Women in Computing around the World: an Initial Comparison of International Statistics

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Abstract

This technical report describes the participation of women in computing in more than 30 countries, by focussing on participation at undergraduate level. A brief discussion covers how societal and cultural factors may affect women's participation. Statistics from many different sources are presented for comparison. Generally, participation is low – most countries fall in the 10-40% range with a few below 10% and a few above above 40%. In the appendices, the approach to data collection is described and statistics for women in computing and mathematics are presented.

1 Introduction

This report presents a picture of the participation of women in computing around the world. Much has been published on the low participation of women in computing in the USA, UK and Australia; and there are researchers active in other countries seeking to describe and understand their own situations. It is important to consider the situation in different countries to avoid incorrect assumptions and to find appropriate solutions.

Recently, steps have been taken to obtain a global picture of the situation with the introduction of the ACM-W Ambassador program by the ACM's Committee on Women in Computing (ACM-W). Each ACM-W Ambassador will provide information about the status of women in computing in their country via a website – links to these sites can be found at http://www.acm.org/women.

This paper focusses on participation in academic study, specifically university undergraduate level, as this is a relatively available statistic. Other measures will be used to fill out the picture where necessary. Computing has been described as a discipline that contains aspects of science, engineering and mathematics [16]. As a result of this complex nature, it is not possible to infer the situation of women in computing from information about women in science, or information about women in engineering. Hence, published statistical information that aggregates disciplines is not useful in determining the status of women in computing. This article presents mostly information about computing, but presents more general information in places to broaden the picture.

The next section briefly considers how cultural factors affect the participation of women in computing. The main section of the paper then presents data from different countries. The data is presented compactly in tables, and details of how the tables can be interpreted are given. Finally, a brief discussion of the data is given. The first appendix describes how data was collected and the second appendix presents the percentage of women studying computer science and mathematics at tertiary level for 100 countries.

2 The effect of culture and society

The reasons that women choose to study computing will vary from culture to culture, and from country to country, and it is beyond the scope of this paper to consider this issue in detail. When seeking solutions for women's low participation in computing, it is important to consider all cultural and societal factors that may affect this participation. This also allows us to identify when a solution from one country may or may not be suitable to use in another country. For example, Mukhopadhyay [34] argues that the 'internal' 'self-selection' model used to explain the participation of women in science in the USA, cannot be applied to India. A model with the family as decision-maker is more appropriate and explains why there is lower participation in the applied sciences such as engineering and technology when compared to the pure sciences such as physics, chemistry and mathematics.

In 1994, Science published a special issue comparing women in science across a number of cultures and countries. Factors that were associated to high numbers of women in science are [4]: girls-only schooling (India, predominantly Catholic countries), compulsory mathematics and science through secondary school (Poland, Italy), family-friendly societies (Israel, Mediterranean countries), perceptions of science as a low-status occupation when compared to disciplines such as engineering (Portugal, Turkey, India), class issues (India, Latin American countries) and recently developed science capabilities (Portugal, Mexico, Argentina).

It is not clear whether these factors apply to computer science as well. Researchers have investigated cross-cultural gender issues in computing and some of these studies are now briefly described. Janssen Reinen and Plomp [27] considered primary and secondary school students from Austria, Bulgaria, Greece, India, Japan, Latvia, the Netherlands, Slovenia and the USA collected in 1989 and 1992. All countries showed gender differences in basic knowledge and skills except Bulgaria, USA and India. The lack of difference in the USA was attributed to high number of female teachers, parental encouragement and computer use outside school, and in Bulgaria it was attributed to high number of female teachers.

In their study of university students in 23 countries, Weil and Rosen [69] found that in Thailand, Italy and Kenya, males were significantly more anxious about computers, whereas in Israel and Hungary, women were significantly more anxious. There were significantly more male technophobes in Kenya, and significantly more female technophobes in the USA, Hungary and Australia. In the USA, Singapore, Kenya, Israel, Hungary, Czechoslovakia, Belgium, Australia and South Africa [11], men had significantly more positive cognitions with the reverse in Northern Ireland. In one country, Indonesia, female students had significantly more experience than males, and the opposite was found in Yugoslavia-Croatia, Thailand, Mexico, Japan, Italy, India, Hungary, Germany, Czechoslovakia and Australia.

