

Main conclusions of the self-assessment made in participant HEIS on gender equity in STEM fields

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Contents

1. Objective
2. Description and scope of the self-assessment instrument
3. Data available from the survey
4. Some preliminary results
5. Lessons learnt and future steps

Objective

To analyze, quantitatively, the current state of each institution regarding indicators of access, attraction, guidance and retention of women in STEM programs.

“if you cannot measure it, no one will be responsible”

ATTRACTION

applications
statistics

ACCESS

enrollment
statistics

GUIDANCE

policies(?)
checklist

Description and scope of the self-assessment instrument

SAGA Indicator Matrix

From Measuring Gender Equality in Science and Engineering: The SAGA Toolkit Working Paper 2, p. 57 – 60

<https://unesdoc.unesco.org/ark:/48223/pf0000259766>

Table 8. SAGA Indicator Matrix

Indicators	STI gender objectives						
	1	2	3	4	5	6	7
	Social norms and stereotypes	Primary and secondary education	Higher education	Career progression	Research content, practice and agendas	Policy-making processes	Entrepreneurship and innovation

Teachers

- 4 Total and share of female teachers by
- subject (in science)
 - type of institution (private, public)
 - educational level (primary, secondary, TVET)

Source: National education data

X

HEI



Students

- 5 Total and share of female students by
- age
 - field of study
 - level of education (ISCED)
 - by classroom (ratio of female students to teacher)

Source: National education data

X

Applicants

- 6 Total and share of female applicants to university by
- field of study (broad and especially narrow – STEM fields)
 - educational levels

Source: National education data

X

Accepted

- 7 Total and share of women accepted to university programmes by
- field of study (broad and especially narrow – STEM fields)
 - educational level

Source: National education data

X

Enrolled

- 8 Total and share of women enrolled in university programmes by
- field of study (broad and especially narrow – STEM fields)
 - educational level

Source: National education data

X

Graduates

- 9 Total and share of female graduates from university programmes by
- field of study (broad and especially narrow – STEM fields)
 - educational level

Source: National education data

X

The 10 core themes in the W-STEM institutional data collection matrix (the Excel spread sheet):

University background info (total number of students and staff: males/females), **STEM Programmes** according to ISCED 2013 classification – broad field.

Students (question nbr 5)

Attraction (nbr 6), Access (nbr 7), Enrollment (question nbr 8)

Discrimination (nbr 14), Sexual harassment (nbr 15)

Guidance (question nbr 47), Dropouts (question nbr 48)

STEM-variant of ISCED-F 2013

Table 2 From Measuring Gender Equality in Science and Engineering: The SAGA Toolkit Working Paper 2, p. 35

<https://unesdoc.unesco.org/ark:/48223/pf0000259766>

Table 2. STEM-variant of ISCED-F 2013

Broad and narrow fields	Detailed fields
05 Natural sciences, mathematics and statistics	
051 Biological and related sciences	0511 Biology
	0512 Biochemistry
052 Environment	0521 Environment sciences
	0522 Natural environments and wildlife
053 Physical sciences	0531 Chemistry
	0532 Earth sciences
	0533 Physics
054 Mathematics and statistics	0541 Mathematics
	0542 Statistics
06 Information and communication technologies	
061 Information and communication technologies	0611 Computer use
	0612 Database and network design and administration
	0613 Software and applications development and analysis
07 Engineering, manufacturing and construction	
071 Engineering and engineering trades	0711 Chemical engineering and processes
	0712 Environmental protection technology
	0713 Electricity and energy
	0714 Electronics and automation
	0715 Mechanics and metal trades
	0716 Motor vehicles, ships and aircraft
072 Manufacturing and processing	0721 Food processing
	0722 Materials (glass, paper, plastic and wood)
	0723 Textiles (clothes, footwear and leather)
	0724 Mining and extraction
073 Architecture and construction	0731 Architecture and town planning
	0732 Building and civil engineering

Broad and narrow fields	Detailed fields
05 Natural sciences, mathematics and statistics	
051 Biological and related sciences	0511 Biology
	0512 Biochemistry
052 Environment	0521 Environment sciences
	0522 Natural environments and wildlife
053 Physical sciences	0531 Chemistry
	0532 Earth sciences
	0533 Physics
054 Mathematics and statistics	0541 Mathematics
	0542 Statistics

06 Information and communication technologies

061 Information and communication technologies

0611 Computer use

0612 Database and network design and administration

0613 Software and applications development and analysis

07 Engineering, manufacturing and construction

071 Engineering and engineering trades	0711 Chemical engineering and processes
	0712 Environmental protection technology
	0713 Electricity and energy
	0714 Electronics and automation
	0715 Mechanics and metal trades
	0716 Motor vehicles, ships and aircraft
072 Manufacturing and processing	0721 Food processing
	0722 Materials (glass, paper, plastic and wood)
	0723 Textiles (clothes, footwear and leather)
	0724 Mining and extraction
073 Architecture and construction	0731 Architecture and town planning
	0732 Building and civil engineering

Description and scope of the self-assessment instrument

- **The survey is organized in 26 sections**, 10 of which are marked to indicate that they are most relevant to examine attraction, access and guidance of women in STEM fields at the institutional level.
- **Universities are requested to provide information to the level available in each institution**,
 - Aggregate data (University total for STEM programs)
 - By fields of study for STEM programs (ISCED-F 2013 variants).
- **Information is gathered on the undergraduate education level only (bachelor's degree or equivalent)**, this is specifically for the **2018 student intake** and data concerning them during their first year of studies in the academic year 2018 – 2019.

Description and scope of the self-assessment instrument

Main sections

PROGRAMMES

4. STAFF

5. STUDENTS

6. ATTRACTION

7. ACCESS

8. ENROLLMENT

9. GRADUATES

10. NOMINATIONS FOR SCHOLARSHIP AND AWARD

11. APPLICATIONS TO SCHOLARSHIPS AND AWARDS

12. RECIPIENTS OF SCHOLARSHIPS AND AWARDS

13. TERTIARY EDUCATION

14. DISCRIMINATION

15. SEXUAL HARASSMENT

16. APPLICANTS TO FUNDING FOR INTERNATIONAL MOBILITY

17. RECIPIENTS TO FUNDING FOR INTERNATIONAL MOBILITY

18. PARTICIPANTS TO INTERNATIONAL MOBILITY PROGRAMMES

19. RE-ENTRY GRANT APPLICANTS AFTER CAREER BREAKS

20. RECIPIENTS FOR RE-ENTRY GRANT AFTER CAREER BREAKS

21. DAY AND CHILD CARE FACILITIES

22. SCIENCE & ENGINEERING OCCUPATIONS

23. TERTIARY EDUCATED IN S&E OCCUPATIONS

24. GROSS ANNUAL EARNINGS

25. APPLICANTS OF ENGINEERING CERTIFICATION

26. RECIPIENTS OF ENGINEERING CERTIFICATION

47. GUIDANCE (modified nbr 9)

48. DROP-OUTs (NEW)

Description and scope of the self-assessment instrument

Main sections

INSTITUTIONAL BACKGROUND INFO

PROGRAMMES

Programmes that are you using for data collection

Unique multidisciplinary STEM programmes that intend to attract especially female students

Length of programmes (years / months)

4. STAFF

Number of teaching staff members for first year programmes, by field of study

Number of staff trained on gender issues in education.

Related policies:

Training on gender issues education provided for staff in STEM programmes

Benefits provided for its staff advancing their gender competence

5. STUDENTS

Number students by field

Description and scope of the self-assessment instrument

Main sections (cont.)

6. ATTRACTION

Number of applicants and related policies

7. ACCESS

Number of applicants accepted and related policies

8. ENROLLMENT

Number of applicants enrolled and related policies

9. GRADUATES

Total number of graduates

10. NOMINATIONS FOR SCHOLARSHIP AND AWARD

Number of nominations for scholarships and related policies

11. APPLICATIONS TO SCHOLARSHIPS AND AWARDS

Number of applicants for scholarships and awards and related policies

12. RECIPIENTS OF SCHOLARSHIPS AND AWARDS

Number of recipients of scholarships and awards

13. TERTIARY EDUCATION

Number of population with tertiary education by age

14. DISCRIMINATION

Number of reported discrimination events and related policies

15. SEXUAL HARASSMENT

Number of reported sexual harassment events and related policies

Description and scope of the self-assessment instrument

Main sections (cont.)

