SAGA (STEM and Gender Advancement)

Improved measurement of gender equality in science, technology, engineering and mathematics

A Global UNESCO project, with the support of Sida

Working Paper 1

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SAGA **S**cience, **T**echnology and **I**nnovation

Gender **O**bjectives **L**ist (**STI GOL**)

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SAGA (STEM and Gender Advancement)

SAGA is a global UNESCO project supported by the Government of Sweden through the Swedish International Development Cooperation Agency (Sida).

The general objective of SAGA is to contribute to reducing the gender gap in science, technology, engineering and mathematics (STEM) fields in all countries at all levels of education and research, by determining, measuring and assessing sex-disaggregated data, as well as supporting the design and implementation of policy instruments that affect gender equality in STEM.

Furthermore, SAGA aims to analyse how policies affect the gender balance in STEM, undertake inventories of science, technology and innovation (STI) gender equality policies, develop new and better indicators to provide tools for evidence-based policy-making, build capacity in Member States for data collection on gender in STEM, and prepare methodological documents to support the collection of statistics.

SAGA Science, Technology and Innovation Gender Objectives List (STI GOL)

The Science, Technology and Innovation Gender Objectives List (STI GOL) is a tool for classifying STI policies and indicators, developed in the framework of SAGA[1].

The STI GOL enables the categorization of policies and policy instruments, and assists in analysis aimed at preparing regional or country profiles. At the same time, it allows for identifying gaps in the STI policy mix, thereby supporting policy-makers worldwide in setting up, implementing, monitoring and evaluating gender equality policies in STI.

The STI GOL will also be a useful tool for gender in STEM indicators, as it will allow for existing indicators to be mapped to gender objectives, while at the same time identifying ones for which indicators do not exist yet.

While worldwide figures of women students and graduates in higher education have grown steadily in the last decade, women are still a minority in STEM fields, both in numbers of graduates (especially at Ph.D. level), and in the research profession (see for example **UNESCO Science Report: Towards 2030** or the UNESCO Institute for Statistics (UIS) **Women in Science** visualisation). Gender equality in STEM therefore implies encouraging further participation of women and girls throughout all levels of education, and providing equal opportunities for scientists and engineers throughout their careers. Achieving gender equality is an overarching UNESCO priority, both as a matter of human rights and in order to enhance countries' STI capacities to achieve the 2030 Agenda for Sustainable Development, especially Sustainable Development Goal 5 (SDG 5): "Achieve gender equality and empower all women and girls", and all other SDGs relying on STI capacities.

The STI GOL aims at encompassing all aspects of gender equality in STI policy making, as identified through research conducted in the framework of SAGA. It does not necessarily constitute a formal "classification", since policies and instruments might be placed under more than one STI gender objective, and this list of gender objectives cannot be considered exhaustive until extensive field tests are carried out.

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1   For more information on the background of the project visit the SAGA Website (http://www.unesco.org/new/en/saga).

The STI GOL is based on different areas of objectives or policy impacts:

1. Social norms and stereotypes

2. Primary and secondary education

3. Higher education

4. Career progression

5. Research content, practice and agendas

6. Policy-making processes

7. Entrepreneurship and innovation

These seven areas configure the first level of STI gender objectives. A second level, and additional bullet points in some cases, provide breakdowns that allow for more meaningful and in-depth analysis. It is therefore recommended that at least the second level is used for classifying policy instruments and indicators.

A number of different concepts are used in the STI GOL, including most notably "STEM", "S&E", and "STI":

STEM – Science, Technology, Engineering and Mathematics – is used to characterize the corresponding fields of knowledge and study. **S&E** – Scientists and Engineers is used when dealing with professions, most frequently carried out by graduates of STEM Higher Education careers. **STI** – Science, Technology and Innovation – is used when referring to policies[2].

The STI GOL configures the conceptual backbone of the SAGA project, by linking gender equality STI policy instruments with indicators. The STI GOL allows for a wide-ranging mapping and classification of the STI policy instruments involved, while assessing the availability of indicators in each area. This mapping of STI policy instruments will also highlight gaps in the policy mix, driving STI policy- and other decision makers towards the development and implementation of new policies and instruments at the country level, particularly when the specific STI gender objective is shown to be in need of intervention by the corresponding indicators. Applying the STI GOL to classify policies and indicators at a country level will therefore also become one of the main monitoring and evaluation tools for gender equality in STI policies.

The STI GOL will be used for upcoming work on gender in STI policies and indicators by UNESCO and other organizations. For instance, the Inter-American Development Bank has already committed to applying it in its project "Gender Gaps in Science, Technology and Innovation in Latin America and the Caribbean". It will also be submitted to specialized fora such as the OECD's "Blue Sky 3" conference, the S&T Indicators International Conference 2016, the 8th Gender Summit, and to regional networks such as RICYT in Ibero-America.

This first version of the STI GOL will be updated after its application in pilot countries in the framework of SAGA and discussion with specialized fora during 2016 and 2017. A revised version of the STI GOL will be published as part of the final SAGA package.

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2   A full and more detailed glossary can be found in the SAGA Toolkit (to be published).