Makrakis [31] considered computer self-efficacy amongst Japanese and Swedish secondary school pupils and found no gender differences in either country. The research showed the ‘We can, I can’t’ paradox [47, cited in [18]] appeared amongst Japanese students of both genders but not amongst the Swedish students, and this was attributed to a greater focus in Japanese society on group identity. A similar study investigating self-efficacy amongst Romanian and Scottish higher education students [17] found differences between the male and female students but there was no interaction of gender and nationality. Collis and Williams [12] found that there were fewer gender-based differences between Chinese students than Canadian students. The main gender-based difference for Chinese students was in the perceptions of women’s abilities where female students were much more positive than male students. This difference also occurred amongst the Canadian students.

Within a country, students of different backgrounds can have different experiences. Von Hellens and Nielsen [68] note that amongst IT students at an Australian university, female Asian students feel they are ignored by non-Asian students and male Asian students, whereas female non-Asian students feel they are the focus of sexual harassment and unwanted positive discrimination.

Not all countries have low participation by women. In 1987 more than 50% of application/analyst programmers and system analyst/designers in Singapore were female, and the majority of graduates from computer courses were female [29]. Uden [64] argues that this occurs because of government promotion of the use of computers, perceptions of good career prospects in IT, a preference amongst women for computing as opposed to engineering which also pays well, exposure to computers at schools level in a gender-neutral manner, and assistance with domestic responsibilities by older family members or employees.

3 Women’s participation in computing

The specific measure that will be considered in the tables that follow is women as a percentage of the total number of undergraduate computing students or computing graduates. Hence, the data collected concentrates on students taking computing at tertiary education level as a major subject, in the sense that their qualification will focus on computing. In some cases, the data refers to students in a particular year of study who are taking computing courses at a major level. Where is was not possible to determine the type of course, the course has been briefly described. Most data is drawn from universities, but as the tertiary education system varies from country to country, information has been drawn from other types of institutions such as technical colleges. Other data not specific to computing at tertiary level will be used to give a more complete picture.

Not all countries publish easily available national data recording the percentages, so data has been obtained from two other sources: data from individual universities and data reported by individuals attending or presenting classes at university level. There are four tables, Tables 1-4, grouping together countries from similar geographical areas. For a discussion of the approach taken in collecting data, see Appendix A.

Country	Data	Year	Trend	Type	Source
Botswana	10% (2)	1998		UG fy, CS	Ind, U of Botswana[a] [54]
Eritrea	< 10%	2001		UG, CS	Ind, U of Asmara[b] [33]
Madagascar	11.1%	1997?		Other[c]	National [67]
Kenya	11.1% (3)	2001		Deg, CS	Ind, U of Nairobi [46]
Libya	35.7% (606)	2002		Deg, CT	Insts, Alfateh U, 7th of April U, Altakadum U [2]
Nigeria	31.3% (10) 20%-30% 32.6%	1997 1994-6 1994	 28.7% 1991	UG, CS UG, CS CS	Ind, Ogun State U [51] Ind, U of Benin [1] Insts, Nigerian polytechnics [23]
South Africa	32.1% (337)	1998	none 1991	Deg, CS&IS	National [49]
Tanzania	3% (2)	1996	14% 1993	UG, Inf	Insts, U of Dar-es-Salam, Sokoine and Muhimbili [67]
Uganda	∼ 27% (9-10)	2000		UG fy, CS	Ind, U of Makerere [21]
Zimbabwe	40.7% (341)	1996		CS	Insts, Technical colleges [67]

[a]The University of Botswana is the only university in Botswana offering a BSc in Computer Science.
[b]The University of Asmara is the only university in Eritrea.
[c]Computer Science higher education teachers.

Table 1: Africa

3.1 Reading the tables

The first four tables have the format described below. Information that is unclear is marked with a question mark, and figures that are approximate are indicated with ∼.

Country: Some countries have more than one entry, when the data is reported from different sources. The data is presented as discovered, so there is the possibility of contradictory or disparate data.

Data: In this column, a percentage is given calculated from the total number of women and the total number of people, and if available, the actual number of women is given in brackets.

Year: This is the year or years that the data comes from. Where year information was given as an academic year split over two calendar years, the most recent year of the two is used in these tables.