16. APPLICANTS TO FUNDING FOR INTERNATIONAL MOBILITY

Number of applicants for international mobility and related policies

17. RECIPIENTS TO FUNDING FOR INTERNATIONAL MOBILITY

Number of recipients to funding for international mobility

18. PARTICIPANTS TO INTERNATIONAL MOBILITY PROGRAMMES

Number of participants to international mobility programmes

19. RE-ENTRY GRANT APPLICANTS AFTER CAREER BREAKS

Number of applicants for re-entry after career breaks and related policy

20. RECIPIENTS FOR RE-ENTRY GRANT AFTER CAREER BREAKS

Number of recipients for re-entry grant after career breaks

21. DAY AND CHILD CARE FACILITIES

Total use of day and child care facilities

Number of men taking a child/children to day and child care facilities and Related policies

Description and scope of the self-assessment instrument

Main sections (cont.)

22. SCIENCE & ENGINEERING OCCUPATIONS

Number of workers in S&E occupations in your country.

23. TERTIARY EDUCATED IN S&E OCCUPATIONS

Number of tertiary educated and employed as professionals or technicians (S&E occupations) as a percentage of tertiary educated people.

24. GROSS ANNUAL EARNINGS

Gross annual earnings by sex; field of R&D; occupation; economic activity e.g. (NACE).

25. APPLICANTS OF ENGINEERING CERTIFICATION

Number of applicants for engineering and related policies

Description and scope of the self-assessment instrument

Main sections (cont.)

26. RECIPIENTS OF ENGINEERING CERTIFICATION

Number of recipients of engineering certification and related policies

47. GUIDANCE (modified nbr 9)

Number of applicants who enrolled in first year

Number of students graduated by field of study

Related policies

48. DROP-OUTS (NEW)

Total drop-out on first year and related policies

A brief description of the student drop-out procedure at your university with a specification if there are preventing measures at place.

Data available from the survey

- 29th September : First proposal spreadsheet form for the survey was shared
- 3th July : Final spreadsheet form for the survey and Instruction notes were sent
- 9th October : Reception of Questions initiates
- 17th October : Responses to questions were sent
- 30th October : Cloud space was created to receive completed surveys from institutions
- 20th November : 12 surveys available

University of Salamanca

Universidad del Norte

Oulu University

Politecnico di Torino

Technological University Dublin

Northern Regional College

Universidad de Guadalajara

Pontificia Universidad Católica de Valparaíso

Universidad Tecnológica de Bolívar

Instituto Tecnológico de Costa Rica

Universidad de Costa Rica

Universidad Técnica del Norte

Survey Data

Main Fields Reported

FIELD	#	FIELD	#	FIELD	#
05 Natural sciences, mathematics and statistics	12	07 Engineering, manufacturing and construction	12	06 Information and Communication Technologies (ICTs)	11
051 Biological and related sciences	11	071 Engineering and engineering trades	12	061 Information and Communication Technologies (ICTs)	11
0511 Biology	10	0711 Chemical engineering and processes	12	0611 Computer use	11
0512 Biochemistry	11	0712 Environmental protection technology	11	0612 Database and network design and administration	11
052 Environment	11	0713 Electricity and energy	12	0613 Software and applications development and analysis	12
0521 Environmental sciences	10	0714 Electronics and automation	12		
0522 Natural environments and wildlife	10	0715 Mechanics and metal trades	11		
053 Physical sciences	11	0716 Vehículos de motor, barcos y aeronaves.	11		
0531 Chemistry	11	INDUSTRIAL ENGINEERING	11		
0532 Earth sciences	11	0719 engineering and engineering trades not elsewhere classified	2		
0533 Physics	11	072 Manufacturing and processing	11		
054 Mathematics and statistics	12	0721 Food processing	10		
0541 Mathematics	12	0722 Materials (glass, paper, plastic and wood)	11		
0542 Statistics	10	0723 Textiles (clothes, footwear and leather)	10		
		0724 Mining and extraction	11		
		073 Architecture and construction	12		
		0731 Architecture and town planning	12		
		0732 Construcción e ingeniería civil	12		
		078 Inter-disciplinary programmes and qualifications involving engineering, manufacturing and construction	1		
		0788 Inter-disciplinary programmes and qualifications involving engineering, manufacturing and construction	1		
		0789 Ingeniería Mecatrónica	1		

Survey Data

Other Fields Reported

FIELD	#	FIELD	#	FIELD	#
06 Information and Communication Technologies (ICTs)	12	02 Arts and Humanities	2	08 Agriculture, Forestry, Fisheries and Veterinary	1
061 Information and Communication Technologies (ICTs)	12	021 Arts	2	081 Agriculture	1
0611 Computer use	11	0212 Fashion, interior and industrial design	2	0811 Crop and livestock production	1
0612 Database and network design and administration	11			0812 Horticulture	1
0613 Software and applications development and analysis	12			082 Forestry	1
				0821 Forestry	1
OTHER	1			10 Services	1
Systems engineering (computer science engineering)	1			102 Hygiene and occupational health services	1
Natural sciences, general programs	1			1022 Occupational health and safety	1
Mecatronics	1				
Machine, energy and electricity technology	1				

Survey Data

Response rate

SECCION	% Numeric Answers	% Text Answers
4. STAFF	58%	38%
5. STUDENTS	100%	
6. ATTRACTION	79%	75%
7. ACCESS	83%	56%
8. ENROLLMENT	88%	64%
9. GRADUATES	83%	
10. NOMINATIONS FOR SCHOLARSHIP AND AWARD	17%	67%
11. APPLICATIONS TO SCHOLARSHIPS AND AWARDS	25%	50%
12. RECIPIENTS OF SCHOLARSHIPS AND AWARDS	25%	
13. TERTIARY EDUCATION	25%	
14. DISCRIMINATION	58%	75%
15. SEXUAL HARASSMENT	25%	67%
16. APPLICANTS TO FUNDING FOR INTERNATIONAL MOBILITY	42%	42%
17. RECIPIENTS TO FUNDING FOR INTERNATIONAL MOBILITY	42%	
18. PARTICIPANTS TO INTERNATIONAL MOBILITY PROGRAMMES	33%	
19. RE-ENTRY GRANT APPLICANTS AFTER CAREER BREAKS	29%	42%
20. RECIPIENTS FOR RE-ENTRY GRANT AFTER CAREER BREAKS	83%	
21. DAY AND CHILD CARE FACILITIES	54%	50%
22. SCIENCE & ENGINEERING OCCUPATIONS	21%	
23. TERTIARY EDUCATED IN S&E OCCUPATIONS	54%	
24. GROSS ANNUAL EARNINGS	58%	
25. APPLICANTS OF ENGINEERING CERTIFICATION	21%	42%
26. RECIPIENTS OF ENGINEERING CERTIFICATION	50%	42%
47. GUIDANCE (modified nbr 9)	52%	33%
48. DROP-OUTs (NEW)	50%	58%

Some preliminary results

PROGRAMMES

Programmes / courses

12 Institution have reported 199 Programmes / courses with student enrollment

Only 3 out of 12 Institutions declare having a Unique multidisciplinary STEM program that intends to attract female students

University of Salamanca

Universidad del Norte

Oulu University

Politecnico di Torino

Technological University Dublin

Northern Regional College

Universidad de Guadalajara

Intitution	EU	LA
USAL	19	
NRC	24	
OULU	16	
POLITO	6	
TUD	27	
UCR		12
UNINOR		9
UTB		10
UTCR		20
UTN		10
UDG		18
PUCV		28
Total	92	107

