TEACHING YOUTH TO USE AI TO TACKLE THE SUSTAINABLE DEVELOPMENT GOALS
‘Tremendously off track’ to meet 2030 SDGs: UN chief

Source: Human Development Report Office (see box 11).
Young people’s climate anxiety revealed in landmark survey

Children worldwide worry about the future and feel let down by governments, a huge study on attitudes towards climate change has found.
Girls’ education strengthens economies and creates jobs (adding ~35% to GDP for some).

Educated girls are healthier citizens who raise healthier families.

Communities are more stable and can recover faster after conflict — when girls are educated.

Girls’ education is at the heart of sustainable development.

5th most effective carbon drawdown strategy
There are 900 million teenage girls in the world.
We have the technology, the tools, the infrastructure and a research-based blueprint to empower millions of girls to lead sustainable development.
HIGH-IMPACT, GLOBAL PROGRAM CHECKLIST
FOR ADOLESCENTS

1. Choice
2. Work in teams
3. Build a sense of purpose & identity
4. Supported by warm, caring mentors
5. Physiologically thrilling

(Bandura, 1997; Steinberg, 2015)
TECHNOVATION: MENTORS & GIRLS (AGES 8-18) TACKLE SDGS USING TECHNOLOGY (OVER 12-WEEKS)
Girls Solving SDGs with AI

Impact results published in *KI - Künstliche Intelligenz*, German Journal of Artificial Intelligence
350,000 participants, 120+ countries
Girls tackling real-world problems with AI (~1000 prototypes)

- **NewsBear (Canada)**
  - Combating fake news

- **SafeDrive (Kenya)**
  - Protecting drivers by predicting auto collisions

- **EatAware (Canada)**
  - Using AI to teach healthy eating habits

- **RespirAr (Brazil)**
  - Evaluating daily pollution data to alert about unsafe air

- **Hands with Voice (Mexico)**
  - Using AI to help deaf people communicate

- **SmartCare (India)**
  - Helping elders navigate technology and stay independent
22,500 children & parents solving real-world problems with AI

22,500 under-resourced 3rd-8th grade students, parents and educators engaged

91% of students increased their self-efficacy as STEM learners

87% of parents indicated greater capability to support STEM learning at home

100% of educators learned better ways to stimulate a student’s interest in STEM
TECHNOVATION - INCREASING YOUNG WOMEN'S SELF-EFFICACY & FINANCIAL CAPACITY, WHILE ALSO CHANGING SOCIAL NORMS
Celebrating a decade of partnering with Technovation

Jan 12, 2022  ·  4 min read

Maggie Johnson
VP, Education and Research Operations

Share
TECHNOVATION: SUSTAINED IMPACT

- 350,000 participants engaged across 100+ countries
- 150,000 young women alumnae trained as technology entrepreneurs & innovators
- 76% of alumnae are pursuing STEM degrees (WestEd, 2020)
- 60% of alumnae are working in STEM careers
- 50% of alumnae are leading change in their communities & being honored
- 60% of alumnae credit Technovation for their career choice & increasing their self-efficacy
2022
SEASON
A CONTINUUM OF SUPPORT FOR GIRLS & YOUNG WOMEN

8-12 year old girls supported by Parents & Mentors
BEGINNER DIVISION

13-15 year old girls supported by Mentors
JUNIOR DIVISION

16-18 year old girls supported by Mentors
SENIOR DIVISION

Alumna support
BEGINNER DIVISION

Technovation Girls Beginner Division is for girls ages 8-12 and their parent / caregivers to work together to learn about app development and artificial intelligence while solving a problem that matters to them! Let’s get started.