Trend: This indicates any trends in the percentage data. If the percentage in the Trend column is less that that in the Data column, this means that since the year given in the Trend column, there has been an overall trend for the data to increase. If the percentage in the Trend column is more than that in the Data column, then since the year given in the Trend column, there has been a trend for the data to decrease. If 'none' appears in the trend column then since the year indicated in the Trend column, there has been no discernible trend. In some cases, the trends have been inferred from the data available, and in other cases, it has been described as a trend by the source of the data.

Type: This column covers the level and the discipline to which the data refers. As mentioned above, the data collected refers to the study of computing at major level at tertiary institutions. Where it was not possible to determine whether this was the case, the category 'Other' has been used.

The abbreviations for level are: 'UG' – undergraduate study, 'fy' – final year, '1y' – first year, 'dist' – distance learning, 'Deg' – first/undergraduate degree (this category excludes postgraduate/graduate qualifications), 'PG' – postgraduate study, 'Acc' – applicants accepted to degree programmes. The abbreviation 'UG&MSc' is used when figures are given for both undergraduate and MSc study. If the level could not be determined from the source, the level is not given.

The abbreviations used for discipline are: 'CS' – Computer Science, 'Inf' – Informatics, 'IT' – Information Technology, 'IT&T' – Information Technology and Telecommunications, 'Cmp' – Computing, 'CmpSci' – Computing Science, 'CmpStd' – Computer Studies, 'CSS' – Computer and System Sciences, 'CSys' – Computer Systems, 'BusCmp' – Business Computing, 'Tech' – Technology, 'CT' – Computer Technology, 'TechInf' – Technical Informatics, and 'IS' – Information Systems.

Country	Data	Year	Trend	Type	Source
India	20.3% (15)	2002	none 1993	UG, CS	Inst, Annamalai U [59]
	11.3% (11)	1996		CSS	Inst, J Nehru U [10]
	7.84% (22,857)	1994	none 1992	Other[a]	National [10]
	28.42% (27)	1993	7.3% 1982	IT	Inst, Andhra U [22]
Iran	41%	1999?		CS	Insts, vocational and training institutions [50]
Pakistan	18.2% (8)	2000		PG, CS	Insts, Q.A.U. Islamabad [5]
	4.99% (685)	1998		Other[b]	Insts [5]
Malaysia	51.4% (2,167)	1991		Other[c]	National [39]
Singapore	$>$ 50%	1987?		Other[d]	Insts [29]
Thailand	55% (158,286)	1998	57.2% 1996	Other[e]	Insts [36]
Turkey	20.4% (1,753)	2001	18.3% 1997	UG, CSys	National [37, 3]
Australia	19%	1998	22% 1994	IT&T	National [38]
	49%	1995	∼35% 1990	UG, BusCmp	Inst, Victoria U [13]
New Zealand	20%	1992-6		Deg, CS&IS	Inst, Massey U [48]
	26%	1989-96		UG 1y, Cmp	Inst, Auckland U [48]
	17-23%	1990-6		UG 1y, CS	Inst, Victoria U of Wellington [7]

[a] Students studying Engineering and Technology. National statistics do not give separate figures for computing [10]. Most computer science departments are located in faculties of Engineering and Technology [22].
[b] Enrollment at universities of engineering and technology.
[c] Students enrolled for computer related courses at tertiary institutions.
[d] Graduates from computer courses from four public institutions.
[e] Participation in computer courses at private vocational institutes.