Pontificia Universidad Católica de Valparaíso

Universidad Tecnológica de Bolívar

Instituto Tecnológico de Costa Rica

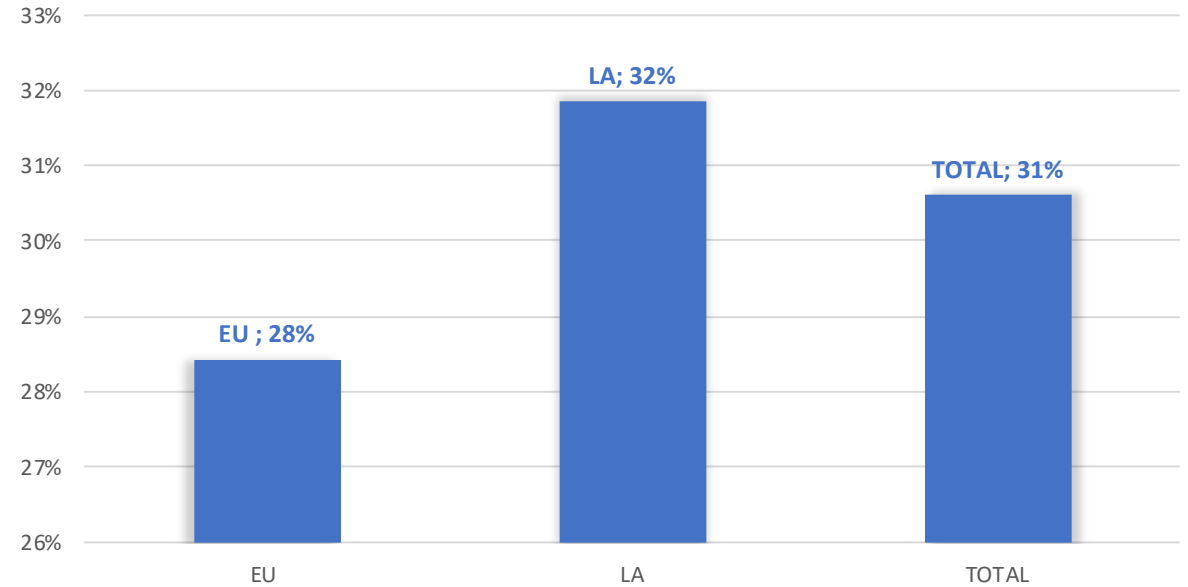
Universidad de Costa Rica

Universidad Técnica del Norte

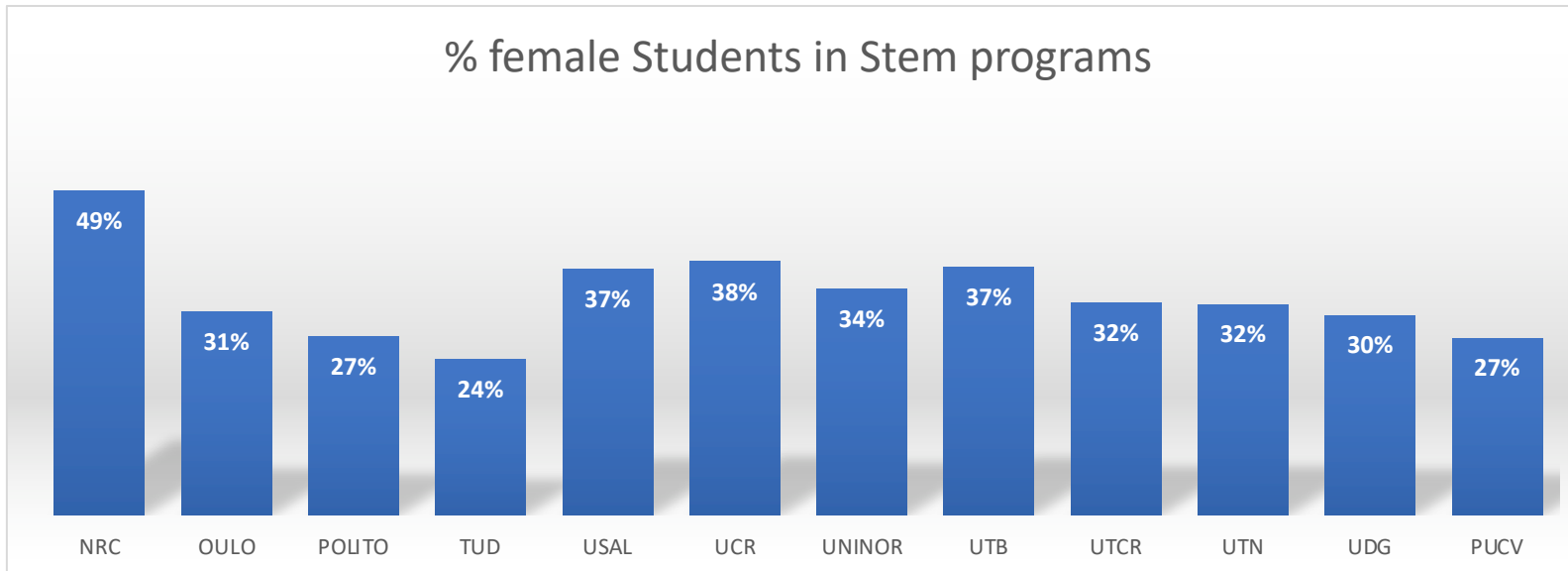
Some preliminary results

STUDENTS

% FEMALE STUDENTS IN STEM PROGRAMS



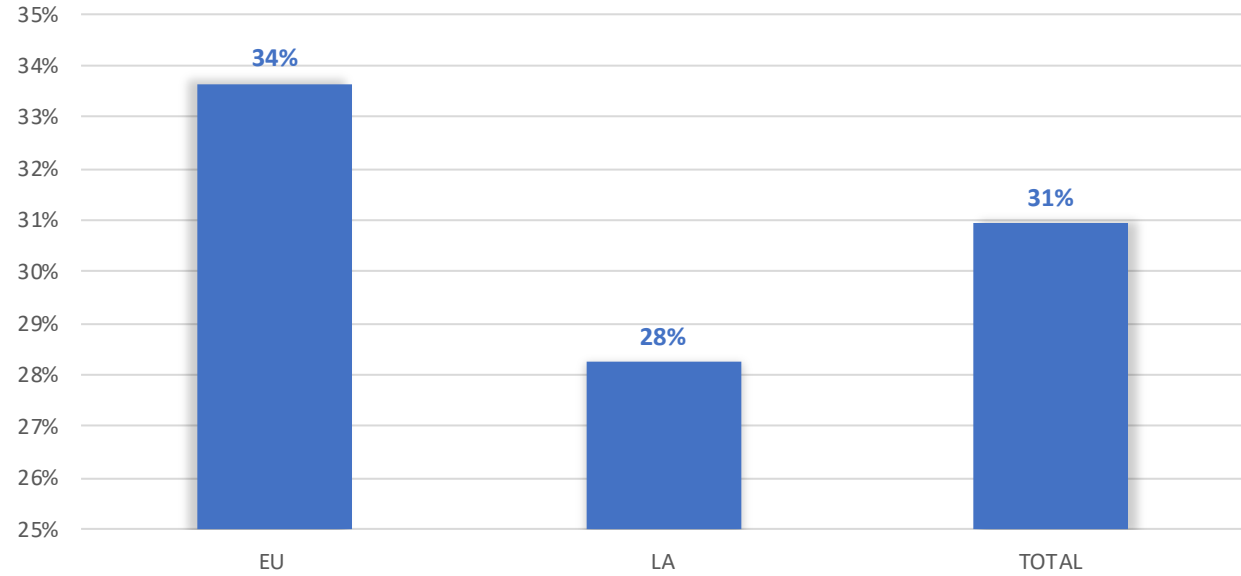
% female Students in Stem programs



