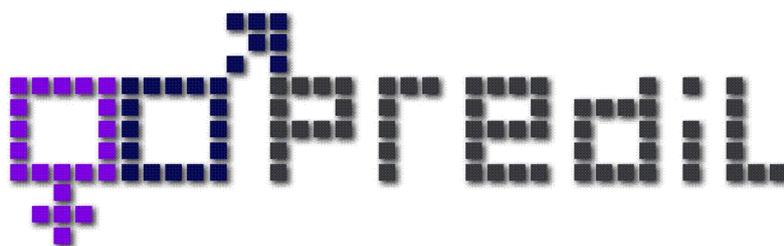


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PREDIL

Promoting Equality in Digital Literacy

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**ANALYSIS OF RESOURCES
COMPARATIVE REPORT**

With the support of the Lifelong Learning Programme of the European Union

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SUMMARY

The PREDIL project conducted an analysis of learning and teaching materials for informatics lessons at secondary school level. The analysis included materials for pupils – to be used during lessons, as well as materials for teachers – didactical materials and for teacher education. Further, a differentiation between offline (books, journals) and online (electronic resources, web portals) was made.

This report presents a comparison of the data retrieved in the following partner countries: **France, Germany, Greece, Poland, Slovakia, Spain, Switzerland.**

The analysis focused on the identification of gender aspects in the materials, e.g. the share of male and female expressions in texts, and the share of males and females described to be performing an activity or to be in a leading position. Also, pictures with people were considered regarding the number of males and females shown on it and how many of them were illustrated as being in a leading position.

Research shows that women do feel less addressed by texts with a majority of male expressions, and a reproduction of stereotypical socialisation processes is supported through explicit and implicit statements about gender in teaching materials (see Chapman, n.d.; Schneider, 2006; Wiesner et al., 2003). Although the resource analysis at hand can be considered exemplarily only, the results show a clear gender bias in all kinds of materials.

In summary, it can be said that both kinds of materials, for pupils and for teachers, show a bias in the frequencies of men and women in texts and pictures, although with different intensity for text books and online materials, for pupils' and teachers' materials, and between countries.

TABLE OF CONTENTS

1	Introduction	5
2	Analysis Process	6
3	Selection of Resources.....	7
4	Main Results of the PREDIL Countries	10
4.1	<i>France</i>	10
4.2	<i>Germany</i>	13
4.3	<i>Greece</i>	16
4.4	<i>Poland</i>	18
4.5	<i>Slovakia</i>	21
4.6	<i>Spain</i>	24
4.7	<i>Switzerland</i>	27
5	Conclusion “Across Countries”	29
6	References.....	30
7	Annex – Analysis Scheme	33

1 Introduction

School book research is often focused on subjects like history, languages and politics education (see Matthes & Heinze, 2005; www.edumeres.net). However, girls and boys show different interests and self-efficacy in using information and communication technologies (ICT) at school and at home (see Ertl & Helling, 2010; Imhof, Vollmeyer & Beierlein, 2007; Initiative D21, 2008; OECD, 2005). Also, the uptake of careers in the ICT sector is subject to gender differences. Women are clearly underrepresented in the ICT professions and at informatics at university (see Briedis et al., 2008; European Commission, 2006). For this reason, the PREDIL project consortium considered it important to analyse the representations of females and males in informatics educational materials, presuming that gender sensitive design of educational materials could have an influence on the teachers' and pupils' perceptions of gender ICT.

Research shows that women do feel less addressed by texts with a majority of male expressions, and a reproduction of stereotypical socialisation processes is supported through explicit and implicit statements about gender in teaching materials (see Chapman, n.d.; Schneider, 2006; Wiesner et al., 2003). Systematic research on school books on national and international level revealed a bias in the representation of men and women to the advantage of men, on a quantitative and qualitative level (see Commonwealth Secretariat, 1995; Paseka, 2004).

Materials related to information and communication technologies (ICT) can be used from two perspectives in the context of school education: either as materials for pupils, e.g. school books and online resources with exercises and tasks to be performed by pupils; or as materials for teachers, e.g. books and online materials which are designed to educate teachers in the application of ICT for teaching and develop their ICT-related didactical competences. Resources that were included in the analysis were online materials, e.g. websites, learning repositories and data bases, and offline materials, e.g. school books and journals.

School books are considered an important part of teaching processes – although this differs between subjects – and systematic research on school books is conducted on national and international level. However, the focus is often on school books for subjects like history, languages and politics education (see Matthes & Heinze, 2005; www.edumeres.net). Offline learning and teaching materials are supplemented with a vast collection of online materials. Most of the informatics online materials for teachers and pupils are freely available on the internet; however, the materials often stand for itself and are hardly interlinked.

In the context of the PREDIL project a resource collection with online materials has been built and is available on the project website. The PREDIL consortium was interested in the quality of these resources from a gender perspective. An exemplary analysis of materials was performed in the countries of the PREDIL partnership. The analysis focused on the identification of (in-)equality in the representation of males and females in texts and pictures.

This report presents the comparative results of the resource analysis of school books and online teaching materials in the PREDIL partner countries: **France, Germany, Greece, Poland, Slovakia, Spain, Switzerland**. For detailed country reports of the resource analysis see PREDIL website at <http://predil.iacm.forth.gr>.

2 Analysis Process

The selected materials were analysed for the number of male and female expressions and activities of people described in texts and shown in pictures. The following seven categories were applied to the materials¹:

- For pictures: men/women in pictures, men/women in leading position²
- For texts/descriptions: male/female expressions, men/women as acting persons, men/women in leading positions, neutral expressions.
- The scheme used for the analysis includes also a category named „sexist expressions“; however, this category did not show any impact in the analysis and was not further considered.

The number and percentage of people (women and men) in pictures refers to photographs and drawings which showed any people at all; the total number of pictures in a material might be higher (e.g. if pictures showed animals).

In general, acting persons were identified by a verb which described the activity performed by the person or presented the person as main actor in an interaction of a group of people.

Leading positions in texts were counted for all people which were ascribed a leading role (e.g. doctor as compared to doctors' assistant) and also for people which were described as being the main speaker or expert in certain situations, e.g. if one child explains a subject matter to another child. In some cases, persons in leading positions and active persons were the same, and were counted once in each category.

Some partner countries also adopted an **own approaches for the analysis** of learning and teaching materials. For example, in France, the method used is the one described by Brugeilles & Cromer (2005). A particular attention has been paid to the social position of each protagonist in the situation shown in textbooks and to the lexical feminization of professions. In Greece, a review of two existing papers on the issue of gender representation of informatics and technology learning materials was made.

Language Characteristics

There are some language characteristics which contribute to an increased gender bias in texts written in certain languages, if authors do not pay attention to these issues. For example, in French, German and Italian the use of masculine expressions for a group of persons is typical. Also, in German and Spanish, masculine expressions can be used to address both, males and females.

¹ See annex for an overview of the categories and analysis scheme used in the survey.

² The category "leading positions" in pictures did not reveal any significant results and was therefore excluded in this report.

3 Selection of Resources

The following section provides an overview about the resources selected for analysis. Table 1 presents the resources for pupils (e.g. learning materials and exercises for informatics and ICT-related teaching to be used by pupils), table 2 the resources for teachers (e.g. for teacher training, such as didactical aspects of teaching and learning with ICT and informatics teaching, didactical manuals, lesson plans, etc.).