Table 2: Asia and Australasia

Country	Data	Year	Trend	Type	Source
Czech Republic	9.6% (51)	2001		UG, Inf	Ind, Masaryk U [9]
	25%	1989-94		UG&MSc, CS	Ind, Charles U [58]
Denmark	6%	1996		CS	National [43]
Finland	20%	1997	31% 1985	UG 1y, IT	National [43]
Germany	10.5% (610)	2000	16.2% 1995	Deg,Inf	National [57]
	8.8% (46)	1999		Inf	Inst, U Karlsruhe [28]
	9%	1999		Inf	Inst, RWTH Aachen [28]
	9.5% (2,958)	1994	18.8% 1979	UG, Inf	National (West Germany) [41]
Iceland	24% (47)	2000		CS	Inst, U of Iceland [52]
	28% (42)	1999		UG, CS	Inst, Reykjavík U [52]
Netherlands	6.6% (7)	1999		TechInf	Inst, Technical U Delft [28]
	18%	1992		UG dist, Inf	Inst, Open U of the Netherlands [15]
	12%	1991		Tech	Insts, traditional universities [63]
Norway	23.2% (1,691)	1999	20.4% 1996	Tech	National [56]
	34% (69)	1998	6% 1996	CS	Inst, Norwegian U of Science and Technology (NTNU) [40]
Slovenia	6.7% (94)	2000?		CS&Inf	Inst, U of Ljubljana [55]
Spain	25.2% (1,101)	1998		Deg, Inf[a]	National [25]
Sweden	30% (16,245)	2000		UG, Tech	National [60]
	∼10% (∼24)	1990-4		UG, CS	Inst, Uppsala U [6]
Switzerland	11.4% (122)	2001	4,2% 1995	UG, Inf	Inst, ETH Zürich [30, 20]
	6.5% (2)	1998		Deg, Inf	Inst, EPFL [24]
UK	19% (3,444)	1999		Acc, CmpStd	National [42]

[a] Students graduating with Diplomado Informática, Ing. Téc. Informática de Sistemas, and Ing. Informática.

Table 3: Europe

Country	Data	Year	Trend	Type	Source
Canada	24% (211) 12% (55),	2000 1997	16% 1993	UG, CS UG, CmpSci	Inst, UBC [62] Inst, Simon Fraser U [61]
USA	26.7% (7,166)	1998	37.1% 1984	Deg, CS&IS	National [35]
USA & Canada	20.4% (2,372)	2000		Deg, CS	Inst, PhD granting departments [8]
Mexico	39.2% (55,154)	1999	43.1% 1992	UG, Cmp[a]	National [26]
Brazil[b]	34.8% (5,641) 20%	1993 1993		UG, CS UG, CS	National [32] Insts, U of São Paulo, U of Campinas [32]
Bolivia	34.1% (15)	1997		Inf	Insts, private universities [45]
Guyana	54.5% (22)	2001	none 1998	Deg, CS	Ind, University of Guyana[c] [14]

[a] Students registered for a Licenciatura in Computación y Sistemas.

[b] Other data records 5-10% female students at University of São Paolo, in the last ten years and not more than 20% at other institutions in the same period [53].

[c] The University of Guyana is the only university in Guyana.

Table 4: North and South America

'Other' is used when the data is not about major-level computing at university or a similar tertiary institution, and a footnote is given describing the data.

Source: If the data is national, 'National' is used. 'Inst' is used for published or official data from a specific university or institution, and 'Insts' for similar data from a group of universities or institutions. 'Ind' is used for data given by an individual. For both institutional and individual data, the names of the institutions are given where known.

3.2 Other data

The 1998 UNESCO Statistical Yearbook [66] gives figures on participation on women in the subject area Mathematics and Computer Science, both in terms of enrollment and graduates. This data is of interest, but must be considered with care as a high participation in mathematics may mask a low participation in computer science or *vice versa*. The 1999 editions of the Statistical Yearbook does not give this breakdown – it only gives figures of female participation for the broad fields Education, Humanities, Social Sciences, Natural Sciences, Medical Sciences and Others – and no future issues are planned of this yearbook [19]. A summary of the statistics from the 1998 UNESCO Statistical Yearbook can be found in Appendix B.

3.3 Discussion

As can be seen from the tables, there is a wide range in participation in computing by women. As the information covers different courses and different levels, it is difficult to do a direct comparison between countries. It can be seen from the data, participation is between 10% and 40% in most countries and courses, with a wide spread in this range. Hence, there is a strong indication that there is an underrepresentation of women in computing worldwide, at least in terms of undergraduate participation. There are some countries and courses where women's participation is below 10%, some with participation above 40%, and a few where women are in the majority. Some countries and courses show an increasing trend and some decreasing, so it is not possible to predict future changes. To conclude, women appear to be under represented in the discipline of computing, when we consider the figures for undergraduate participation, and there is no clear indication that this will improve in the near future. Ongoing research is required to determine causes and solutions.

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Request for Information: The research that lead to this article is ongoing and the author appreciates any information about countries not discussed in this article, or more recent information about countries mentioned here.