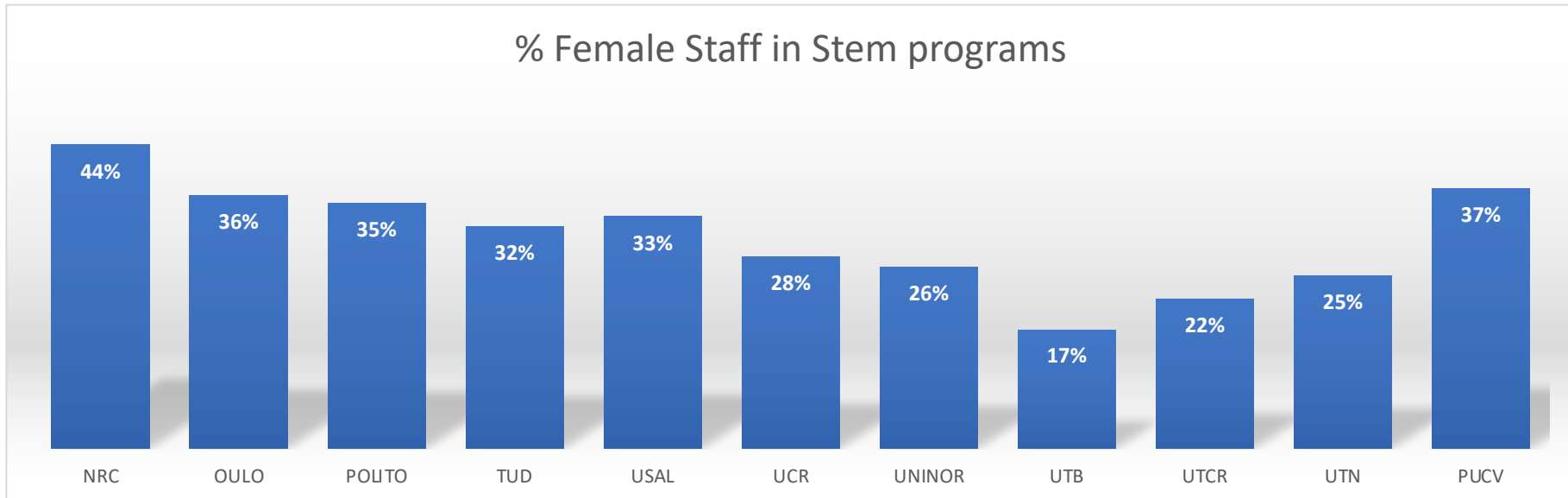
Some preliminary results

STAFF

% FEMALE STAFF IN STEM PROGRAMS



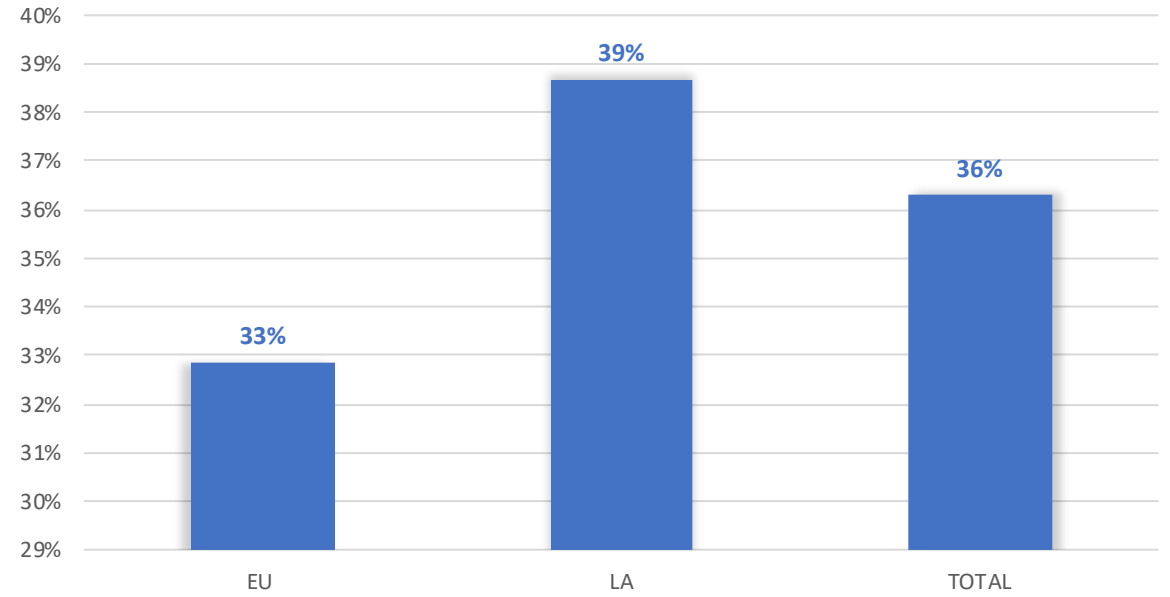
% Female Staff in Stem programs



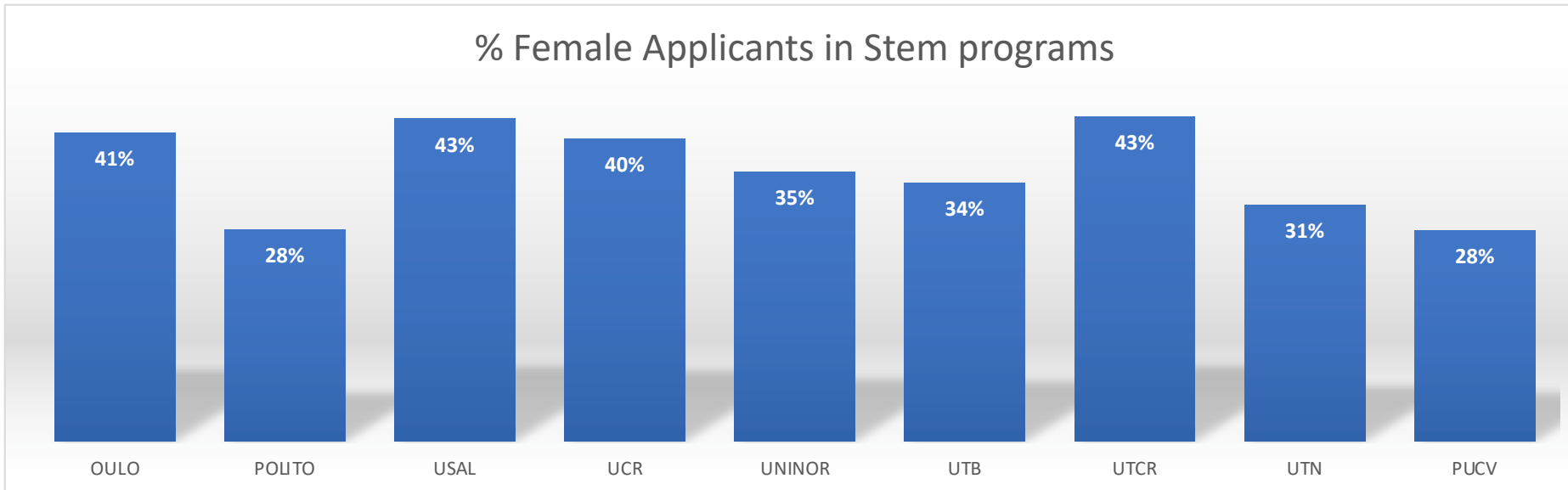
Some preliminary results

ATTRACTION

% FEMALE APPLICANTS IN STEM PROGRAMS



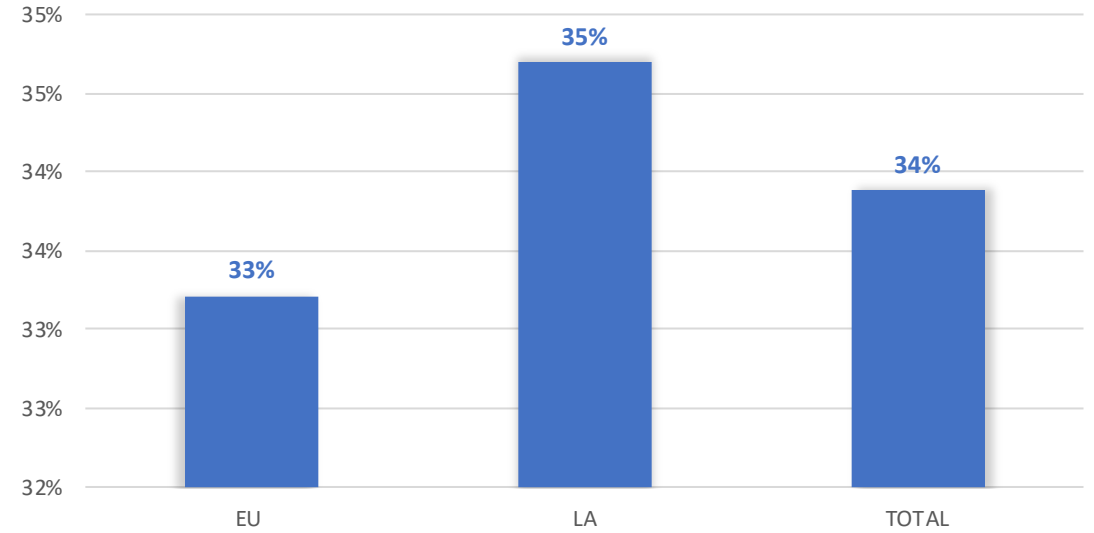
% Female Applicants in Stem programs



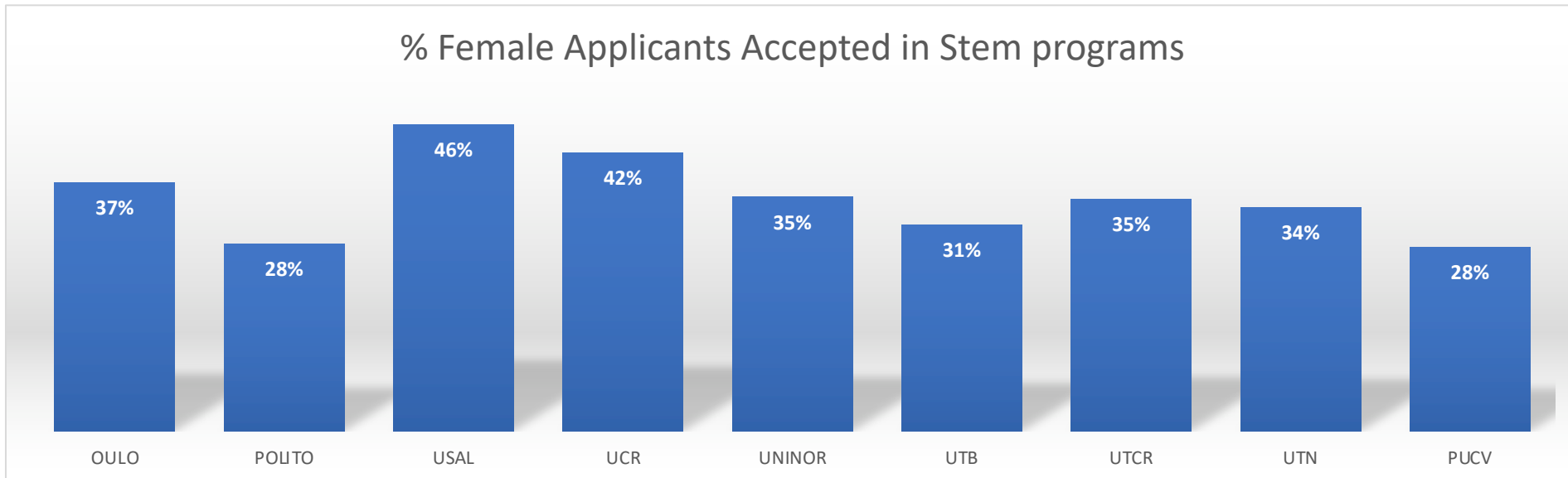