STI Gender Objectives List

1 Change perceptions, attitudes, behaviours, **social norms and stereotypes** towards women in STEM in society

1. 1.   Promote awareness of and overcome non conscious and cultural gender biases widely expressed as gender stereotypes, among scientists, educators, policy-makers, research organizations, the media, and the public at large.

1. 2.   Promote visibility of women with STEM qualifications, and in STEM careers, especially in leadership positions in governments, business enterprises, universities, and research organizations.

1. 3.   Mainstream gender perspectives in science communication and informal and non-formal STEM education activities, including in science centres and museums.

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2 Engage girls and young women in STEM **primary and secondary education**, as well as in technical and vocational education and training

2. 1.   Promote S&E vocations to girls and young women, including by stimulating interest, fostering in-depth knowledge about S&E career issues, and presenting role models.

2. 2.   Mainstream the gender perspective in educational content (teacher training, curricula, pedagogical methods, and teaching material).

2. 3.   Promote gender-sensitive pedagogical approaches to STEM teaching, including encouraging hands-on training and experiments.

2. 4.   Promote gender balance among STEM teachers.

2. 5.   Promote gender equality in STEM school-to-work transitions.

3 Attraction, access to and retention of women in STEM **higher education** at all levels

3. 1.   Promote access of and attract women to STEM higher education (including Masters and Ph.D.), including through specific scholarships and awards.

3. 2.   Prevent gender bias in the student admission and financial aid process

3. 3.   Promote retention of women in STEM higher education at all levels, including through gender-sensitive mentoring, workshops and networks.

3. 4.   Prevent gender-based discrimination and sexual harassment at all levels, including Masters and Ph.D.

3. 5.   Promote gender equality in international mobility of students.

3. 6.   Promote day care/child care facilities for students, particularly at STEM higher education institutions.

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4 Gender equality in **career progression** for scientists and engineers (S&E)

4. 1. Ensure gender equality in access to job opportunities, recruitment criteria and processes.

4. 2. Promote equal work conditions through, among others:
- gender equality in remuneration
- preventing gender bias in performance evaluation criteria (including productivity measurement)
- adequate safety and security of fieldwork
- sexual harassment prevention policies and procedures.

4. 3. Ensure gender equality in access to opportunities in the workplace:
- training and conferences
- research teams, networks (national and international), expert panels and advisory groups
- publications and patent applications, including preventing bias in review.
- financial and non-financial incentives
- recognition, rewards and awards.

4. 4. Promote work–life balance through, among others:
- infrastructure for child care
- flexible working hours
- reduction and redistribution of unpaid care and domestic care
- family leave for both parents
- appropriate re-entry mechanisms to the S&E workforce after career break or family leave.

4. 5. Promote gender equality in international mobility of post-docs and researchers, and facilitate women's return.

4. 6. Promote gender balance in leadership positions in S&E occupations (including decision making and research).

4. 7. Promote transformations of STI institutions and organizations (structure, governance, policies, norms and values) aimed at achieving gender equality.

4. 8. Ensure gender equality in S&E professional certifications, in particular in engineering.
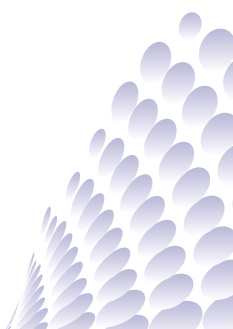
5 Promote the gender dimension in **research content, practice and agendas**

5. 1.   Establish specific gender-oriented R&D programmes, including research on gender in STEM and on the gender dimension of the country's research agenda and portfolio.

5. 2.   Incorporate gender dimensions into the evaluation of R&D projects.

5. 3.   Promote gender-sensitive analysis in research hypotheses and consideration of sex of research subjects.

5. 4.   Promote gender responsive and gender-sensitive research dissemination and science communication, including through science centres and museums, science journalism, specific conferences, workshops, and publications.

6 Promote gender equality in STEM-related **policy-making**

6. 1.   Ensure gender balance in STEM-related policy design (decision makers, consultative committees, expert groups, etc.):
- Education policy
- Higher education policy
- STI policy
- Economic policy
- Workforce policy
- SDGs / international policies.

6. 2.   Ensure gender mainstreaming and prioritization of gender equality in STEM-related policy design, monitoring and evaluation:
- Education policy
- Higher education policy
- STI policy
- Economic policy
- Workforce policy
- SDGs / international policies.

7 Promote gender equality in science and technology-based **entrepreneurship and innovation** activities

7. 1.   Promote gender equality in access to seed capital, angel investors, venture capital, and similar start-up financing.

7. 2.   Ensure equal access to public support for innovation for women-owned firms.

7. 3.   Ensure visibility of women entrepreneurs as role models.

7. 4.   Ensure women's access to mentorship and participation in the design and implementation of gender-sensitive training in entrepreneurship, innovation management, and Intellectual Property Rights.

7. 5.   Promote networks of women entrepreneurs and women's participation in entrepreneurship networks.

7. 6.   Promote gendered innovation approaches.

7. 7.   Promote external incentives and recognition for women-led innovation and acceptance of women innovators in society.

7. 8.   Promote gender equality in the access and use of enabling technology, in particular information and communication technology.

7. 9.   Promote a gender balanced workforce and equal opportunities in start-up companies.

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