

Topic: *Has there been any progress towards gender balance?*

Keywords: technology, education, school, gender, divide, Russia

Women in Technological Society: a Challenge to the Modern School

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Introduction

The theme of women in technology is very important for Russia because of economical and demographical reasons. Population of Russia decreases from year to year. For country in transition with annual growth of GDP around 7% it results in the lack of workforce on the labour market. According to the Federal State Statistics Service of the Russian Federation the level of unemployment at the end of February 2005 was 8.8% of employable citizens (applying the ILO method of calculation). In mega polis like Moscow, St Petersburg, Yekaterinburg the level of unemployment is less than 1%. Such low level of unemployment in fact means lack of qualified personnel. In compliance with state statistic data women in Russia have higher than men level of education, but due to cultural perceptions women are not hired if the professional activity involves technology. It is believed that men can cope with technology much better than women. The changing of this misconception will help to fill up the lack of qualified personnel in technology applied areas

More over, women in 21st century, still face a number of limitations and restrictions in the labour markets of many countries.

Meanwhile, as experience of developed countries shows the new knowledge economy has created new possibilities for female employment. According to the survey “Women in the New Economy: Insights and Realities” (Gewirtz and Lindsey 2000) “women believe they are thriving and faring much better than in the old economy companies”. But these hopes do not always transform into reality: “The good news is that women have made great strides in education and the work force. The bad news is that the new high-tech economy is leaving women behind” (Smyth 2003). It is obvious that women face specific obstacles making their way in new hi-tech professions. To limit the subject of this paper we grouped these obstacles into two large clusters:

- a) *social*, which aren't the subject of this paper;
- b) *professional*, the causes of which goes back mainly to primary and secondary school .

There are few research and projects dealing with the problem of gender differences in teaching and learning science and technology carried out mainly in US and Israeli schools (Avery 2002, Cody 2001, Eisenberg 2002, Gondek 2000). But social conditions and philosophy of educational system in Russia differ much from those in US and Israel and there is a strong need to research the problem of “gender divide” in technology education in Russia.

Why do we focus on *technology* education? We believe that Technology education is a bridge between traditional academic education and real life and can also be a tool to overcome “technology divide” between male and female students in education and then between men and women in new economy. But sometimes as experience highlights this statement proves to be wrong.

As a school discipline Technology became a compulsory part of the National Curriculum in Russia in 1993. In 2004-2005 academic year school students of 1-8 grades have an average of 1-2 hours of Technology class per week. There is a possibility to take Technology as electives in grades 9, 10,

11. Most Russian schools have different Technology syllabi and different classrooms for girls and boys. Boys usually are trained for the career in engineering and industry and girls in house keeping. Thus, the technology divide emerges at school.

Aiming to introduce a technological literacy approach, ORT - one of the largest non-governmental education and training organisations in the world, founded in 1880 in Russia - launched its Technology for All (TfA) project in Russia, Ukraine and Moldova in 1998. Gender equality is one of the basic ORT's approaches to Technology education. Boys and girls must have equal opportunity to study Technology courses that is why they are placed in the same classroom.

After 6 years of project implementation we've realized: to ignore a gender problem does not mean to solve a problem. Girls and boys appeared to have more differences in learning styles, perception and knowledge acquisition. If we really want to improve the situation and give all students equal opportunities to acquire comprehensive Technology education we need to find out what differences affect the quality of Technology education, what kind of learning material and specific instructions are needed to overcome the situation. To develop the solution we need to analyse the current situation.

The objective of the paper is to describe primary results of our research of the gender equality problem in technology education in Russia and tentative ideas on how to improve situation.

To analyse the problem from different points of view ORT-Russia Research and Development Department carried out the research which includes:

- Opinion polling of teachers and educators in Russia and several foreign countries.
- Interviewing students in ORT schools.
- Analysis of students' academic achievements.

1. Opinion polling of teachers and educators in Russia and several foreign countries

33 teachers and educators from the countries of the former Soviet Union - FSU (ORT schools in Byelorussia, Latvia, Moldova, Russia and Ukraine) and 6 from Australia, England, Israel, Netherlands, Scotland and South Africa) answered our questions relate to 2 school subjects (subject areas):

- **Technology** (“Design and Technology”, “Science and Technology”, “Labour Education”, “Industrial Arts”, etc).
- **ICT** (“Information & Communication Technologies”, “Informatics”, “Programming”, “Computer Science”, etc).