Some preliminary results

ACCESS

% FEMALE APPLICANTS ACCEPTED IN STEM PROGRAMS



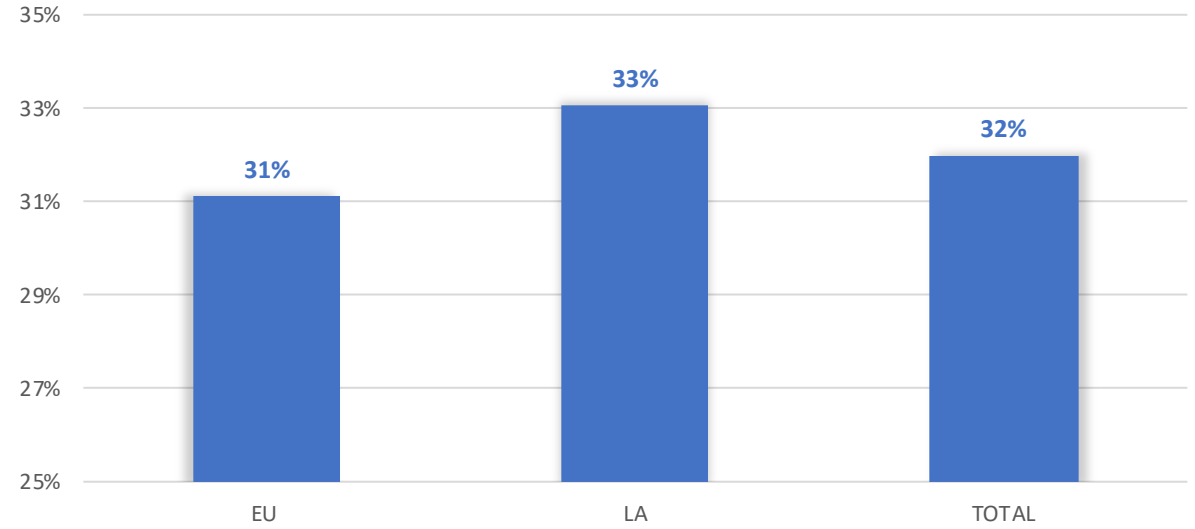
% Female Applicants Accepted in Stem programs



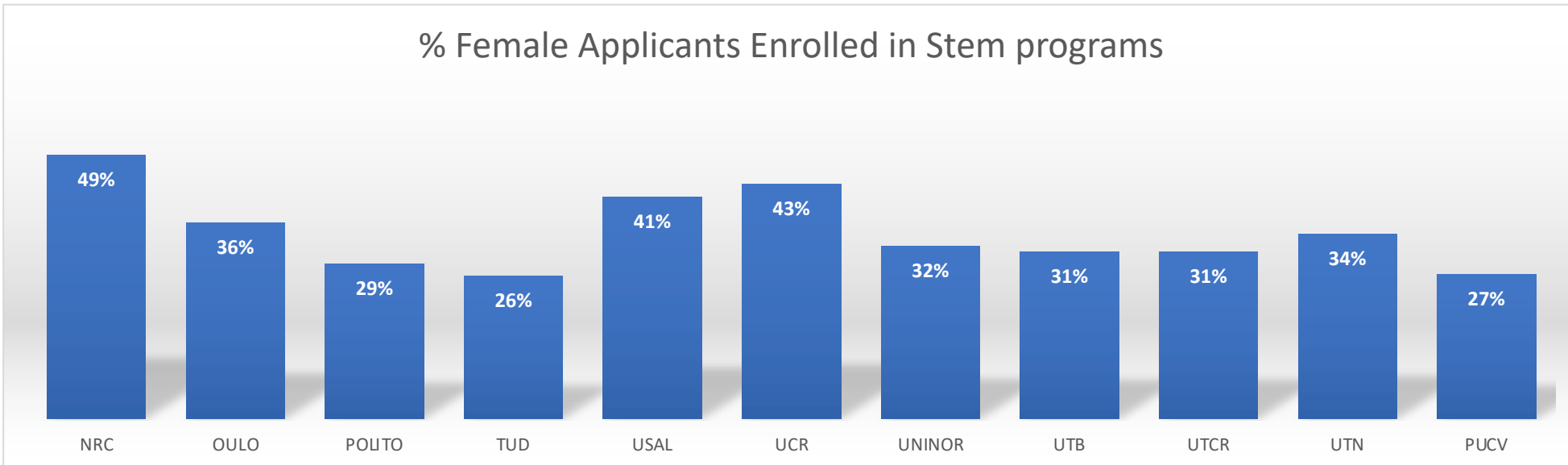
Some preliminary results

ENROLLMENT

% FEMALE APPLICANTS ENROLLED IN STEM PROGRAMS



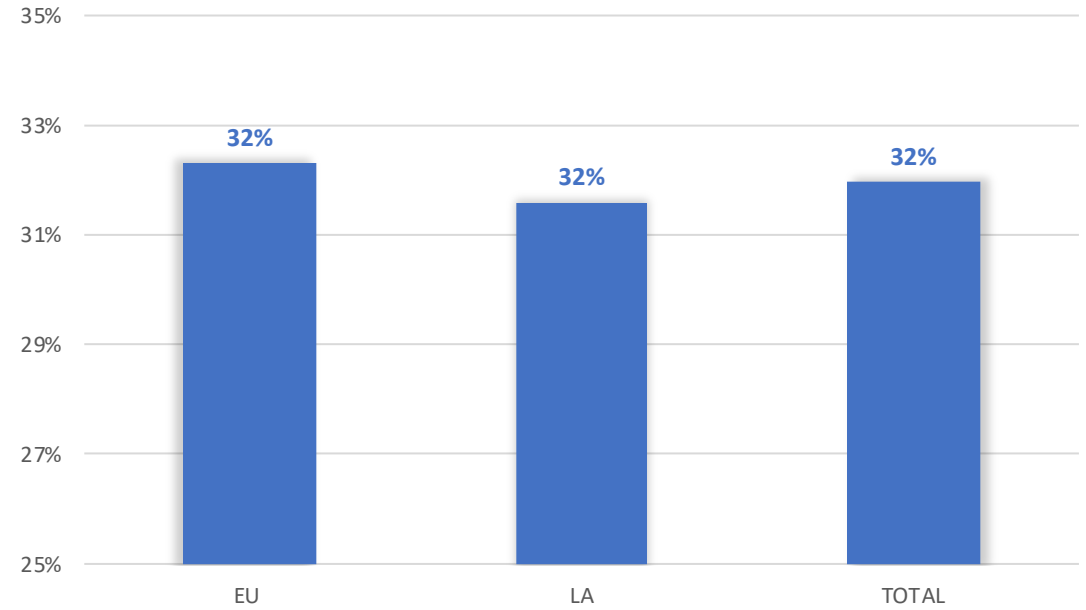
% Female Applicants Enrolled in Stem programs