It has to be noted, that the resources were selected in each country in accordance with the specific availability of resources (e.g. text books for informatics and teaching with ICT were not available in each country; also the availability of online resources differed much in quantity and quality). In general, the selected resources were analysed partially; certain chapters or exercises were selected exemplarily. Although, some materials were subject to complete analysis. Further details on the specific resources (e.g. reference information, short description) are available in the detailed country reports at the PREDIL website at <http://predil.iacm.forth.gr>.

Table 1. Pupils' materials.

Country	Offline materials	Online materials
France	<p><i>43 textbooks in technology</i></p> <ul style="list-style-type: none"> • 20 textbooks (from 1986 to 2006) published by several • 23 textbooks, from 1986 to 2006 <p>From different publishers and addressing different grades. The choice has been driven by the known dissemination of these textbooks and also by convenience factors.</p>	<p><i>1 national portal run by the ministry of education</i></p> <p>The focus was on a series of 230 institutional resources present on the portal. The authorship and the contents of these resources were</p>
Germany	<p><i>9 text books for different grades</i></p> <p>The focus of the research was on materials for the subjects "informatics" (Informatik) and "basic education in information technology" (Informationstechnische Grundbildung, ITG) for upper secondary schools, across several school types and Länder.</p>	<p><i>10 online resources for pupils (5 online portals, 3 websites authored by informatics teachers/schools, 1 examination rule, 1 competition task)</i></p> <p>The selection focused on materials for informatics teaching and basic education in information technology, for different grades at lower and upper secondary level, and school types.</p>

Table 1 (continuing). Pupils' materials.

<p>Greece</p>	<p><i>2 papers on gender aspects in text books</i></p> <p>In the first paper (Georgiadou & Kekkeris, 2009 in Greek – presented in the 3rd Panellenic Workshop of Secondary School Informatics Teachers, 3-4 April 2009) two Informatics teachers have analysed 14 Information Technology books – 10 textbooks used in lower (Gymnasium) and upper (Lyceum) secondary education and 4 books published by private publishing houses.</p> <p>In the second paper (Koukourikou, 2008 in Greek – presented in the 2nd Panellenic Workshop of Secondary School Informatics Teachers, 11-12 April 2008), the new textbook used in Gymnasium is analysed (this is also examined in the first paper).</p>	<p>N/A</p>
<p>Poland</p>	<p><i>10 offline resources (schoolbooks, for different grades)</i></p> <p>The focus of the research was on materials for the subject informatics and basic education in information technology for upper secondary schools, across several school types. Ten books for pupils from different grades and school types have been selected for analysis.</p>	<p><i>5 online resources for pupils (5 online portals)</i></p> <p>The internet research of online resources related to ICT/informatics (and gender) at school. 5 resources were selected from this collection: the selection focused on materials for informatics teaching and basic education in information technology, for different grades at lower and upper secondary level, and school types.</p>
<p>Slovakia</p>	<p><i>4 textbooks</i></p>	<p>3 online resources for pupils</p>
<p>Spain</p>	<p><i>9 textbooks</i></p> <p>Offline resources for pupils were selected from a list of samples of materials on the subjects "Computer Science" (Informàtica) and "Technology" (Tecnologia) for different grades in secondary education, both compulsory and not compulsory (baccalaureate). All the textbooks are written in Catalan.</p>	<p><i>6 online resources for pupils (three digital books, one e-book and two websites)</i></p> <p>The proposal of the Spanish Ministry of Education and the Department of Education of Catalonia is to offer pupils and schools the possibility of teaching/learning with digital books and other online materials. Next school year (2010-2011) pupils aged 12 to 14 will be the focus of this project in Spain. This is why we considered it interesting to analyse three examples of digital books for pupils that publishers are offering right now to teachers.</p>
<p>Switzerland</p>	<p>There are no specific measures for integrating ICT in the compulsory school curriculum in the Suisse cantons; text books are hardly available on the topic. See also "teachers' materials"</p>	<p>See "teachers' materials"</p>

Table 2. Teachers' materials.

Country	Offline materials	Online materials
France	N/A	N/A
Germany	<p><i>2 journals, 1 book</i></p> <p>The analysis of offline teacher materials focused on the main informatics teacher journal available in Germany: LOGIN (see www.login.de). Additionally, one teacher book was analysed which complemented one of the analysed school books.</p>	<p><i>4 state education servers, 3 online portals/initiatives</i></p> <p>Education servers and online portals also provide specific information on teaching with ICT, the didactics of informatics teaching, and related gender issues. The number of these portals is limited, and the available offers are often adapted to curriculums of some states only. Often, resources are uploaded by informatics teachers from single schools</p>
Greece	N/A	N/A
Poland	<p><i>3 offline resources</i></p> <p>The analysis of offline teacher materials focused on the main informatics didactic books available in Poland.</p>	<p><i>12 online-resources (online portals)</i></p> <p>Most of the online materials for informatics are materials that can be used during lessons e.g. tasks and exercises, with short didactical background information) Often, resources are uploaded by informatics teachers.</p>
Slovakia	N/A	1 online-resource
Spain	<p><i>3 teachers' books</i></p> <p>The analysis of offline teacher materials focused on STEM (Science, Technology, Engineering, and Mathematics) teaching. The three teachers' books (also in Catalan) contain didactical aids, as well as a set of theoretical and practical exercises. One teachers' book refers to technology; the other two refer to physics and chemistry.</p>	<p><i>5 online resources (online portals/initiatives)</i></p> <p>Two of the five online resources contain self-diagnostic tools for teachers to enhance teaching practices from a gender equity perspective. The other three online materials are portals with suggestions for use during lessons with didactical background information.</p>
Switzerland	<p><i>2 booklets for teachers (incl. online manual), 5 booklets for teachers and pupils (incl. online manual)</i></p> <p>The booklets are specific issue of the more comprehensive publications' program/ internet portal "SchoolNetGuide".</p> <p>The booklets focus on different issues of using information and communication technology</p>	<p><i>1 online manuals for teachers, 2 online manuals for teachers (incl. booklet), 5 online manuals for teachers and pupils (incl. booklet):</i> Focus on different issues of using information and communication technology</p> <p><i>5 portals/websites for schools:</i> Focus: teaching with ICT; online resources for different subjects</p>

4 Main Results of the PREDIL Countries

4.1 France

Background Information

In France, the subject Technology is the main place where ICT is taught along with other technologies, in particular those used in the industrial field. In order to learn ICT-related facts, students may use textbooks, web sites and internet tools as pedagogical resources. The pedagogical resources that have been analysed in France generally pay attention toward presenting gender-neutral resources. One of the reasons why textbooks in technology have been analysed in France is that this discipline is the main place where students are confronted with ICT at junior secondary level. As any other French discipline, it relies on textbooks chosen at the school level between a series of proposals by private editors. There is no government-driven agreement procedure and the market is free and open. Quite normally, textbooks receive the support of some personality (inspector, instructor in teacher education, academic...) who co-signs the book, thus guaranteeing its contents.

A list of ICT competencies has been defined and a specific certification (Brevet informatique et internet, B2i) has been created by the government in 2000, with 2 levels (primary school and end of lower secondary education). Passing it is compulsory. But there is no specific ICT curriculum. The idea put forward by the government is that ICT should be integrated in the different disciplines, so that the necessary competences are supposed to be acquired there. Uses of software in different subjects heavily depend upon the curricula and the situations. In technical and vocational subjects, students tend to adapt well to the kind of software that is going to be part of their professional life.