17 questions (see appendix 1) were grouped as following:

- **Problem recognition**
- **Current situation in the country**
- **Would this help girls be more competent in the subject?**

For summary of the answers see appendix 2. Some conclusions.

- **Problem recognition.**
 - The gender equality problem is more vivid for Technology courses rather than for ICT.
 - Teachers and educators from the countries of the former Soviet Union (FSU) see fewer problems than their colleagues in Europe, Africa and Australia.
 - Most teachers and educators acknowledge barriers that prevent women from pursuing and entering technology-related fields, but most Russian (FSU) teachers think these barriers do not apply to school.

- **Current situation in the country**
 - There is no difference in teaching ICT to boys and girls
 - There is a difference in teaching boys and girls technology in Russia and other countries of the FSU.
- **Would this help girls be more competent in the subject?**

There is no universal remedy for the gender equality problem, but most teachers expect a lot from new educational student-centred technologies like cooperative learning etc. Most teachers admit importance of the “human dimensions of technology”.

James Pitt (England) wrote in his answer: “A gender-neutral curriculum – that is equally attractive to girls and boys – can be achieved through focusing on the human dimensions of technology. This appeals to girls without putting off the boys. If the teacher focuses on how things work or the technical side, rather than why people / society needs them, there is a danger that it will not capture the girls’ interest”. This answer fully complies with the research (Nair, Hanson and Reidy 2003) which showed that “women learn more effectively when they can connect what they are learning to their own lives and real-world situations”. This observation can be essential for change of teaching technology in mixed classes.

2. Interviewing of students in ORT schools

In 2003-2004 academic year 1272 students from ORT schools in Byelorussia, Moldova, Russia and Ukraine aged 11 – 17 were asked to answer questions concerning Science and Technology, current interests and plans for their future employment. We used the same questionnaire as in 1998 (Gorinskiy, 2003). For the number of students interviewed see table below.

Table

Grade	Boys	Girls	Total
5	98	81	179
6	106	115	221
7	77	87	164
8	92	116	208
9	83	84	167
10	74	110	184
11	64	85	149
Total	594	678	1272

Analysing data received we tried to understand in the answers to what questions the difference between boys and girls attitude to Technology and ICT appears.

- We tried to “measure” pupils’ attitudes toward Technology as to a school subject and suggested five possible answers from “it’s not interesting to me” (1 point) to “I have a strong desire to study Technology” (5 points). Boys and girls show approximately the same attitude to Technology (3.1 and 2.9).
- Both boys and girls mentioned computer as principal hobby, but there is an evident difference between percents of students who rated computer the first place: 77% of boys and 43% of girls.
- More boys than girls have computers at home: 77% against 67%.
- More boys than girls are major computer users in family: 86% against 67%.
- More boys than girls think about future career in ICT: 32% against 6%.
- Less boys than girls think about future career in design and architecture: 10% against 21%.

3. Analysis of students achievements

The research lightened up an interesting controversy fact: female students of junior middle school get higher points for Technology and Science disciplines but hardly a few girls choose these courses as majors for their future careers.

Most of the academic courses in Russian schools are compulsory. All school students have to take all subjects prescribed by National Curriculum which in fact just several years ago prescribed to teach Technology differently to boys and girls according to different syllabi and in separate groups. In contrast to ordinary Russian schools in ORT schools female and male students are not separated and have the same syllabi for Technology courses. ORT promotes the idea that boys and girls should have equal opportunities to study Technology, thus they shouldn't be separated. But there should be learning and teaching materials and learning environment in general developed that would be interesting and motivating for both groups.

In spite of higher academic achievements very few female students participate in prestigious City, Regional or National Competitions on ICT, Math and Science which are not compulsory. It proves that girls do not have motivation or interest in these disciplines, do not choose careers that require competence in these areas, though they do well in these courses if it is required.

It is interesting that because of official policy of segregation in Technology education there are 2 different competitions in Technology for boys and girls in Russia.

The research has also discovered that that there are no or next to no winners of ICT and Science contests among female students.

The data collected during the research gave grounds to conclude that most of the technology courses, textbooks, tasks, quests/contests and are male oriented. All of them are talking about engines, mechanisms, devices that mainly boys are interested in.