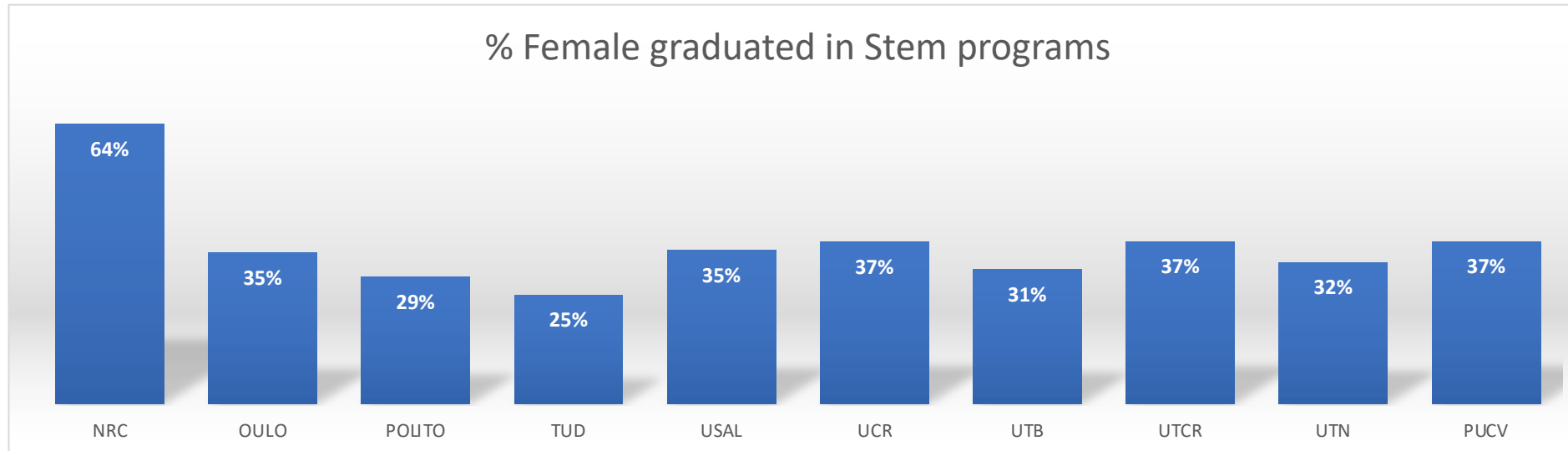
Some preliminary results

GRADUATES

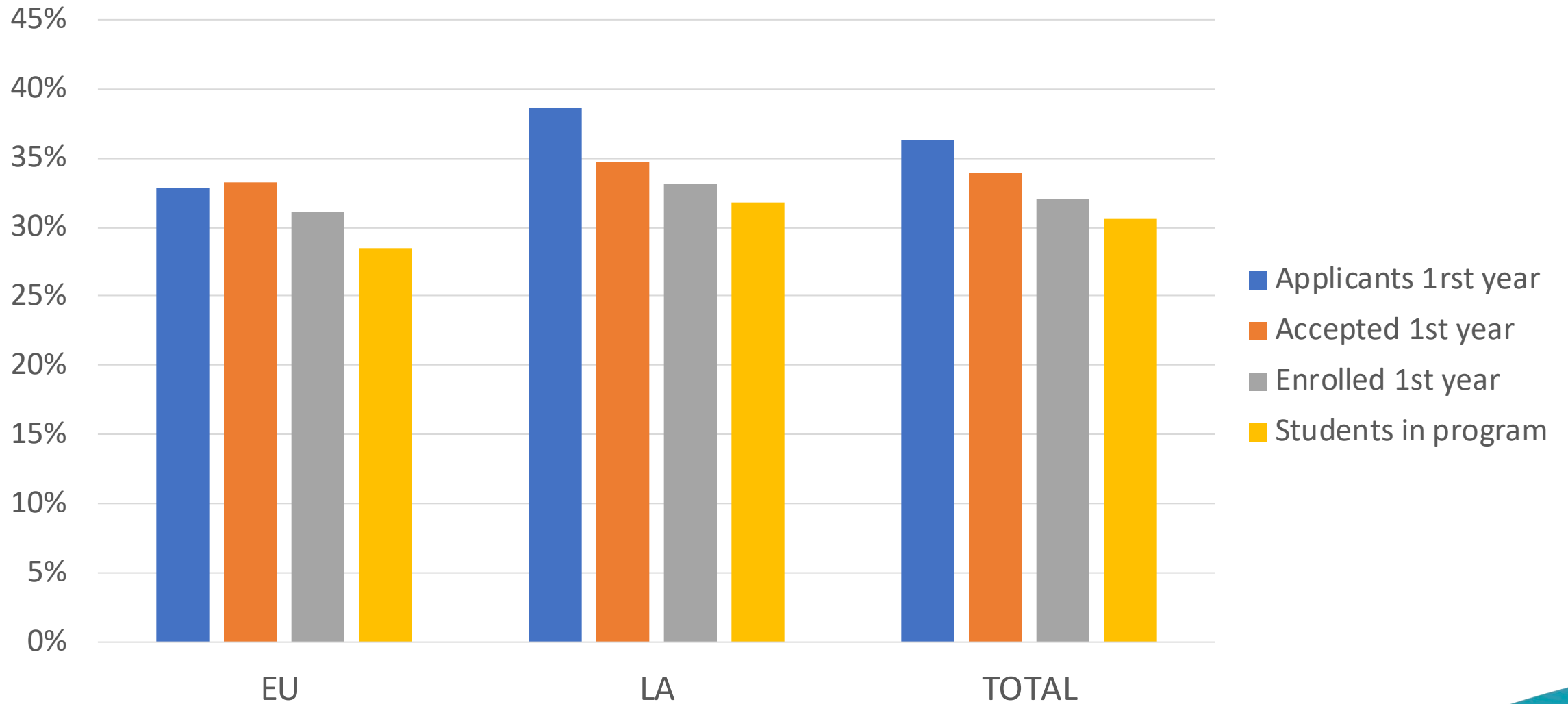
% FEMALE GRADUATED IN STEM PROGRAMS



% Female graduated in Stem programs



Proportion of female students



Lessons learnt and future steps

- In most cases the detailed ISCED2013 classification was too narrow, but it could be helpful to identify areas that are included to the STEM fields.
- However, some areas seemed to be missing from ISCED 2013 such as Industrial engineering.
- Policies were not so easy to find, but luckily there were people involved who knew the institutional history to share it.
- The statistical data was not always easily available to feed indicators and “data miners” were needed to do that work.