In France, since the early 90's, many initiatives have aimed at developing a provision of digital resources for online education. In the late 1990s, due to national policies, large institutional portals have appeared. However, only some of the resources easily available to teachers and students have been validated by an institution, either public or private publishers. It is not easy for readers to access what is the validity of the information they retrieve. It is easier when the website has been produced by a reputable institution (but some institutions have sites with a modest coherence, due to problems of upgrading). When the authors do not have a reputation, the situation is more critical (Baron & Dané, 2007).

Main Results

The analysis of a sample of textbooks in Technology from 1985 to 2009 shows that men are more often represented in pictures than women. In this sample, we found 257 pictures representing men in a professional context, 82 pictures representing women in a professional context and 45 representing both men and women in professional context. Moreover, when women are shown they are significantly more represented with a differentiated social status: women tend to be consumers or employees whereas men tend to have leading responsibilities (see figure 1). This can be seen in the first technology textbooks and even in some more recent ones.

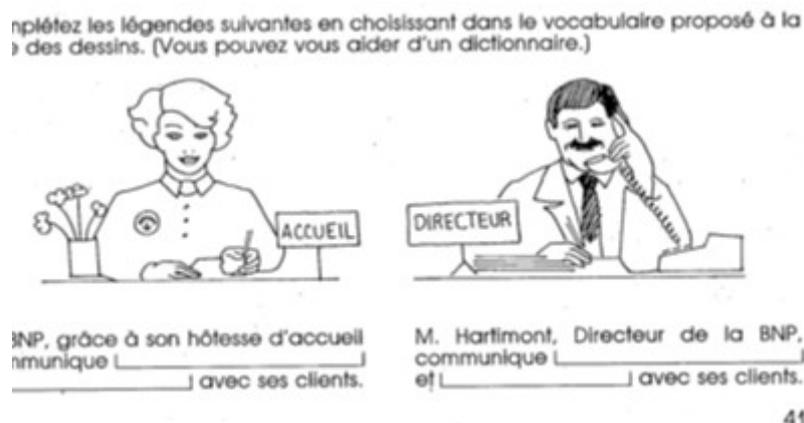


Figure 1. Bonnet G., et al. (1985, p. 41).

The man is an executive and the woman is employed at the reception desk.

In the 1990, topics pertaining to the traditional technological fields were traditionally linked to the working universe of men: engines, machines. Regarding ICT-related jobs, illustrations also more often show males in a situation of manager than females. The same is true for ICT technical skills. In the 1990s, men tend to be shown in contexts that require technical knowledge (coding, network design...) (see figure 2). For their part, women are rather represented in contexts linked to communication and to the new literacies defined by Leu, Kinzer, Coiro, & Cammack, (2004) (see figure 3).



Figure 2.
Cliquet, J. et al. (1998, p. 164)



Figure 3.
Cliquet et al. (1998, p. 88).

In the textbooks published in the years 2000, a growing awareness towards gender issues and a tendency to suppress stereotypes, to valorise girls and to present symmetrical situations was found. Moreover some textbooks focus on men overrepresented occupation and promote gender equity by exposing positive aspect of those jobs.

The on-line resources analysed were produced by groups of teachers under the supervision of inspectors. This process is rather close to what happens for textbooks, except that the final validation has been explicitly granted by an institution and not by a private publisher. Several results were found. First, authors tend to be men, more often than women. A wide spectrum of themes is present, often very technical, like achievements controlled by computer. No explicitly gender-biased content could be found. Several other kinds of portals do exist on the web, developed by schools, by associations, publishers and even by individual teachers. A huge diversity was observed between them, including regarding gender. For example, stereotypically masculine images have been found and apparently the implications have escaped the authors of the website. The same is true for certain portals accompanying B2i that have apparently not been screened regarding gender issues.

Discussion

In this sample, authors have generally paid attention toward presenting gender-neutral contents. An explanation may be found in official prescriptions: equality between girls and boys is a legal obligation for the French educational system. Regarding on-line resources, the situation is similar. Institutional websites seem to be well controlled, while some others reveal signs of gender bias. But what exactly is the role of these resources is still unclear. Thus, far beyond resources, the role of teachers for deconstructing gender stereotypes related to information and communication technology should be considered, in order to enable girls to project themselves into these occupations. From this perspective, the fact that the proportion of male teachers seems to be steadily rising in technology is a concern, even if male teachers may be very attentive to gender equity. In this respect, what happens in teacher pre-service education seems to be a relevant field of inquiry and a pertinent lever for promoting equity in education.

4.2 Germany

Background Information

Schoolbooks in Germany are subject to accreditation processes in some of the Länder. These processes are either managed by the cultural ministry of a state or specific authorities established for this purpose. Due to the structure of Federal System and the educational responsibility of the Länder (Kulturhoheit der Länder) regulations for school book accreditation are not coherent between the Länder. For example, Berlin, Hamburg, Saarland and Schleswig-Holstein do not have an accreditation procedure for school books, in other Länder it is optional, and school books on secondary school level, for vocational education, and for specific subjects are often an exempted from the accreditation process. The current discussion about school book accreditation considers the negative aspects of control and censorship by the state vs. the positive aspects of quality assurance and appropriateness according to predefined criteria (see Stöber, 2010).

According to Stöber (2010) most school laws of the Länder, and complementary decrees, define criteria for accreditation (which should also be considered by authors teachers and schools, if accreditation is not required). These include conformity with the constitution and law, didactical appropriateness, accordance with the curricula, profitability, and in some Länder also absence of serious mistakes, orientation towards competence standards, and sensitivity in the representation of gender, religion and ethnicity. The school book accreditation act of Baden-Wuerttemberg clearly refers to the concept of Gender Mainstreaming as criterion for the content and design of school books (see Schulbuchzulassung, 2007).

Main Results

The figures 4 and 5 summarize the results for the analysis of pupil materials and teacher materials. The results are represented by showing a female and male figure sized according to the frequent occurrence (in per cent) persons/personal expressions in pictures and text. A figure would have a size of 100%, if all persons on pictures, or all expressions in text, would have been either female or male, and if no neutral expressions exist.

Within the two categories that look at the overall **numbers of males and females** in pictures and texts it can be reported for all types of materials that the share of males exceeds that of women. Looking at the represented **leading positions and activities of persons** it can be concluded that for all types of materials the situation is to the advantage of men. Within each text, the total number of men in leading positions or described as acting is above that of women. This result has two exceptions: the in-group percentage of all women reported to be in a leading position in texts (pupils' offline materials) and described as acting persons (pupils' online materials) is above that of men. This means, if women are represented in these texts at all, they are more often in a leading positions/acting role, than the men represented in the same texts.