Level: Beginner

Study time: 40+ hours

Duration: 12 weeks
STATE OF AI EDUCATION
Only a handful

Table 5. Governmental K–12 AI curricula in development

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Curriculum title</th>
<th>Curriculum developer</th>
<th>Educational levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armenia</td>
<td>Curriculum of ICT</td>
<td>Government</td>
<td>X</td>
</tr>
<tr>
<td>Austria</td>
<td>Data Science and Artificial Intelligence</td>
<td>Federal Ministry of Education, Science and Research</td>
<td>X</td>
</tr>
<tr>
<td>Belgium</td>
<td>IT Repository</td>
<td>Fédération Wallonie-Bruxelles (French-speaking Community of Belgium)</td>
<td>X</td>
</tr>
<tr>
<td>China</td>
<td>AI curriculum embedded in the Information Science and Technology curriculum</td>
<td>The Ministry of Education of the People's Republic of China</td>
<td>X X X</td>
</tr>
<tr>
<td>India</td>
<td>Atal Tinker Labs AI modules</td>
<td>Atal Tinker Labs, Atal Innovation Mission, NITI Aayog</td>
<td>X X</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>'AI Mathematics' under the Mathematics Subject Group for high schools</td>
<td>Korea Foundation for the Advancement of Science and Creativity</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>'AI Basics' under Technology Home Economics Subject Group for high schools</td>
<td>Korea Foundation for the Advancement of Science and Creativity</td>
<td>X</td>
</tr>
<tr>
<td>Kuwait</td>
<td>Standards curriculum</td>
<td>Curricula technical guidance experts and teachers</td>
<td>X X</td>
</tr>
<tr>
<td>Portugal</td>
<td>Information and Communication Technologies</td>
<td>State school teachers of ICT and Mathematics</td>
<td>X X X</td>
</tr>
<tr>
<td>Qatar</td>
<td>Computing and Information Technology</td>
<td>Binary Logic, Ministry of Education and Higher Education</td>
<td>X X X</td>
</tr>
<tr>
<td></td>
<td>Computing and Information Technology (High Tech Track)</td>
<td>Binary Logic, Ministry of Education and Higher Education</td>
<td>X</td>
</tr>
<tr>
<td>Serbia</td>
<td>Informatics and programming – Grade 8</td>
<td>Ministry of Education working group</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Modern technologies in gymnasiums – Grade 3 and 4</td>
<td>Ministry of Education working group</td>
<td>X</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>AI curriculum embedded under the Technology Subject Framework</td>
<td>Ministry of Education</td>
<td>X X X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: UNESCO (2021b)

Table 6. Non-governmental AI curricula included in the study as benchmarks

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Curriculum title(s)</th>
<th>Curriculum developer</th>
<th>Educational levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>International</td>
<td>1. IBM EdTech Youth Challenge</td>
<td>IBM</td>
<td>X X</td>
</tr>
<tr>
<td></td>
<td>2. AI Youth Skills</td>
<td>Microsoft</td>
<td>X X</td>
</tr>
<tr>
<td></td>
<td>3. Global AI Readiness Program (High Tech Track)</td>
<td>Intel</td>
<td>X X</td>
</tr>
<tr>
<td></td>
<td>4. Global AI Readiness Program (General Track)</td>
<td>Intel</td>
<td>X X</td>
</tr>
<tr>
<td>United States</td>
<td>5. DM &amp; AI Curriculum</td>
<td>MIT</td>
<td>X X</td>
</tr>
</tbody>
</table>

Source: UNESCO (2021b)
# Average Length of Curriculum

## Table 9. Curriculum engagement by topic area

<table>
<thead>
<tr>
<th></th>
<th>AI foundations</th>
<th>Ethics and social impact</th>
<th>Understanding, using and developing AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of curricula covering the topic area (n = 21)</td>
<td>20</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>Range of hours</td>
<td>0–432</td>
<td>0–185</td>
<td>0–465</td>
</tr>
<tr>
<td>Average hour commitment (all)</td>
<td>99.8</td>
<td>29.7</td>
<td>39.0</td>
</tr>
<tr>
<td>Average hour commitment (for those with allocations)</td>
<td>104.8</td>
<td>31.2</td>
<td>45.5</td>
</tr>
<tr>
<td>Median hour commitment (for those with allocations)</td>
<td>31.3</td>
<td>13.7</td>
<td>11.9</td>
</tr>
</tbody>
</table>