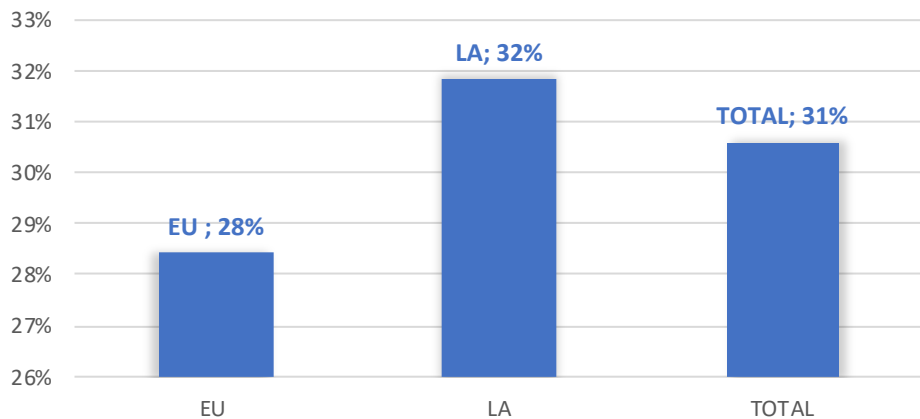
Lessons learnt and future steps

- Finish collecting information from all institutions
- Clean, Debug and standardize data (feedback loop)
- Analyze data
- Establish gaps
- Identify good practices

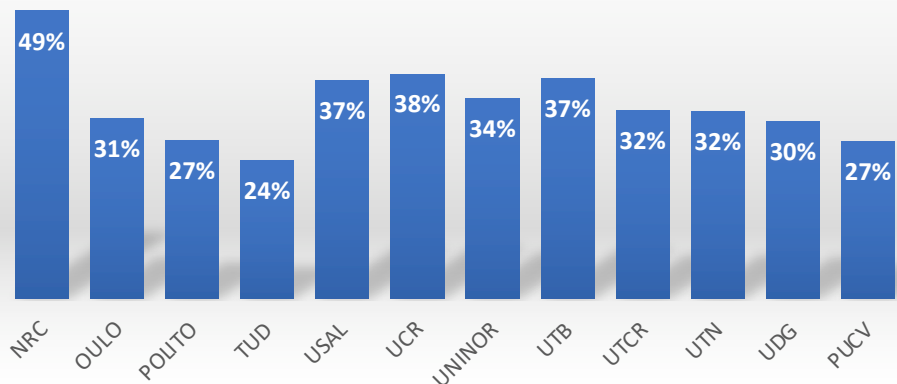
Some preliminary results by Sections

STUDENTS

% FEMALE STUDENTS IN STEM PROGRAMS



% female Students in Stem programs

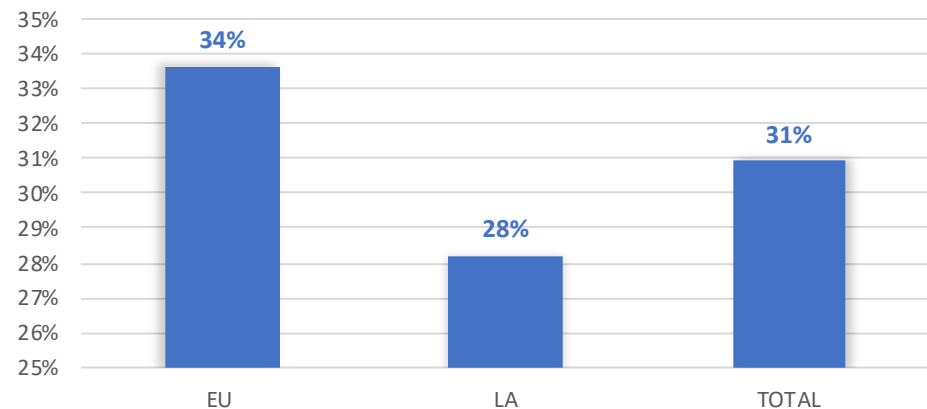


Institution	Total Students	Females	% Female
EU	36.373	10.339	28%
NRC	227	111	49%
OULU	5.385	1.656	31%
POLITO	19.556	5.269	27%
TUD	6.284	1.478	24%
USAL	4.921	1.825	37%
LA	63.928	20.357	32%
UCR	7.047	2.693	38%
UNINOR	4.873	1.663	34%
UTB	2.920	1.093	37%
UTCR	8.855	2.837	32%
UTN	6.180	1.965	32%
UDG	29.258	8.823	30%
PUCV	4.795	1.283	27%
TOTAL	100.301	30.696	31%

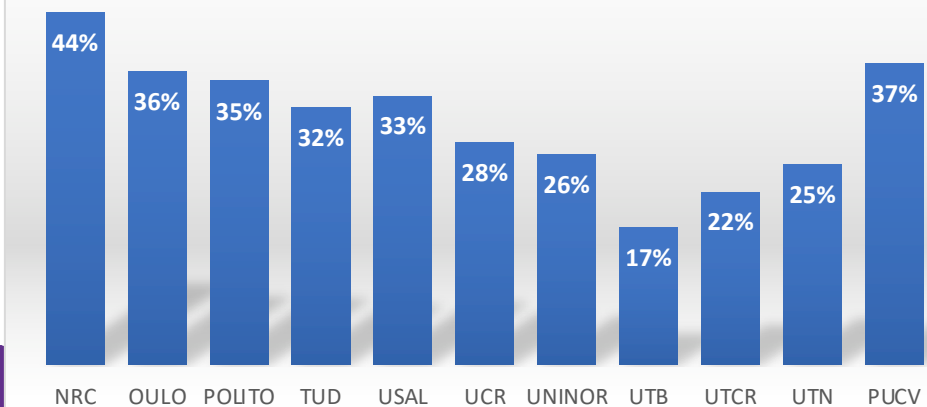
Some preliminary results by Sections

STAFF

% FEMALE STAFF IN STEM PROGRAMS



% Female Staff in Stem programs

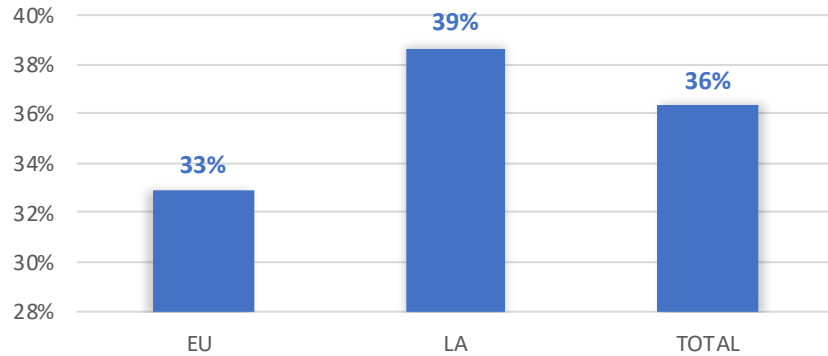


Institution	Total Staff	Females	% Female
EU	2.558	861	34%
NRC	16	7	44%
OULO	469	171	36%
POLITO	405	143	35%
TUD	1.234	395	32%
USAL	434	145	33%
LA	2.593	732	28%
UCR	824	228	28%
UNINOR	703	184	26%
UTB	70	12	17%
UTCR	158	34	22%
UTN	317	79	25%
UDG	-	-	-
PUCV	521	195	37%
TOTAL	5.151	1.593	31%

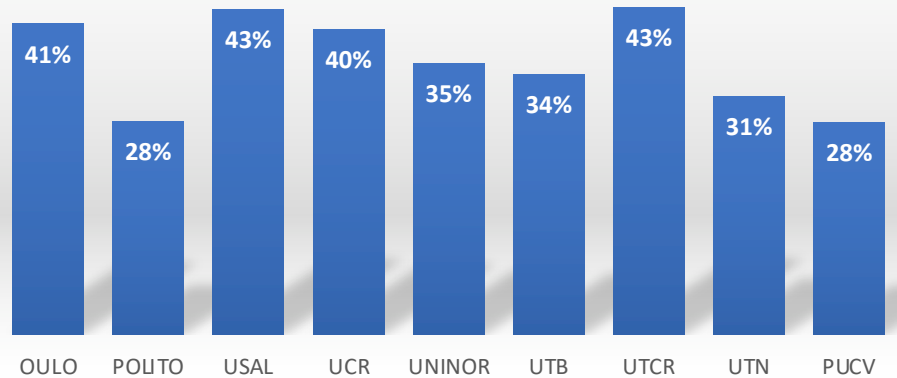
Some preliminary results by Sections

ATTRACTION

% FEMALE APPLICANTS IN STEM PROGRAMS



% Female Applicants in Stem programs

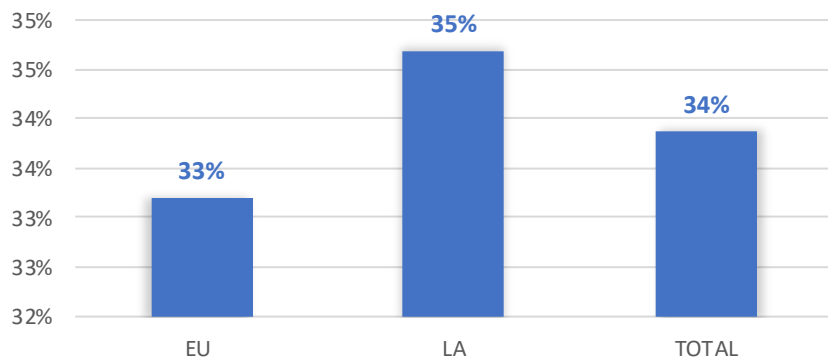


Institution	Total Applicants	Females	%Female
EU	20.179	6.635	33%
NRC	-	-	
OULO	5.273	2.144	41%
POLITO	12.619	3.518	28%
TUD	-	-	
USAL	2.287	973	43%
LA	29.209	11.299	38%
UCR	4.031	1.609	40%
UNINOR	2.673	948	35%
UTB	483	165	34%
UTCR	16.089	6.886	43%
UTN	1.292	403	31%
UDG			
PUCV	4.641	1.288	28%
TOTAL	49.388	17.934	36%