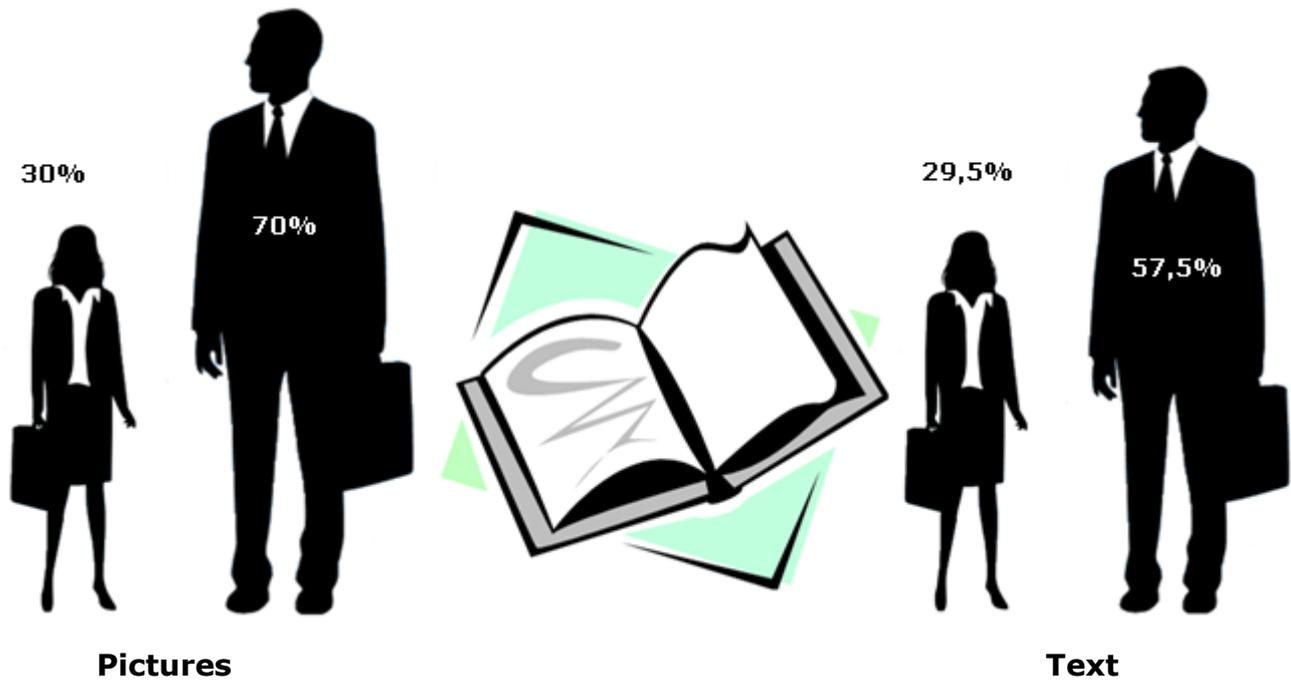


Figure 4. Number of women and men in pictures, and number of female and male expressions in texts of offline and online pupils' materials (in %³).

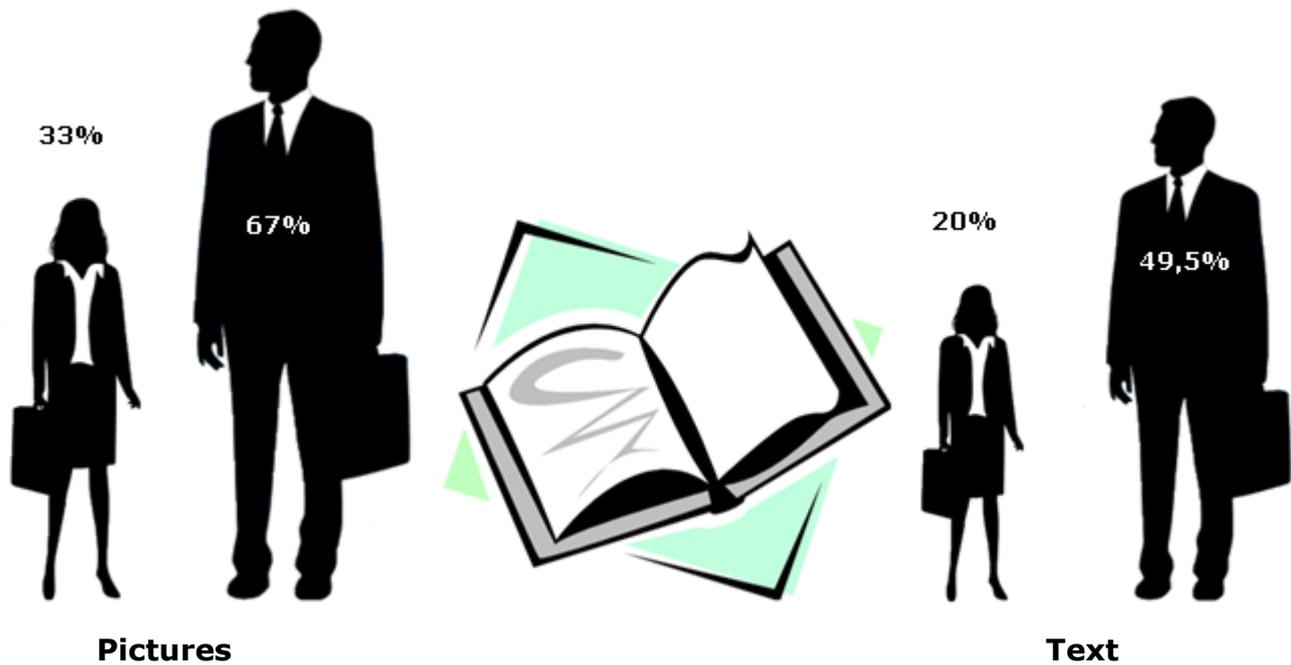


Figure 5. Number of women and men in pictures, and number of female and male expressions in texts of offline and online teachers' materials (in %).

³ The areal expanse (height, width) of the figures was adapted to represent the quantitative ratio of women and men in pictures and of female and male expressions in texts, respectively

Discussion

In summary, it can be said that both kinds of materials, for pupils and for teachers, show a bias in the frequencies of men and women in texts and pictures. Although, it has to be noted that the selection of materials in Germany was exemplarily and was also dependent on the availability of the materials. Further, the number of materials considered in each category is rather low and not representative. Still, the results suggest that in offline as well as in online materials, the number of men exceeds that of women and women are less often presented as acting or in a leading position.

The analysis at hand focused merely on the numbers of male and female expressions and the occurrence of active/leading persons by sex; however, such examples, suggest, that a qualitative analysis of the actual contents of exercises and task descriptions might reveal a bias that goes beyond frequencies of male and female expressions (see also Helling & Petter, 2008). Similarly, a qualitative analysis of the pictures in the materials for pupils might reveal additional imbalances in the presentation of men and women

The results show that the overall bias revealed in pupils' and teachers' materials is to the advantage of men. In consequence, girls at school have less opportunities to see role examples of women in an informatics and ICT context, which might support the reproduction of stereotypes in the field of women and ICT (see Chapman, n.d.; Schneider, 2006; Wiesner et al., 2003). In conclusion, it has to be noted that the production and selection of materials for pupils and teachers and related accreditation and quality control processes need to focus on gender equality aspects more intensely. Furthermore, because of the free availability and exchange of materials, especially in online repositories and databases, teacher training and further education needs to raise teachers' awareness for gender issues and develop competences for a gender-reflective use of such materials during lessons.