Summary

1. According to the research the female students' academic achievements in technology related subjects (as well as in science) are higher than of the boys.
2. At the same time girls pay less attention to technology out of school and don't see connection between technology and their future career. They aim more to attain better grades at school rather than to develop their technological capabilities.
3. To increase girl's positive attitude to technology we have to:
 - a. Increase human dimensions of technology lessons at school.
 - b. Change assessment system to motivate students to develop technological capabilities.
 - c. Pay more attention to after class activity in Technology applied areas.

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Appendix 1

Questionnaire

Problem recognition

- 1) Do you agree with the statement: “Men and women are equally represented in modern technology in my country”? (Yes/No)
- 2) Do you agree with the statement: “There are barriers that prevent women from pursuing and entering technology-related fields”? (Yes/No)
- 3) Do you agree with the statement: “Girls and boys are equally prepared at school to use technology in their future careers”? (Yes/No)
- 4) Do you agree with the statement: “There is a gender equity problem in technology lessons at school”? (Yes/No)

Current situation in your country

- 5) What are the titles of the subjects related to Technology and ICT in your country’s national school curriculum?
- 6) At what age students begin to study these subjects in school?
- 7) At what age do students finish their study of these subjects in school?
- 8) Do boys and girls study the subject using the same curriculum? (Yes/No)
- 9) Do boys and girls study these subjects together in one classroom? (Yes/No)
- 10) Do teachers use the same teaching methods for boys and girls? (Yes/No)

11) Do girls have possibility to study this subject additionally and separately from boys?

(Yes/No)

Your opinion: Would this help girls be more competent in the subject?

12) Different curricula for girls and boys (Yes/No)

13) Separate classes for girls and boys (Yes/No)

14) Different teaching methods for girls and boys (Yes/No)

15) Different examples from real life for girls and boys (Yes/No)

16) Additional possibilities for girls to study technology, girls' clubs, etc (Yes/No)

17) Mixed classes for boys and girls in small groups, cooperative\collaborative learning

(Yes/No)

Appendix 2

Analysis of the answers		Russia (FSU)	Foreign
Number of responses		33	6
Technology			
<i>Problem recognition</i>			
1	Men and women are equally represented in modern technology in my country.	33%	0%
2	There are barriers that prevent women from pursuing and entering technology-related fields.	62%	83%
3	Girls and boys are equally prepared at school to use technology in their future careers.	81%	17%
4	There is a gender equity problem in technology lessons at school.	11%	67%
<i>Current situation in the country</i>			
8	Boys and girls study the subject using the same curriculum.	81%	100%
9	Boys and girls study these subjects together in one classroom.	81%	100%
10	Teachers use the same teaching methods for boys and girls.	85%	100%

11	Girls have possibility to study this subject additionally and separately from boys.	36%	17%
<i>Would this help girls be more competent in the subject?</i>			
12	Different curricula for girls and boys.	35%	0%
13	Separate classes for girls and boys.	27%	50%
14	Different teaching methods for girls and boys.	48%	30%
15	Different examples from real life for girls and boys.	79%	20%
16	Additional possibilities for girls to study technology, girls' clubs, etc.	76%	83%
17	Mixed classes for boys and girls in small groups, cooperative\collaborative learning	92%	83%
ICT			
<i>Problem recognition</i>			
1	Men and women are equally represented in modern ICT in my country.	32%	40%
2	There are barriers that prevent women from pursuing and entering ICT-related fields.	62%	80%
3	Girls and boys are equally prepared at school to use ICT in their future careers.	75%	60%
4	There is a gender equity problem in ICT lessons at school.	7%	60%
<i>Current situation in the country</i>			
8	Boys and girls study the subject using the same curriculum.	97%	100%
9	Boys and girls study these subjects together in one classroom.	97%	100%
10	Teachers use the same teaching methods for boys and girls.	100%	100%
11	Girls have possibility to study this subject additionally and separately from boys.	28%	20%
<i>Would this help girls be more competent in the subject?</i>			
12	Different curricula for girls and boys.	35%	0%
13	Separate classes for girls and boys.	13%	30%
14	Different teaching methods for girls and boys.	30%	10%
15	Different examples from real life for girls and boys.	68%	20%
16	Additional possibilities for girls to study technology, girls' clubs, etc.	43%	60%
17	Mixed classes for boys and girls in small groups, cooperative\collaborative learning	89%	80%