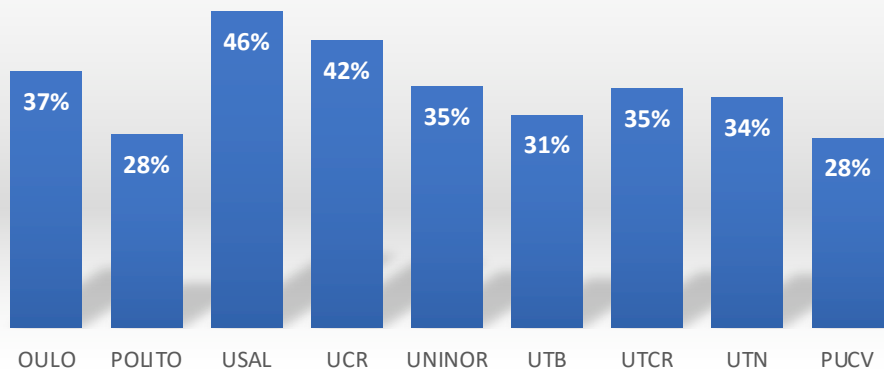
Some preliminary results by Sections

ACCESS

% FEMALE APPLICANTS ACCEPTED IN STEM PROGRAMS



% Female Applicants Accepted in Stem programs

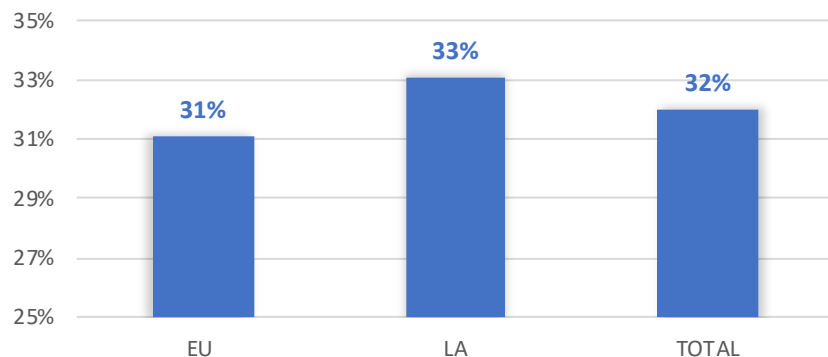


Institution	Total Applicants Accepted	Females	%Female
EU	10.502	3.488	33%
NRC	227	111	
OULO	1.146	427	37%
POLITO	6.976	1.959	28%
TUD	-	-	
USAL	2.153	991	46%
LA	8.655	3.003	35%
UCR	1.420	593	42%
UNINOR	2.481	872	35%
UTB	351	109	31%
UTCR	2.211	770	35%
UTN	903	303	34%
UDG			
PUCV	1.289	356	28%
TOTAL	19.157	6.491	34%

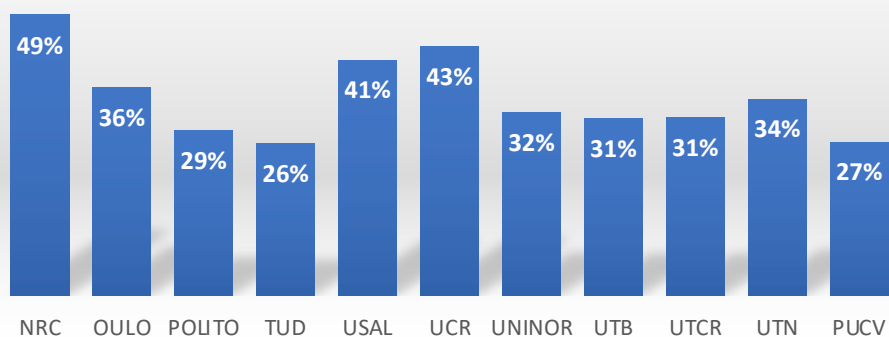
Some preliminary results by Sections

ENROLLMENT

% FEMALE APPLICANTS ENROLLED IN STEM PROGRAMS



% Female Applicants Enrolled in Stem programs

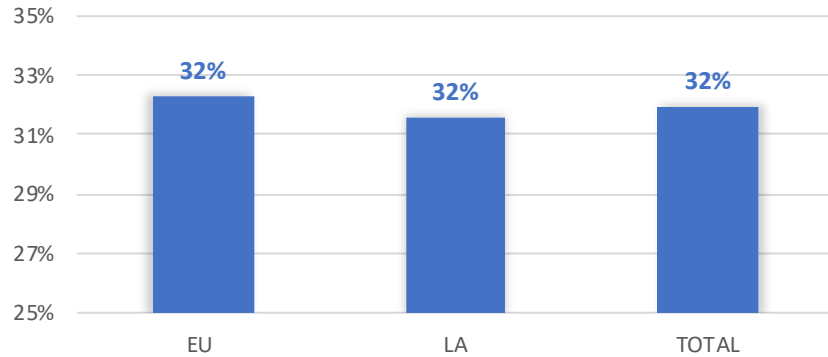


Institution	Total Applicants Enrolled	Females	%Female
EU	8.714	2.711	31%
NRC	227	111	49%
OULO	995	361	36%
POLITO	4.954	1.423	29%
TUD	1.549	410	26%
USAL	989	406	41%
LA	7.191	2.379	33%
UCR	1.105	480	43%
UNINOR	1.152	368	32%
UTB	351	109	31%
UTCR	1.637	507	31%
UTN	1.704	583	34%
UDG			
PUCV	1.242	332	27%
TOTAL	15.905	5.090	32%

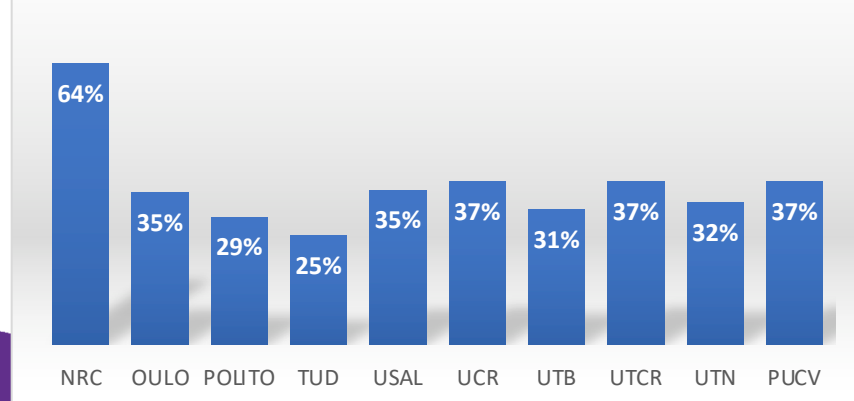
Some preliminary results for Sectoins

GRADUATES

% FEMALE GRADUATED IN STEM PROGRAMS



% Female graduated in Stem programs



Institution	Total Graduated	Females	%Female
EU	6.940	2.242	32%
NRC	606	388	64%
OULO	285	99	35%
POLITO	3.672	1.072	29%
TUD	1.515	379	25%
USAL	862	304	35%
LA	6.458	2.039	32%
UCR	-	-	
UNINOR	278	86	31%
UTB	862	321	37%
UTCR	348	113	32%
UTN	3.820	1.091	
UDG	550	205	37%
PUCV	-	-	
TOTAL	13.398	4.281	32%

Disclaimer

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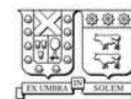
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