A Data collection

For the record, this appendix details the process that was used to collect data for this survey. In general, finding information of this type is fairly difficult because:

- it often doesn't exist because it hasn't been collected.
- data exists but it is not identifiable. For example, it often not clear whether computer science is categorised under the headings Natural Science, Engineering or Technology.
- data exists, but it is not disaggregated. So for example, even if it is possible to determine that Computer Science is included under Natural Science, it is not possible to obtain the Computer Science statistics.
- it is not clear from the data source to what the data refers. For example, it can be difficult to determine whether the figures cover all tertiary education or university-level education.

Because of these difficulties, the approach taken in this report has been to give the reader as much information as possible about the data and its source. This is done to show that the data is not necessarily comparable and to give the important details of the data. As can be seen from the tables in the body of the report, these details include the actual percentage, the actual count (if available), trend information (if available), the year, the level of study and field of study, the type of information and the source of the information.

The majority of this data was collected online in the following fashion:

- searching with appropriate terms in a search engine such as Google (`www.google.com`).
- working through lists of national statistical websites such as those at
  - United Nations (`www.un.org/Depts/unsd/gs_natstat.htm`)
  - Statistics Netherlands (`www.cbs.nl/en/services/links/default.asp`)

Other data was collected through journal articles and books. There are a number of limitations to this general approach:

- Lack of consistency in terms of what is measured because it comes from a variety of sources.
- Lack of detailed information – it may be the case with a national statistical site that there is a non-electronic document with the information being sought for. Clearly a web search will not find this document.

As, can be seen from the data presented in the first part of the report, there is clearly substantial variation in what is being measured. However, within the limitation of the approach taken in data collection, it is a comprehensive survey, and the author is not aware of any similar work.

B Computer Science and Mathematics

This appendix summarises data from the 1998 UNESCO Statistical Yearbook [66] and from an European Union Report [44]. These appear to be one of the few sources of global statistics that specifically mention computer science as a field of study. Unfortunately, it is aggregated with mathematics, and hence high participation in the mathematics may hide low participation in computer science, and *vice versa*. However, because of its breadth, this data is included in this report.

B.1 UNESCO data

The UNESCO data covers 'general programmes in mathematics, statistics, actuarial science, computer science', and is presented for the following academic levels:

ISCED Level 5: Programmes leading to an award not equivalent to a first university degree.

ISCED Level 6: Programmes leading to a first university degree or equivalent qualification

ISCED Level 7: Programmes leading to a post-graduate university degree or equivalent qualification

Country	%	Country	%	Country	%	Country	%
Albania[a]	52	Estonia	25	Latvia	38	Romania	51
Austria	20	Finland	30	Lithuania	36	Slovakia	18
Belgium[a]	18	Germany	22	Macedonia	40	Slovenia	14
Bulgaria	53	Hungary	29	Netherlands	14	Spain	29
Czech Republic	15	Ireland	33	Poland	47	Sweden	35
Denmark	22	Italy	45	Portugal	38	United Kingdom[a]	25

[a] 1997

Table 5: Participation in tertiary level mathematics and computer science 1998 [44]

Data is given for number of students as well as number of graduates. Not all countries have data for the number of women, and those that do not are excluded.

The approach taken in summarising the data is to present data for all tertiary education, namely ISCED Level 5, 6, and 7 (Tables 6 and 7), and for first university degrees, namely ISCED Level 6 (Tables 8 and 9). For both of these types of data, the most common data available is number of students. In a few cases, this data was not available, and the number of graduates is used instead The tables have the following format:

Country: This is the country name. The same list is used for both sets of tables, even though for ISCED Level 6 some countries have no data.

Percentage: This is the number of women expressed as a percentage of the total number of students.

Year: This is the year that the data comes from. In the case of academic years split over two calendar years, the more recent year is used.

Count: This is the actual number of female students or graduates.

Type: This is the type of data, either students or graduates. Note that when considering actual numbers, care should be taken in comparing student numbers with graduate numbers.

Change: For some countries, two years of student numbers are given. In this case, if there has been a change of five percent in the percentage figure, this is indicated as either an increase or decrease. If the change is smaller than this, it is indicated by the word 'Static'. given.

The tables show a wide range of participation rates from 1.3% at ISCED Level 6 to 81.0% at ISCED Level 6. No clear trends can be determined from the change indicators – some countries have seen an increase in participation, some a decrease, but most show little change. Considering the countries with a majority of women participation, a number come from the Far East, Middle East and Eastern Europe. A sociological analysis of cultural factors may be able to explain these patterns, but this is beyond the scope of this report.