4.3 Greece

Background Information

Textbooks analysis was not performed for Greece in the frame of the PREDIL project since there are two recent papers addressing this issue. In the first paper (Georgiadou & Kekkeris, 2009 in Greek – presented in the 3rd Panellenic Workshop of Secondary School Informatics Teachers, 3-4 April 2009) two Informatics teachers have analysed 14 Information Technology books –10 textbooks used in lower (Gymnasium) and upper (Lyceum) secondary education and 4 books published by private publishing houses. In the second paper (Koukourikou, 2008 in Greek –presented in the 2nd Panellenic Workshop of Secondary School Informatics Teachers, 11-12 April 2008), the new textbook used in Gymnasium is analysed (this is also examined in the first paper). The following results are mainly based on these two papers.

ICT in schools is a rather new subject matter and at the time this was included in Greek school curricula gender issues were raised widely discussed in educational research community. This does not mean that gender issues are resolved or even really addressed in ICT text books. It is more that the Pedagogical Institute of Greece – responsible agency for the textbooks, included in its recommendations to the authoring teams gender awareness issues and the selected books were also reviewed/judged on this base.

It is of interest that IT books written in the beginning of 2000 are characterised by a “technical” approach where not only the gender aspect but even the “human presence” was missing. These focussed on the computer as a machine and not on the person that would use or program this computer. One can assume that this is a result of an effort to present the new subject matter as “neutral” but in reality this approach discouraged girls more than boys.

In contrast to the above gender considerations are present to a rather satisfactory degree in the more recent textbook (published in 2006) for the Gymnasium, at least if one compares it with the other used books.

The current situation is summarized by the two Informatics teachers as: “The analysis of the texts and pictures used in the books showed that gender stereotypes have not been omitted in the books’ context. Women are presented as they are not using ICTs or they use them less than men do. The way women are presented in the books doesn’t support the use of ICTs by the female side as this representation continues the old social inequalities.” (Georgiadou & Kekkeris, 2009).

Main Results

The authors of both papers undertook textbook context analysis. A summary of the findings is presented below with special emphasis on the Gymnasium and Lyceum textbooks that are the most widely used:

Authoring teams

The authoring teams of the textbooks are mainly comprised of men –this is not the case for the books of the private publishing houses. Women usually are responsible for the linguistic editing of the books.

Use of Language

Male articles and pronouns are almost always used even when the text addressed both genders. This results to an uneven presentation of the genders and makes it is extremely easy for a girl to disassociate herself from this subject matter.

It is worth mentioning that in the Gymnasium textbook effort is made to represent –in the text and pictures, females (although still males are dominant in using computers). In contrast the Lyceum textbook makes usually reference not to boys or girls but to words as “user”, “person”, “citizen”.

Acting persons

When referring to persons the textbooks use mainly male names. In the Gymnasium book among the 51 references made to persons it is only two that are women (although this can be explained by the fact that a Chapter is dedicated to the history and evolution of informatics). When examples are provided (in the same book) there is almost a balance in terms of numbers between the genders (14 males and 9 females) and both genders appear familiar with new technologies.

Many times books reproduce stereotypes -i.e. behaviour, profession a person is associated with, even when men and women cooperating in front of a computer it is the man that explains/shows to the woman.

Persons in Pictures

The majority of the persons represented in pictures are males. In the Gymnasium book 43 figures are male and 22 represent females. It has to be mentioned that the selected figures do not reproduce gender stereotypes. This is not the case with the Lyceum textbook, where one can find 38 male pictures and 9 female since beyond the uneven representation there is also difference in genders’ engagement with computers and IT. Men are more active (scientists, using special applications etc.) and women are mere users of simple computer applications.

Once again it has to be mentioned that the majority of the images do not represent human figures, as an example among the 236 images of the Gymnasium textbook only 30 represent humans.

Discussion

In concluding, one can say that although attention has been given in gender issues and this is evident in the evolution of the gender sensitivity in books (as can be seen in the Gymnasium textbook) still the IT books used in secondary education are not gender neutral and in many cases reproduce gender stereotypes. The authors of the papers comment on the impression textbooks provide their readers with:

“On the one hand, one gets the impression that the textbooks are oriented towards male students and are taught by male teachers, and on the other, constructs the perception that only men have knowledge concerning new technologies and are able to use these.” (Koukourikou, 2008) or as Georgiadou & Kekkeris (2009) state: “The books give students the impression that new technologies have been developed by the male gender and that their applications –at the usage level, is for the female gender too.” More effort is needed in order to produce textbooks that will treat genders equally and will be more appealing for females. Then it will be easier for girls to associate themselves with this subject matter and to engage in ICT related choices and careers feeling it as a domain they can contribute to. Otherwise it is likely that many girls will continue to lag behind in accessing new technologies.

4.4 Poland

Background Information

Since 1998 the Ministry of Education has been purchasing computers for schools. In 2003 The Council for ICT in Education was created advising the Ministry of Education in ICT matters.

ICT is used in a growing number of schools. There are some actions promoting the use of ICT like "School with the style" organized by the main national newspaper such as "Gazeta Wyborcza". In August 2004 there was an agreement between the Minister of Education and Polish Telecommunication to provide broadband network for school Internet for a symbolic 1 zł fee. As a result 1561 primary schools were connected to the Internet and were equipped with an Internet laboratory with 10 computers and connection.

Main Results

A gender gap, no doubt is present in Polish textbooks, however, this gender gap is so subtle that it evades superficial analysis. Teachers and students are unaware of its presence and impact, which makes the phenomenon less harmful.

The Ministry of Education allows school use for all stages of education several hundred sets of Polish school textbooks. Most Polish school textbooks offer traditional, social, political, economic aspects. Stereotypical attitudes to women and men and the roles they play in family and society affect the decisions of young people when it comes to further education, occupation, or personal life. Stereotypical attitudes, in fact, strengthen and favour the male point of view on issues such as division of household duties, activity in the labour market, and political commitment.

Pupil's Materials

The percentage of women in pictures differs between school books (offline materials) and online materials. For online materials (54% women, and 46% men in the pictures), offline materials (18% women, and 82% men in the pictures).

Likewise, the number of female expressions in texts of offline and online materials for pupils is far below that of male expressions. 50% of the expressions in offline materials are male, 40% are female, and 10% are neutral. In the case of online materials, the number of female expressions (25%) is even below that of neutral expressions (30%), and male expressions (45%).

In school books, the percentage of women in leading positions (20%) is much lower than that of men in leading positions (80%). In online materials, women (60%) and 40% of the male persons in pictures are shown in leading positions.

In the analysed texts, the majority of the text is neutral both in offline and online materials.

Teacher Materials

In the analysed offline materials for teachers 61% of the persons in pictures are female (and 39% male), and in online materials 30% of the persons are female and 70% are male.

The percentage of female expressions in offline and online materials for teachers is both 30%. However, in offline materials the majority are male expressions (57%), and 13% are neutral expressions; and in online materials the majority of expressions are neutral (38%) and 32% are male expressions.

Leading positions in pictures: In pictures of teacher materials there are hardly any persons shown in leading positions. With regard to offline materials, males are mainly presented in leading positions, this is also true in online materials.

Leading positions in texts: Again, in offline texts no woman (0%) is described to be in a leading position, and mainly the male expressions are related to a leading position. With regard to online teacher materials, the main part of the text is neutral.

Discussion

In summary, it can be said that both kinds of materials, for pupils and for teachers, show a bias in the frequencies of men and women in texts and pictures. In offline as well as in online materials, the number of men exceeds and women are less often presented as acting or in a leading position.

It has to be noted that the bias of **pupils' materials** differs between online and offline materials. The bias to the advantage of men in pictures is larger in online materials, and exists also in offline materials.

