with them helped me to undertsand the difficulties and I got answers for my methodologycal questions.

2.4 The experience of project implementing

2.4.1 Revision of training material

Skool has its own methodological training which prepares the trainers fro the full day programs and gives further suggestions for the projekts.
I looked through this program and i could see it in practice so it was easier to undertsand it all in all.
It can be seen immediately that they are punctual ad detail orientated. The summery below shows pedagogical, educational, didactical perceptions and some suggestions.
The training material is structured, but with some more ideas and extra observations can be even more useful.
Structure

build-up: morning and afternoon units, usually 15 minutes or longer of explanation with details. It explains some of the units step by step starting from the planned starting time. Every step is connected to an exact time which is essential to be efficiently prepared.

Content
A logically built-up, informative plan. First part contains the morning preparation next one is the afternoon one with scratch learning steps.
Introduction is obviously necesssary and so is the getting to know each other games after that.
The advantage of the game is that its connected to the main goal and theme but by being attached to personal information.
Maybe at this point its useful to think through wether its really necessary that all participants talk to each other as the number of the students in the group can be large so it could take a big amount of time and maybe a shorter introduction would also make the same positive results.

After the game we could give the children the opportunity to use their own opinion and words to introduce the trainings instead of pre-written sentences about them, which can also give positive feedback, for example, „today you all have the opportunity to participate in and lead this great one day event".

The next unit contains the basics of Skool trainings (general and methodological mixed together) that also helps interaction and creating a good vibes.
They are makig small groups after this, but the way of making groups is not determined. Although making groups based on symphaty can be good it can also be a bit confusing between participants who have never met. If the trainer puts the groups together thats a contradiction to the platform of the methods so maybe co-ordinated, co-operativ way can be the solution.

Whats also drew my attenton is that the self-motivating sentences like „be yourself"… can be very good but if its too much they can confuse the students and also the age gap and how to call each other is a question.
The tasks and the connections between the tasks and the steps are not cler enough and thats vey important to be clear in pedagocical structures also for the particpants and for those who observe.

The knowledge of important concepts an principles are important, becasue bringing any knowledge to the surface is essential.
Talking and putting old and new concepts together is very useful in teaching so its good to have questions to start a conversation: What do you think what does it men, Have you heard about it, How would you explain it, What does it remind you of, What can you relate it to?

The knowledge of students can be various so it can be useful to give different explanations from different perspectives. Moderating and keeping some rules is a part of it that contains useful advices and directions. Higly important that it also talks about children with special needs and gender specific stereotypes.
The second part, which is the afternoon part is similar but the program is the middle of attention here. The teaching and learning of Scratch shows very useful instructions. The method is direct here most of the times and the description is detailed and clear. It says one sentence about ending the day.

Methodological elements
Its pedagocically valuable that new forms of teaching methods appear from time to time. It can be seen that it doesnt sympatise with direct teaching and direct and indirect form is also present.
Being a unit or different has the same value becasue it all depends on the average content.
In this program mentors give one by one help to the participants so it doesnt matter what level the students have and on the other hand students can also keep their unique perception.
One more important thing I noticed: Its very useful to give feedback and it could be in the system to build-in how and when it is the most useful.

Overall the training material is a two sided mixed document: a conceptioanl basic document where we can see the trainig materials and the detailed lesson plans. Its a description with writings about the projekts, lessons, tasks and some illustrations.

The materials help in learning, they are efficient, they give the opportunity of asking questions.
To be more professional we can add a few more suggestions:
1. Introduction part which contains
-target and goals
-educational goals, how it connects to learning in school, personal learning, what is the main focus on talent/knowledge-improvement

2. A detailed program could be made. Being punctual about who is doing what and when, with which method and equipment. Time-method-activity-equipment and instructions at the end. The form of a detailed program could be tabulation. Clarify the process of activity (when, who, what is it doing, what role it is - a trainee, a student participant, etc.), what tools are needed, and what is the most important form of work. (The origin of materials, how does it come together, what are the goals, methods and equipments to reach the goals?)

2.4.2 One day Scratch program at Skool

The day of the this program is probably the most determinded day for everyone with lots of experience and learning.
The trip of the Icelandic partners to Budapest was a very important event when they held a day at one of Skool"s partners where the girls coded together with the tech developers of the company and they could have a glimpse of their every day work and they also had lunch together and shared intereseting experiences and had atour in the office. The goal of the program was succesful, which was to encourage women to step into tech world.
They could see the equipments, the working area and the process of working.
All in all ithink it was the most succesful part of the program, the girls aged 10-11 had a great time and altough they were tired at the end of the day, they were very proud of their achievemetns.

2.4.3 The visit of Icelandic partners in Budapest

They visited Budapest between the 25th to the 30th of January. The program had different parts: sharing general and professional experience, getting to know personal conditions and volunteering system, participate in one Scratch course, sharing opinions.

Sharing experiences
It took part in Skool in a friendly athmosphere. The Hungarian partner shared their experience, thoughts, methods and questions which the Icelandic parner could react fro during the conversation and after.
The meeting had different stages
The backround of Skool and its goals: Its obvious that there is a big difference in between girls and boys in STEM which is caused by cultural backround, growing up and the stereotypes.
To have more girls working in STEM area its essential to develop their self-confidence and motivate them.
Challenges: Expectations of parents, stereotypes, gender based judement of teachers
An average school environment usually doesnt improve creativity and personal improvement and so it can be a challenge during a Skool training. The goal of Skool is improving creativity and free thinking.
Educational basics: To be efficent and give enough encouragement projekt-based education is needed, so the girls can epxerience and ask questions and be their creative selves. The trainer is not an average instructor but a partner and an equal person who is there to help. There is no competition its all about individuality.
Environment: Calm, friendly, safe, free, comfortable. Equipmnets are there, students can move, talk and co-operate.
Ice-breaking tasks:There are always games to help getting to know each other and to decrease the tension at he start
Communication standards: No gender stereotypes, decisions made by involving participants,no hierarchy, positive feedback.
Mentors: Their presence is necessary. They help everyone, find mistakes, let the instructors know if the process need to be faster or slower, they picture the future tech career opportunities.