B.2 European Union data

The European Union (EU) information covers computer science and mathematics and computer science data for a number of European countries – EU member states as well as countries from Central and Eastern Europe (the PHARE countries). This data is provided here because it is more recent than the UNESCO data, but it is tabulated separately because of a change in the ISCED classification system [65]. The data is for the new ISCED levels 5 and 6 which covers all tertiary education. It is not clear whether this can be directly equated with the previous ISCED levels 5, 6 and 7 as described above. Table 5 presents the the percentage of women studying computer science and mathematics. There is no clear pattern in this data. All countries with a majority of women are in Eastern Europe. Italy, Macedonia, Latvia, Lithuania and Portugal have more than 35% participation. The lowest figures (less than 20%) are found in a range of countries – Belgium, Czech Republic, the Netherlands, Slovenia and Slovakia. Again, an analysis of the factors causing these differences are beyond the scope of this report.

Country	%	Year	Count	Type	Change
Albania	56.2%	1997	224	Students	Increase (1991)
Algeria	36.0%	1996	7,006	Students	
Armenia	50.9%	1996	665	Students	
Australia	25.0%	1996	7,001	Students	
Austria	20.5%	1996	3,651	Students	Static (1991)
Bahrain	67.5%	1991	329	Students	
Belgium	22.9%	1994	2,378	Students	Static (1991)
Botswana	30.4%	1997	45	Students	
Brazil	40.3%	1994	37,413	Students	Static (1990)
Brunei Darussalam	48.8%	1996	22	Students	
Bulgaria	53.6%	1997	1,974	Students	Static (1991)
Burkina Faso	5.4%	1995	5	Students	Static (1991)
Burundi	17.6%	1992	9	Students	
Canada	27.6%	1996	16,235	Students	Static (1991)
Congo	6.8%	1991	13	Students	
Côte d’Ivoire	18.6%	1994	515	Students	
Croatia	26.3%	1997	195	Students	Decrease (1993)
Cuba	28.7%	1997	202	Students	Decrease (1991)
Cyprus	39.4%	1997	290	Students	Static (1991)
Czech Republic	15.2%	1996	464	Students	Static (1993)
Denmark	27.2%	1996	1,538	Students	Static (1991)
Eqypt	43.4%	1996	708	Students	Increase (1991)
Eritrea	3.7%	1998	5	Students	
Estonia	45.8%	1997	261	Students	Decrease (1993)
Ethiopia	17.8%	1996	171	Students	Static (1991)
Finland	16.9%	1996	2,425	Students	Decrease (1991)
Georgia	52.1%	1996	795	Students	
Germany	22.5%	1996	25,783	Students	Static (1993)
Ghana	11.4%	1991	26	Students	
Greece	32.5%	1993	4,377	Students	Decrease (1990)
Guyana	32.6%	1995	49	Students	
Honduras	6.6%	1994	177	Students	Decrease (1990)
Hungary	40.3%	1995	1,609	Students	Increase (1991)
Iceland	12.0%	1995	32	Students	
Indonesia	34.2%	1996	43,861	Students	Decrease (1993)
Iran	39.1%	1997	11,225	Students	Increase (1991)
Ireland	27.3%	1996	816	Students	Static (1991)
Israel	34.6%	1993	2,129	Students	Static (1991)
Italy	42.2%	1996	21,016	Students	Static (1991)
Japan	20.1%	1992	4,218	Students	
Jordan	42.1%	1997	4,044	Students	Increase (1991)
Kazakstan	38.6%	1995	2,502	Students	
Korea	33.2%	1997	49,206	Students	Static (1991)
Kuwait	80.9%	1996	507	Students	
Kyrgyzstan	72.5%	1994	1,359	Students	
Lao People’s DR	28.5%	1993	62	Students	
Latvia	31.5%	1997	1506	Students	
Lebanon	37.6%	1996	840	Students	
Lesotho	32.5%	1997	13	Students	
Lithuania	43.2%	1997	831	Students	