Looking at the represented positions and activities of these persons, we discovered also some advantage for women: with regard to leading positions in pictures as well as in texts, women have a slight advantage in the online materials, and activities are more often performed by women in online materials. However, these results refer to the proportions of women in the overall number of women and men in leading positions in text, both in online material and offline the material is neutral.

In **teacher materials**, pictures are biased to the advantage of women: especially in offline materials the number of women in pictures is higher than that of men. Leading positions in pictures are presented mainly by men in the teacher materials. Text descriptions are neutral.

In the **text example**, we discovered that activities are more often performed by men in online and offline materials. However, these results refer to the proportions of women in the overall number of women and men in leading positions in text, both in online material and offline the material is neutral.

Similarly, a qualitative analysis of the pictures in the materials for pupils might reveal imbalances in the presentation of men and women. Looking at the **examples of pictures**, it can be seen that there are pictures which present only boys in front of a computer or ascribe stereotypical activities and interests to males and females, e.g. boys use computer, girls communicate by headset. It has to be noted, that there are also pictures which serve as good practice examples for the presentation of men and women in the context of ICT usage.

The results show that women are not always in a disadvantaged position when it comes to being presented as active and in leading positions (e.g. in pupils' materials). However, it has to be noted that the overall bias revealed in pupils' and teachers' materials is to the advantage of men. With regard to school books, this is a rather alarming result. Several schoolbooks in Poland have to be accredited by the cultural ministries or special authorities before they are recommended for use in accordance with the state specific school curriculums.

In conclusion, it has to be noted that the production and selection of materials for pupils and teachers and related accreditation and quality control processes need to focus on gender equality aspects more intensely. Furthermore, because of the free availability and exchange of materials, especially in online repositories and databases, teacher training and further education needs to raise teachers' awareness of gender issues and develop competences for a gender-reflective use of such materials during lessons.

4.5 Slovakia

Background Information

The Slovakian PREDIL Team has conducted an analysis of different offline and online resources for pupils – 4 offline and 4 online resources.

ICT is used in all schools with support of the project INFOVEK that started in 1998. The main objective of the project was to build in time period of four - five years in primary and secondary schools ICT classrooms, equipment with an average of ten computers connected to the Internet. However it took few more years to equip all schools across country with computers and Internet connection. Because the ICT is fast growing and changing, new textbooks were and are still needed. In order to learn ICT-related facts, students may use textbooks, web sites and Internet tools as educational resources. Few years ago electronic textbooks started to be introduced in schools together with interactive whiteboards.

The project Planet of Knowledge "Planéta vedomostí" contains many digital courses for primary and secondary schools. Each subject consists of two segments, first is the environment for teacher, where he/she can modify, add or remove materials, tests etc. for each class and prepare the content as he/she considers appropriate. The second part is the students' environment. Where students can log in and study, do exercises, tests, watch videos, animations, pictures, etc. This very powerful way of study is still in testing. It should be implemented in curricula in school year 2011/2012. However many primary and secondary schools are using it in testing phase today along with the textbooks and conventional ways of teaching ICT.

Main Results

Representations are approximately gender-balanced among online resources, in contemporary online and offline educational materials.

Online materials analysis

There is variety of online materials, we analysed 4 of them. There was only one that was not well gender balanced and used more male pictures or texts. Other were neutral.

Portal "Infovek" is a collection of well balanced materials as far as gender is concerned, male and female pictures and texts occur in pretty much same number.

Portal Modern school "Moderna skola" contains lots of archives, news and most important information about education system. In pictures there is a prevalence of boys pictures and in texts gender use is similar.

Portal Planet of knowledge "Planéta vedomostí" is a collection of well balanced materials as far as gender is concerned. It was designed with a very sensitive approach to gender equality.

Portal Informatics in school "skola.dvp" is a collection of teaching materials as a support materials for teachers at primary and secondary schools. Portal archives are divided in sections. Concerning graphics, mostly neutral, in-animate (program - manual) representations are contained. Gender-based representations are divided approximately equally.

In general it can be said that occurrence of new online materials are designed better than the older. In few years the older e-books, websites, e-courses will be out of date and will be replaced with new accredited materials that take into account gender equality approach.

Online resources:

www.infovek.sk

www.modernaskola.sk

www.planetavedomosti.sk

www.skola.dvp.sk

Offline materials analysis

The Informatics for secondary schools "Informatika pre stredné školy" (Lukáč et col. 2001) - the total number of examples in the book are 44 and they are differently thematically focused. Most of them, 20 are designed as general examples and tasks such as teacher lesson "instances on blackboard", such as blocks, cars and fruits, 15 of them use terminology focused on nouns nonidentifying gender and population, for example, pupils, teachers in six examples, the authors used masculine and 3 cases of feminine forms.

Informatics for secondary schools "Informatika pre stredné školy" (Kalaš 2001) - in this publication there are 257 pictures and illustrations. There are 17 pictures of a man and only 7 illustrate the feminine part.

In the textbook Informatics for secondary schools "Informatika pre stredné školy" (Machová 2003) there are 63 pictures. On 3 of them there is a man. There is no photo or illustration showing a woman in the textbook. From 73 exercises, 3 exercises are designed to be masculine, one is feminine, and other exercises are designed generally in abstract terms.

In the textbook New A-level from informatics "Nová maturita informatika" (Kulta et col. 2005) there are 156 illustrations. In the 63 cases are general forms of illustrations, which generally indicate in illustrating pictures computer graphics with the figures. Another 15 pictures contain data with mainly masculine names and with 2 female names.

Discussion

The results suggest by tendency a gender-bias in the representation of men and women; however, neutral representations seem to be used much more than more personal representations. There is a significant difference between older and newer textbooks concerning the gender question, as the new textbooks are already subject to an accreditation process by Ministry of Education and they follow European trends.

Authors and publishers of newer textbooks are more careful in terms of gender equity. The fact is that the use of male general forms is still widespread. In many cases, a gender sensitive approach is revealed by a large use of neutral representations, or of both male and female forms.

4.6 Spain

Background Information

Schoolbooks in Spain are subject to an accreditation process. The processes are either managed by the Ministry of Education or by the Autonomous communities, who are fully in charge of the compulsory education implementation.

Studies realised to find out whether schoolbooks are adapted to the principle of gender equity mandated by the Spanish General Law of Education (in place since 2006), indicate that the situation has not sufficiently improved from previous years in what respect to the unequal or biased used of pictures and text, although it is observed a certain positive trend to pursues this goal (Union, 2007).

Recently electronic textbooks are being introduced in the school together with the electronic boards. This implies that students access these resources electronically.

Main Results

Pupils' Materials

Persons in pictures: The percentage of women in pictures does not differ between offline materials (35.9%) and online materials (33.6%) but in both types of materials, women are under-represented (1 out of 3 are female) (see Garcia Colmenares).