*Source: UNESCO (2021b)*

## Figure 2. Time allocation per year of AI curricula, n = 22

*Source: UNESCO (2021b)*
ALLOCATION OF CURRICULUM TIME

Source: UNESCO (2021b)
| Informal AI Education Programs - Elements of AI, Machine Learning for Kids, AI Singapore, MIT RAISE, Technovation |
| --- | --- | --- | --- | --- |
| **Machine learning for Kids** | **AI Singapore** | **Technovation** | **Elements of AI** | **MIT RAISE** |
| **Years implemented** | 5 | 5 | 5 | 4 | 1 |
| **No. reached** | LOTS! | 50,000+ | 22,500 | 760,000 | ~2500 |
| **Impact data** | LOTS of projects created! | 1000 AI-prototypes | Student, parent, educator self-efficacy | | |
UNESCO’S KEY RECOMMENDATIONS FOR AI CURRICULUM

Need:

1. Impact data and evidence on the quality and effectiveness of AI curricula
2. Focus on the main values and skills needed for work and life in the AI era
3. To be project-based & fun
4. Teacher training
Empowering youth to develop better AI-based solutions for real-world problems.
APPROACH

- Categorize SDGs to facilitate problem solving
- Leverage citizen science frameworks to tackle real-world problems
  - Combine crowdsourcing and satellite data analysis
- Develop System Maps & Coding Tutorials for each SDG
SPECIFIC TECH FOR SPECIFIC SDGS

(INTERNATIONAL, 2021)

PLANETARY INTEGRITY

MATERIAL NEEDS

PEOPLE

PROSPERITY

PEACE
CITIZEN SCIENCE MODELS + MOBILE, GROUND-DATA + SATELLITE DATA + AI → INNOVATIVE SOLUTIONS TO THE SDGS
System maps for SDGs 6, 12 and 13 (water, climate action and responsible consumption) to help girls develop apps that incorporate at least 2 of the 5 elements below.
**METRIC OF SUCCESS:**
**INCREASING FINANCIAL CAPABILITY**

Significant gains in **Resources, Agency & Achievement** for all participants, leading to resilient communities.

**Resources** (preconditions):
- Human capital
- Financial capital
- Social capital
- Physical capital

**Agency** (process):
- Voice
- Participation
- Decision-making

**Achievements** (outcomes):
- Education
- Health & nutrition
- Income generation & assets
BUILDING RESILIENT COMMUNITIES

Increase in:

1. Social capital (mentors) for underserved communities
2. Volunteerism and civic engagement
3. AI capacity for underserved communities
4. Open-mindedness and ability to accept change for community members

Girls’ education strengthens economies and creates jobs (adding ~35% to GDP for some)

Educated girls are healthier citizens who raise healthier families.

Communities are more stable and can recover faster after conflict — when girls are educated.

A world where people & the planet thrive

Empowered young women will lead us to

5th most effective carbon drawdown strategy

3. Good Health and Well-being
2. Zero Hunger
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
**GIRLS SOLVING REAL-WORLD PROBLEMS WITH TECHNOLOGY ENTREPRENEURSHIP**

1. **No Poverty**
   - Helping young people become entrepreneurs (*Kenya*)

2. **Zero Hunger**
   - Charity Feasts - Sharing feasts with the hungry (*Egypt*)

5. **Gender Equality**
   - Violentometro - Reducing domestic violence (*Mexico*)

8. **Decent Work and Economic Growth**
   - Help COVID teenage mothers finish school/learn entrepreneurship (*Kenya*)

13. **Climate Action**
   - Monitoring Forest Fires (*Cambodia*)

16. **Peace, Justice and Strong Institutions**
   - Helping groups develop more empathy (*Ukraine*)