Table 6: ISCED Levels 5, 6 and 7

Country	%	Year	Count	Type	Change
Macau	20.5%	1997	15	Graduates	
Macedonia	64.2%	1997	560	Students	Increase (1993)
Madagascar	26.2%	1997	152	Students	Increase (1991)
Malaysia	50.9%	1991	2,322	Students	
Mali	4.9%	1991	3	Students	
Malta	13.3%	1991	4	Students	
Mauritania	13.2%	1994	7	Students	
Mauritius	29.9%	1991	38	Students	
Mexico	46.6%	1995	29,937	Students	Increase (1991)
Mongolia	48.7%	1997	626	Students	
Mozambique	27.1%	1993	38	Students	
Myanmar	62.2%	1995	9,702	Students	
Netherlands	9.9%	1996	794	Students	Decrease (1991)
New Zealand	32.0%	1996	438	Students	Increase (1990)
Nicaragua	48.1%	1995	1,849	Students	Decrease (1990)
Norway	21.4%	1996	337	Students	Decrease (1991)
Oman	59.0%	1992	36	Students	
Palestine	31.7%	1997	683	Students	
Panama	53.1%	1994	830	Students	
Papua New Guinea	32.5%	1995	27	Students	
Paraguay	46.0%	1993	1,215	Students	
Poland	56.2%	1994	7,214	Students	Static (1991)
Portugal	46.4%	1995	5,961	Students	Static (1991)
Qatar	66.0%	1992	113	Students	
Romania	51.5%	1997	6,423	Students	
Russian Federation	54.9%	1995	84,717	Students	
Rwanda	13.6%	1990	6	Graduates	
Saudi Arabia	76.7%	1996	6,197	Students	Increase (1991)
Senegal	12.4%	1992	22	Students	
Slovakia	21.8%	1997	224	Students	Static (1993)
Slovenia	42.9%	1997	89	Students	Increase (1992)
South Africa	34.9%	1994	10,653	Students	
Spain	30.7%	1996	27,006	Students	Static (1991)
Sri Lanka	33.4%	1995	106	Students	
St Kitts and Nevis	46.2%	1993	31	Students	
Sudan	29.9%	1991	260	Students	
Sweden	28.9%	1996	4,651	Students	Increase (1991)
Switzerland	14.3%	1996	413	Students	Static (1991)
Syrian Arab Republic	39.0%	1995	345	Students	Decrease (1991)
Tanzania	2.7%	1996	2	Students	
Togo	2.9%	1990	6	Students	
Tunisia	27.5%	1997	708	Students	Increase (1991)
Turkey	34.8%	1995	10,010	Students	Static (1991)
UAE	64.7%	1991	167	Students	
Uganda	17.9%	1996	48	Students	Increase (1991)
United Kingdom	23.9%	1995	26,423	Students	Static (1991)
USA	37.1%	1995	26,749	Graduates	
US Virgin Islands	67.4%	1993	60	Students	
Yemen	26.3%	1992	19	Students	
Zimbabawe	36.6%	1996	343	Students	Static (1990)

Table 7: ISCED Levels 5, 6 and 7 (Cont.)