Variousity: Students with special needs such as dislexia, discalculia, asperger syndrome get special help from the mentors and they treat them equally as anyone else.

2.4.4 The filed work of Hungarian partners on Iceland

The filed work took part from the 1st to the 5th of February, 2018.
The summary of the program:

- Meetings every day focused on experiences
- Participate with Kóder at UTMessan event, getting a glimpse of their work and teir marketing strategy
- Visiting Reykjavik Tehcnology College and interviewing two teachers
- Visiting a partner primary school (Hólabrekkuskóli) where tehy do special developing work. Interview with two teachers and the visit of some school projekts.
- Visiting library trainings

Interviews with teachers in primary school
There are four pillars of Icelandic education. Kindergarden is until the age of 6, from the age of 6 to 16 elemtary scool which is obliged, from 16-20 they can continue upper secondary education, the fourth level is after secondary education, University or College.

During our field work we visited a 10 grade institute and their school projekts. According to my plans i would have made an interview with a Dannish teacher but the situation brougth another teacher who teaches creative classes from drama to jewellary making.
I got to know that although programming is not part of the subjects if a teacher wants some changes they can achieve change. Materials are a challenge but having a co-operatin with Kóder they started a programming training from the first to the 8th grade.
In this school they make it very important that sudents can use their knowledge so they can use it in practice and be creative. They believe in „learning by doing"method, so they can learn through their mistakes and try and try again until they succeed.
Its going to be especially important ot Y and Z generation becasue their work in the futre is not known yet.
Independence and improvement is a very important part of the future generation.
Although programming is not an obligatory subject the school has a goal of making it necessary including all the equipments with it.
Kóder is a big help for them with programming. As teachers cant always use IKT eqipmnets they built-in the peer – learning system which means the students get information from each other and not only from the teachers, so basically students educate each other too.
There a re always a few students who have deeper technical knowledge so they hold special trainigs for them with IKT equipments so the teachers can learn something new too and the students can share their knwoledge with the classmates.

Interview with two teachers at Reykjavik Technical College
The method was the mentioned structured interview which became untrsuctred in quite a short ime. I had a paper full of questions but the situation brought more communications instead of filling out the question form. Because of this interview the conversation was flexible and the infromation was all trustable.

One of the teachers has qualified in Computer Science and teaches differrent subjects like computer science, computer architecture, system administration, computer networks. He tries to keep the same level of process in all his classes but it also depends on the trainig materials so he finds creative ways and he has a routine in preparing for the classes from his experiences.

The other teacher has a BA degree too and teaches web development, data bases, programming. The big challenge for him is to ready for the daily changes of technology. According to him is important to be creative as a teacher and listen to the reaction of the students and find different ways of teaching.

Both of them told me that during their two years of specific training they had learnt subjects like mother language, foreign language, socail studies, pedagogical planning, education. The focus was not on learnig the practical part so they were not be preaperd to teach in practice. It would be useful to have trainings which are focused on practise and help to preapere for teaching classes. Hungarian teachers have the same problems.
They find the teaching materials difficult and most of the times they develop their skills on their own and find new ways by being creative. It could help to have trainings for teachers helping with communicatin with students at different age groups etc..
The other problem they told me is that there isnt enough teachers in IT which makes it hard for the students to study related subjects and they can only go to 5 years of training.

They told me about the Icelandic school, that only those students go there who knows exactly that they want to study in tech field and some of them knows at the age of 16 what they want to study in the future. Of course there is alwas some students there too, who chages their kinds but all in all thse who stay are succesful.
The teachers said its easier for them too because it rarely happens that the students ar not interested in the lessons, becasue they are there for a reason, but besides that teachers could use more pedagogical infromation at trainings.

In this College the amount of girls who study these subject are not so high.They try to get their attention and encourage them to choose these subjects and they go to primray schools to advertise. They dont make any gender specific difference between girls and boys in Ieland so the reason for the small amount of girls sudying tech is not in gender sterotypes.
I asked them what they think about the peer-learning method in secondary school and they both agreed that its a great invention and it can be very useful.
The conclusion of the interview is that they think it would be great to renew the methods an some of the materials and also to focus on teachers too, becasue they have to learn and know new things all the time and its not so easy on them.

3. CONCLUSION

The goal was to establish a partner-relationship which allowed us to share experience and trainig materials. The results below show that the achievement of the goals is on the way and can help the future of both partners. Results:

- The improvement of the knowledge and competence of participants
- Stable, long-term partnership and the developement of professional co-operation.
- Innovative elements in professional programs: adaptation of educational elements from foreign experiences and suggestions.
- Finding the areas that needs further improvement according to experiences and feedback

- Pedagogical changes might be needed (materials, methods, practice)
- The professional attitude of University of Óbuda an dReykjavik Technical College and the future co-operation and further partner relations
- The comparison of educations systems, suggestions of how to prepare teachears to have the similar attitude as the projekt partners and how to develop useful co-working projekts for all partners.

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