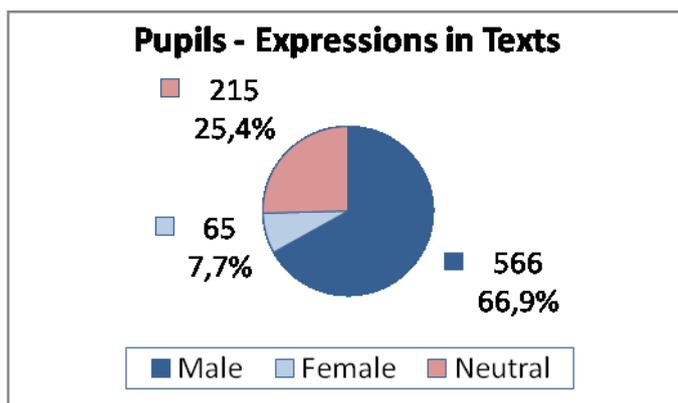
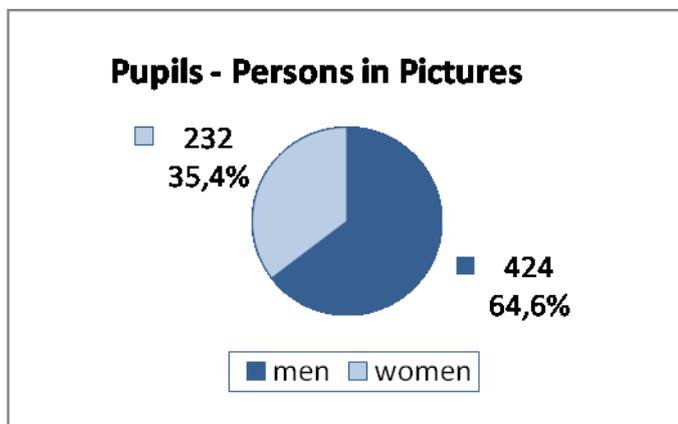
Expressions in texts: The number of female expressions in texts in both offline and online materials is far below that of male expressions; however, this difference is much smaller in online materials. In offline materials, 68.3% of the expressions are male, 5.7% are female, and 26.0% are neutral. In the case of online materials, 58.7% of the expressions are male, 19.0% are female, and 22.2% are neutral. The increase of female expressions in online materials is probably due to the recent use of both forms (masculine and feminine) to promote a balanced treatment of gender. This increase of female expressions in online materials induces a decrease in both male and gender-neutral expressions at nearly the same rate.

Acting persons in texts: In school textbooks, the active part in text descriptions is held by more male (36.6%) than female (14.9%); in online books and materials, there is no representation of women as active persons (women: 0% of the female expressions; men: 20.3% of the male expressions).

Leading positions in texts: We have found very few examples of clear leading positions in texts, either male or female in absolute numbers: no women (0%) vs. two men (0.4%) in offline materials, and one woman (4.2%) vs. four men (5.4%) in online materials (see Gimeno A.).

Teachers' Materials

Persons in pictures: The total amount of women and men in pictures is very small in teachers' materials (offline and online). In fact, teachers' materials contain very few pictures compared to pupils' materials. In the analysed offline materials, 46.2% of the persons are female and 53.8% male; in online materials, 54.5% are female and 45.5% are male: the proportion men/women is reversed from offline materials (more men than women) to online materials (more women than men).



Expressions in texts: The percentage of female expressions in offline materials for teachers (11.5%) is very low compared to the male expressions (58.1%) and neutral expressions (30.1%). On the contrary, in the online materials the percentage of female expressions nearly equals that of male’s (41.5% of female vs. 44.1% of male). Here, gender-neutral decreases to 14.4%.

Acting persons in texts: In absolute numbers, the majority of acting persons both in offline and online materials are male though it is less marked in online materials. Offline materials show seven women vs. thirty six men as acting persons; online materials show six women vs. eight men. But in terms of percentages, the difference between men and women as acting persons is lower: 31.8% women vs. 33.3% men in offline materials, and 3.0% of acting women vs. 3.7% of acting men in online materials. As we can see, the percentages of male and female are similar in both materials.

Leading positions in texts: We have found very few people in a leading position in descriptions, both in offline and online materials: six men (9.1%) vs. two women

(5.6%) in offline materials and no women (0%) vs. two men (0.9%) in online materials.

Discussion

As the sample analysed has only twenty three resources (twelve offline and eleven online materials) the study should be considered of exploratory nature. After the analysis of these resources, it can be said that materials for pupils and teachers show certain trends in the frequencies of male and female in both texts and pictures. As a whole, in both pupils' and teachers' materials, the number of males exceeds that of females.

It seems that the evolution from **offline** to **online** resources is favourable to the presence of female pictures and female expressions, and that this increase is higher in the teachers' materials. We understand that the online resources are more recent than the offline. This implies that when we compare online and offline data, we are actually doing a kind of longitudinal analysis of resources, looking at the evolution of resources linked to the use of ICT in both the access and the format. We note a trend in the evolution from offline to online resources that points to a slight increase in gender equity awareness in the online materials. We argue, however, that this increase is not enough.

As a last reflection, though we have noted that authors and publishers are more careful in terms of gender equity, the fact is that the use of male generic forms is still widely extended. We would say that the production by textbooks publishers should focus on gender equity aspects more intensely. Likewise, schools' selection of the materials for pupils and teachers should avoid those that use gender biased language and gender biased content, in order to develop a non-sexist language and attitude in the pupils. That is, schools have a responsibility to fulfill when it comes to choosing instructional materials

4.7 Switzerland

Background Information

As ICT does not figure systematically in the curricula of the cantons, and particularly in Canton Ticino where there are not specific measure for integrating ICT in the compulsory school curriculum, no specific text books are available on the topic. Nevertheless, some supporting instructional materials (mainly online resources and a few publications) are available for teachers and pupils in the area of ICT.

Main Results

The Suisse resources were partially analysed, with particular attention to textual expressions and pictures. The following graphs (figures 8-10) present the results of the overall analysis.

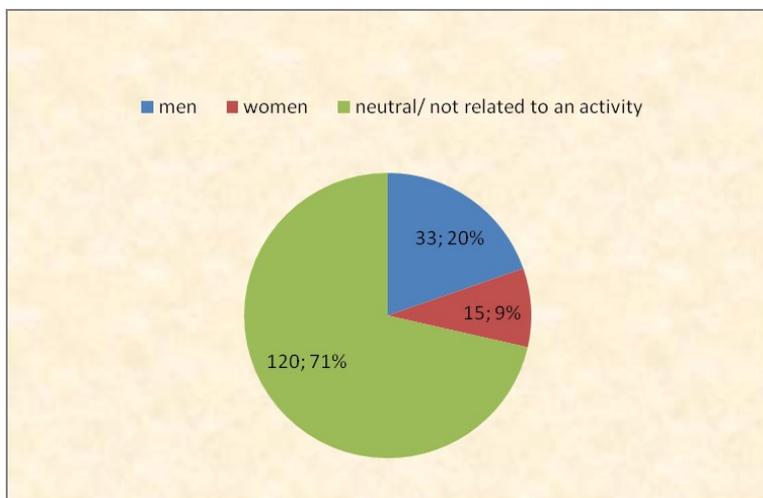


Figure 8. Analysis of the text: Female & male expressions.