Country	%	Year	Count	Type	Change
Albania	46.4%	1991	58	Students	
Algeria	32.9%	1996	4,368	Students	
Armenia					
Australia	24.7%	1996	5,343	Students	
Austria	20.9%	1996	3,192	Students	Static (1991)
Bahrain					
Belgium	28.4%	1994	664	Students	Static (1991)
Botswana	25.4%	1997	16	Students	
Brazil	40.4%	1994	37,413	Students	Static (1990)
Brunei Darussalam					
Bulgaria	53.9%	1997	1,935	Students	Static (1991)
Burkina Faso	5.4%	1995	5	Students	Static (1991)
Burundi	17.6%	1992	9	Students	
Canada	27.8%	1996	7,578	Students	Static (1991)
Congo	7.1%	1991	13	Students	
Côte d’Ivoire					
Croatia	26.4%	1997	195	Students	Decrease (1993)
Cuba	28.8%	1997	202	Students	Decrease (1991)
Cyprus	57.0%	1997	142	Students	
Czech Republic	15.0%	1996	399	Students	
Denmark	27.2%	1996	1,538	Students	Static (1991)
Eqypt	62.0%	1996	529	Students	Increase (1991)
Eritrea	3.8%	1998	5	Students	
Estonia	39.9%	1997	144	Students	Decrease (1993)
Ethiopia	8.7%	1996	49	Students	Static (1991)
Finland	16.8%	1996	1,890	Students	Static (1991)
Georgia	52.0%	1996	714	Students	
Germany	22.5%	1996	25,358	Students	Static (1993)
Ghana	10.7%	1991	22	Students	
Greece	34.1%	1993	4,115	Students	Decrease (1990)
Guyana	29.8%	1995	25	Students	
Honduras	6.4%	1994	170	Students	Decrease (1990)
Hungary	21.5%	1991	94	Students	
Iceland	10.3%	1995	14	Students	
Indonesia	27.4%	1996	14,272	Students	Decrease (1993)
Iran	41.2%	1997	10,025	Students	Increase (1991)
Ireland	40.7%	1996	399	Graduates	
Israel	35.8%	1993	1,771	Students	Static (1991)
Italy	42.0%	1996	20,745	Students	Static (1991)
Japan	20.0%	1992	3,852	Students	
Jordan	32.4%	1997	2,141	Students	Static (1991)
Kazakstan	38.6%	1995	2,502	Students	
Korea	35.2%	1997	35,391	Students	Increase (1991)
Kuwait	81.0%	1996	506	Students	
Kyrgyzstan					
Lao People’s DR	28.6%	1993	62	Students	
Latvia	32.6%	1997	1,302	Students	
Lebanon	37.6%	1996	840	Students	
Lesotho					
Lithuania	39.8%	1997	517	Students	

Table 8: ISCED Level 6

Country	%	Year	Count	Type	Change
Macau	21.4%	1997	15	Graduates	
Macedonia	64.3%	1997	560	Students	Increase (1993)
Madagascar	16.1%	1991	71	Students	
Malaysia	49.4%	1991	678	Students	
Mali	4.9%	1991	3	Students	
Malta	13.3%	1991	4	Students	
Mauritania	13.2%	1994	7	Students	
Mauritius	17.5%	1991	11	Students	
Mexico	47.3%	1995	29,311	Students	Increase (1991)
Mongolia	47.5%	1997	549	Students	
Mozambique	27.1%	1993	38	Students	
Myanmar	62.1%	1995	9,423	Students	
Netherlands	16.0%	1991	450	Students	
New Zealand	24.6%	1996	172	Students	Increase (1990)
Nicaragua	48.3%	1995	1,843	Students	Decrease (1990)
Norway	14.6%	1996	86	Students	Decrease (1991)
Oman	59.0%	1992	36	Students	
Palestine	32.3%	1997	676	Students	
Panama	53.7%	1994	746	Students	
Papua New Guinea	32.5%	1995	27	Students	
Paraguay	46.0%	1993	1,215	Students	
Poland	57.8%	1994	6,679	Students	Static (1991)
Portugal	49.4%	1995	5,102	Students	Static (1991)
Qatar	73.9%	1992	68	Students	
Romania	52.7%	1997	5,786	Students	
Russian Federation	56.4%	1995	77,510	Students	
Rwanda					
Saudi Arabia	74.0%	1996	5,166	Students	Increase (1991)
Senegal	12.4%	1992	22	Students	
Slovakia	22.5%	1997	194	Students	Static (1993)
Slovenia	43.0%	1997	86	Students	Increase (1992)
South Africa	31.3%	1994	4,542	Students	
Spain	30.6%	1996	25,618	Students	Static (1991)
Sri Lanka	18.8%	1994	9	Graduates	
St Kitts and Nevis					
Sudan					
Sweden	29.8%	1996	4,476	Students	Increase (1991)
Switzerland	14.0%	1996	331	Students	Static (1991)
Syrian Arab Republic					
Tanzania	2.7%	1996	2	Students	
Togo	1.3%	1990	1	Students	
Tunisia	27.3%	1997	618	Students	Increase (1991)
Turkey	37.0%	1995	7,209	Students	Static (1991)
UAE	64.7%	1991	167	Students	
Uganda	16.7%	1996	36	Students	Increase (1991)
United Kingdom	24.9%	1995	16,576	Students	Static (1991)
USA	35.1%	1995	13,369	Graduates	
US Virgin Islands	67.4%	1993	60	Students	
Yemen	35.7%	1992	10	Graduates	
Zimbabawe	2.0%	1996	2	Students	

Table 9: ISCED Level 6 (Cont.)

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