

UNICEF China
Terms of Reference

Job Title of Consultancy: International Consultant on STEM Literacy Assessment Tools
Duration: 15 days during November 2022 to June 2023
Supervisor: Education Specialist, Education Section

Background of Consultancy Request:

Science, Technology, Engineering and Mathematics (STEM) Education) is increasingly regarded as a vehicle for innovation and social-economic development worldwide. In China, Science and Innovation has been defined as a national strategy and driver for future growth. The country aims to develop cohorts of young talents with scientific competencies and mindset, as well as sufficient digital skills and life skills to prepare for their future.

Since the 1980's, UNICEF has been working with China Association of Science and Technology (CAST) to support adolescents, especially girls and those from the most vulnerable groups, to develop STEM and life skills. CAST has a national remit to improve access to and quality of science learning, complimenting the formal school system with a readily available network to reach out to leading Chinese scientists and rural schools.

For the 2021-2025 program cycle, UNICEF and CAST will embark on an exciting new project: Inspiring the Future – STEM Education for Rural Adolescents. The project aims to deliver in four thematic areas:

1. inform policy on China's STEM talent pipeline development
2. capacity build rural STEM teachers
3. inspire and support STEM learning for rural adolescents (girls in particular), and
4. upskill grassroots STEM centres to provide alternative learning pathways

One major output of the project under thematic area one is to develop a STEM competency framework and its accompanying assessment tools in order to provide a set of systematic tools to capture the STEM learning outcomes in China, which feeds into the first thematic area to inform policy and thinking through generating evidence-based insights

The National Institute of Educational Sciences (NIES) has been commissioned to lead the development of the STEM literacy framework, drawing on its years of solid experiences working with schools to deepen STEM learning. The major tasks of NIES include:

1. Developing a STEM literacy framework for Chinese adolescents
2. Developing accompanying assessment tool to operationalize the literacy framework
3. Carrying out a national sampling survey to gain understanding of the current state of play and generate evidence-based insights.

To date, the NIES expert team has developed the STEM literacy framework for Chinese adolescents, which is currently under review and refinement by international and domestic experts. The team has also started to develop the assessment tools and question pool to operationalize the framework. It is expected that the assessment tools will be ready for review by November 2022 and the national sampling survey will take place in 2023.

Purpose of Activity/Assignment:

It is the intention of UNICEF, CAST and NIES to seek two international consultants to join the expert consultation and bring strong international perspectives into the development of STEM literacy assessment tool (methodology and the questions pool) and the digital platform to operationalize the assessment.

To give more technical details of the assessment tool development plan:

1. Develop the methodological and analytical framework which explains how the assessment tool is developed and what it aims to achieve, including the assessment logic, testing flow, performance indicators and weighting parameters.
2. Applying the framework, two sets of scenario-based questions targeting students at the beginning of grade 7 and grade 9, are to be developed.
3. A digital platform will finally be developed to operationalize the assessment, allowing the national sampling survey and data analysis to be carried out online.

The international consultants will:

- Provide several rounds of technical comments and reviews to the assessment tool (methodological and analysis framework, questions), help verify and assess the relevance, validity, effectiveness and feasibility of the assessment tool, help ensure it is academically robust and ethically compliant.
- Compare and align, where possible, the tool with international practice and tests to maximize the compatibility and comparability with established international tests (for example, PISA and TIMSS).
- Provide technical advice on the development of the digital platform to help refine the detailed platform development plan to ensure the technical specifications best reflect and deliver on the purpose the assessment.

The two consultants will work closely with the NIES expert team and two other international experts on STEM literacy framework to join technical briefings and discussions, while carrying out and providing several rounds of independent reviews and individual analysis to help ensure different perspectives can be brought into the work.

The consultants will actively engage in technical discussions and provide several rounds of expert reviews according to a mutually agreed schedule.

Major Tasks, Deliverables & Timeframe:

Task	Deliverables	Timeframe (tentative)
1. Join project briefing with UNICEF and NIES expert team to develop understanding of the project objectives, methodology and work plans, mutually agree the work mechanism and timetable.	• A work plan with agreed approach and timeline.	Nov – Dec 2022
2. Join virtual group consultation and provide up to two rounds of expert reviews and technical comments on draft of methodological and analytical framework	• Up to 2 rounds of written technical commentaries on the framework, including comparative analysis of the assessment tools against international standards and recommendations	December - June 2023

3. Provide one round technical comment on the scenario-based questions for the two age groups (grade 7 & grade 9)	<ul style="list-style-type: none"> • Written technical commentaries and reviews on the two sets of scenario-based questions 	December – June 2023
4. provide technical input to the TOR for procurement of the digital platform developer	<ul style="list-style-type: none"> • Written technical review of the digital assessment platform 	January - June 2023

Methodology & Expected Output:

The consultant will carry out the task with a combination of:

- Desk research and document reviews
- Virtual technical briefings and discussions with UNICEF, CAST and NIES expert team

Due to Covid-19 restriction, no international travel is required.

It is expected that by the end of the contract, the following outputs will be delivered:

- Two rounds of written technical commentaries on the framework, including comparative analysis of the assessment tools against international standards and recommendations
- One written technical comment on the two sets of questions for Grade 7 and Grade 9
- One written comparative analysis of the assessment tools against international standards
- Written technical comment on the TOR for digital platform procurement

Start Date: November, 2022

End Date: June 2023

Total Working Days:

up to 15 working days between November 2022 – June 2023.

Consultancy Requirements:

- **Minimum Academic Qualifications required and disciplines:**

Master’s degree in education, social research, social science and/or other relevant disciplines, specialized STEM education background will be a plus.

- **Knowledge/Experience/Expertise/Skills required:**

- Minimum ten years of experience in STEM education related field
- Hands-on experience on developing competency-based assessment tools and adaptive assessments, STEM education research, STEM teaching and learning strategy and/or competency-based education assessment.

- Proven experience of international consultancy experience working with overseas countries and/or international organizations.
- Excellent writing and speaking skills in English.
- A good team player, able to work within deadlines.
- Understanding of China education context.

The following are considered strong assets:

- Previous technical roles with established national and international educational research projects (i.e. PISA, TIMSS etc.) is an asset.
- Previous international consultancy experiences with UN agencies and/or China related projects.
- Strong connection and existing engagement with China in the STEM education field.