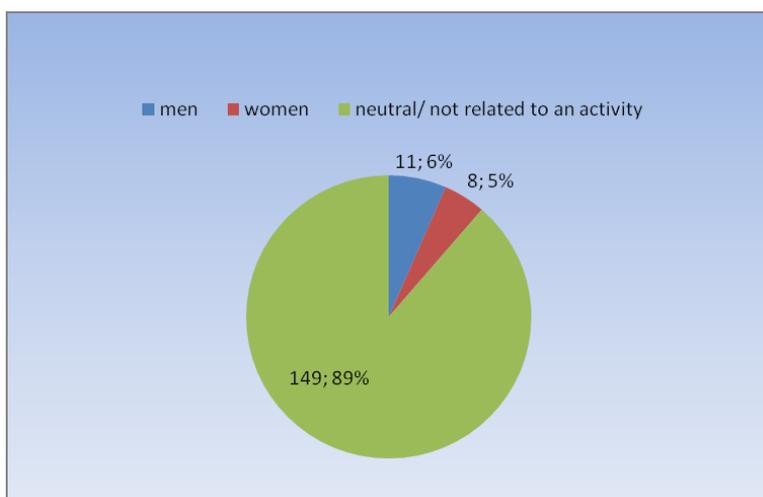


Figure 9. Analysis of the text: Female & male Acting persons

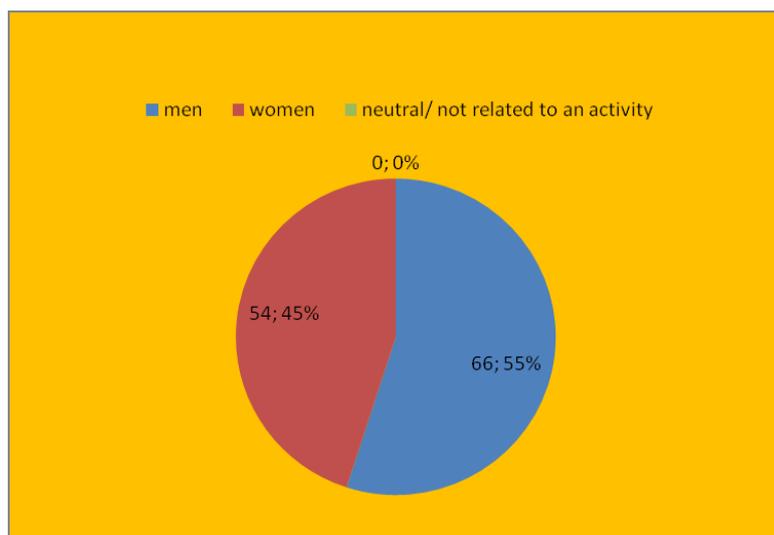


Figure 10. Pictures: Female & male pictures

Discussion

The analysis of the resources reveals a quite gender-sensitive design, especially in the use of the images with a general balance between male and female presence. The analysis of expressions, both in the case of websites/online resources and of publications, generally reveals attention to the gender issues, even if there is a slight predominance of the use of male expressions, mainly due to the use of languages (both Italian and French language texts were analysed), where the presence of male expressions for a group of persons is typical. In some cases, a gender sensitive approach is revealed by a large use of neutral expressions or both male and female expressions (with the female expression in first position) and sometimes even by the use of only female expressions.

5 Conclusion “Across Countries”

The report at hand provided an overview about the analysis of offline and online materials for teaching informatics and the use of information and communication technology (ICT) during lessons. The analysis of the materials for pupils and teachers that was performed in the context of the PREDIL project in the seven partner countries France, Germany, Greece, Poland, Slovakia, Spain, Switzerland, although with a different focus and selection of materials in each country. These differences can be explained by the different backgrounds of these countries: it can be seen that the availability of materials for pupils and teachers for teaching informatics and using ICT during lessons differs greatly. In some countries, text books and online materials are available, easily; in other countries it is either textbooks or online resources that were included in the analysis.

In total, the results show that the overall bias revealed in pupils’ and teachers’ materials – in pictures and texts – is to the advantage of men. This result can be found across all countries, although it has to be noted, that the analysis revealed several changes in the representation of men and women in the materials. For example, gender sensitivity was achieved by using neutral expressions instead of referring to men and women. Also, in languages that differentiate between masculine and feminine forms of the same expressions, an increasing use of both expressions was observed. This is especially true for newer school books, and up-to-date online resources provided by education authorities. Legal obligations that require gender equality in learning and teaching materials support this development.

Still, the bias exists and in consequence, girls at school have less opportunities to see role examples of women in an informatics and ICT context, which might support the reproduction of stereotypes in the field of women and ICT (see Chapman, n.d.; Schneider, 2006; Wiesner et al., 2003).

In conclusion, it has to be noted that the production and selection of materials for pupils and teachers and related accreditation and quality control processes still need to intensify the focus on gender equality aspects. Especially the quality of online materials on private websites (e.g. uploaded by teachers who want to share their materials with colleagues) needs to be reflected. The materials are often freely available and not subject to official quality assessment processes of education authorities. Schools’ selection of the materials for pupils and teachers should avoid those that use gender biased language and gender biased content, in order to develop a non-sexist language and attitude in the pupils. That is, schools have a responsibility to fulfill when it comes to choosing instructional materials. Also, teacher training and further education needs to raise teachers’ awareness for gender issues and develop competences for a gender-reflective use of such materials during lessons.

The overall aim should be to support boys and girls equally and with a focus on gender sensitivity, starting with materials that are designed accordingly, and proceeding towards gender reflective teaching practices. The provision of gender support by teachers through structured measures across the curricular would be inevitable for advancing gender equality in general and in relation to informatics at school. In a long-term perspective, this might reduce inequality in ICT usage in and out of school, and result in an increased uptake of careers in informatics by females through gender-sensitive socialisation processes in school education (see also Ertl & Helling, 2010).

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Annex – Analysis Scheme

Name of Resource	Complete vs. partial analysis
Please use the same name as in the PREDIL Resource Library	Please provide details on the exact object of analysis here, e.g. Complete analysis vs. partial analysis (which part? why?); What is the extent of the resource/ part of the resource? (e.g. number of chapters/ pages, linked websites/ sub pages)?; Does the resource/ part of resource contain text only/ pictures only/ both? Anything else that you feel is necessary for understanding the results!

<i>pictures</i>			
men in pictures	women in pictures	men in leading positions	women in leading positions
Count the overall number of men and women (e.g. photos, drawings or words that occur) on all pictures/ in all illustrations/ graphics		Count the number of men shown in leading positions on pictures/ in illustrations/ graphics, e.g. a male doctor and a female doctors' assistant , a male manager and a female assistant	Count the number of women shown in leading positions on pictures/ in illustrations/ graphics, e.g. a female doctor and a male doctors' assistant , a female manager and a male assistant

text					
male person	female person	men as acting persons	women as acting persons	men in leading positions	women in leading positions
Count the overall number of male/female persons in texts. A person who is named several times during a text counts each time!		Count the number of men and women which are the main agents/ acteurs in the described situation (who is described as doing something, e.g. in a task description, in a lesson plan). A person who conducts several actions/ activities during a text counts each time!		Count the number of men/women which have a leading position in the described situation. A person described as having a leading position several times during a text counts each time!	
sexist female expressions		neutral expressions			
Count the number of sexist expressions, e.g. housemaid (sexist) vs. domestic worker/ servant (non-sexist). An expression which occurs several times during a text counts each time!		Count the number of expressions that refer to both - men and women - without further specification of the sex (might be relevant in some languages only), e.g. guests, children, pupils, people, Lehrer/innen, they. A neutral expression which occurs several times during a text counts each time!			

> do not count expressions which address the reader personally, e.g. "you"
 > if some expressions, pictures, described action etc. are not clear, leave it out