TERMS OF REFERENCE

Consultancy services for strengthening the Palestinian STEM Education Framework/Strategy

Supporting an Education Reform Agenda for improving Teaching, Assessment and Career Pathways (SERATAC)

I. Introduction

The Palestinian Ministry of Education (MOE) has received a grant from the World Bank to implement the **"Supporting an Education Reform Agenda for Improved Teaching, Assessment and Career Pathways (SERATAC)"** program. The program aims at improving education outcomes of primary and secondary students and increasing student pathways to tertiary education and the labor market."
The program is the first phase of a multiphase programmatic approach (MPA); and it includes four components as follows:

- **Component 1:** Building strong foundations for learning and wellbeing
- **Component 2:** Harnessing technology to improve STEM learning and better equip students for the labor market
- **Component 3:** Strengthening the student learning assessment system

Background on Component 2

There are large deficiencies in science, technology, engineering and mathematics (STEM) in the West Bank and Gaza. Results from the Trends in International Mathematics and Science Study (TIMSS) 2011[1]showed that more than half of Palestinian students in Grade 8 did not meet the Low International Benchmark in mathematics, meaning they were not able to work with whole numbers and basic graphs, for example.[2] In science, 41 percent of Palestinian students did not reach the Low International Benchmark, meaning that they did not recognize basic facts from the life and physical sciences, nor demonstrated some familiarity with physical phenomena.[3] These deficiencies become visibly manifest as Palestinian students move to upper primary and lower secondary education.

Deficiencies in STEM skills are a result of many interrelated factors. The most prominent among these is the ineffective preparation of teachers for the use of evidence-based classroom practices that are conducive to high-quality STEM skills development, and in providing differentiated instruction to address the heterogeneity in learning levels. A growing body of evidence suggests that effective STEM instruction seeks to activate students' prior knowledge, supports deeper reasoning and inquisitive thinking, promotes collaborative problem-solving, integrates knowledge from across subjects, and continuously contextualizes mathematical and scientific concepts helping students to draw connections with their daily lives through, for instance, project-based learning (PBL).[4] Beyond shortcomings in their STEM classroom instruction, professionalized career guidance — often provided by career counselors in other countries — and meaningful extracurricular opportunities to help students identify, explore and nurture their talents and interests in STEM early on, are largely absent in Palestinian schools. Together, these early experiences in STEM education are likely to shape students' attitudes and mindset toward mathematics and science

[1] TIMSS 2011 is the most recent high-quality learning data available as WB&G has not participated in any international student assessment since.
[2] Girls substantially outperformed boys in the mathematics, scoring on average 15 points higher on the TIMSS scale. The gender gap in the WB&G was the fifth largest of all countries participating in the mathematics assessment.
[3] 19 Mullis et al 2012. "TIMSS 2011 International Results in Mathematics."
[4] Gustafson, Brenda and Dougal MacDonald. 2014. "Ideas About Designing Science Programs". Science, Technology, & Mathematics (STEM)" 108–11. Corwin Press. https://doi.org/10.4135/9781483377544

subjects and prematurely bias their desire to pursue (or not) a STEM career.[5] This is evident when it's time for Grade 11, students to choose between academic streams. Most students (65 percent) and particularly the poorer performers, choose the Humanities stream for several reasons, including: (i) they are unprepared for the STEM stream, lacking the necessary mathematics, science, and digital knowledge and skills, (ii) they have received limited career guidance and opportunities to identify, explore, and nurture their talents and interests in STEM, and (iii) they are discouraged by the relatively high scores required in the secondary school leaving examination ('Tawjihi') for entry into higher education STEM fields such as engineering.30 [6]This results in only 35 percent of students choosing the STEM stream.[7]

To address each of these identified factors leading to deficiencies in STEM, the MOE is planning a number of systemic interventions inside and outside the classroom and a STEM Education Framework is seen as a strategic vehicle to bring these interventions together. For this, the MOE has developed an initial framework, and hopes to strengthen and operationalize it, based on international best practice.

Subcomponent 2.1 of the project aims to strengthen the STEM Education Framework by expanding its coverage from the early grades up to secondary and tertiary education, strengthening its connection with the current and projected labor market needs over the next decade, and embedding mechanisms to ensure it remains a "live" framework. It will also support the development of an accompanying Action Plan, in coordination with the private sector, that articulates the roles of different actors, provides costing for the envisioned activities and their scale-up, and includes monitoring and evaluation mechanisms to track progress and lessons learned.

The Ministry of Education (MOE) is seeking to recruit an international university to strengthen and operationalize the STEM Education Framework/Strategy.

An invitation is hereby issued to international universities with the required qualifications and experience to apply for this assignment.

II. Objective of the Consultancy

The objective of the consultancy is to **support the MOE to strengthen and operationalize the STEM Education Framework/Strategy.**

III. Coordination Structure

The Ministry of Education has established a Technical Task Force for the STEM Framework. The selected international university will lead the development of the STEM Education Framework and serve as a core member of this Technical Task Force working closely with:

- ***The Ministry of Education:*** Chair of the Task Force, in charge of reviewing and approving all intermediate and final deliverables related to the development of the STEM Framework.
- ***The World Bank:*** Advisor member, who will provide technical guidance and feedback throughout the development of the STEM Framework.
- ***UNICEF:*** Advisor member, who will provide technical guidance and feedback throughout the development of the STEM Framework.

[5] Kasza, Paul and Timothy F. Slater.2017. "A Survey of Best Practices And Key Learning Objectives For Successful Secondary School STEM Academy Settings". Contemporary Issues in Education Research (Online), 10(1): 53–66. http://dx.doi.org/10.19030/cier.v10i1.9880

[6] Palestinian MOE 2019 Statistical Book

[7] Palestinian MOE 2019 Statistical Book.

- ***Al-Quds University:*** National expert member, tasked with implementing in-country data collection, providing technical inputs and leading the consultative process on the STEM Framework in both the West Bank and Gaza, under the technical guidance of the selected international university.

The Ministry of Education, the World Bank and UNICEF have agreed on a sequencing of work between the selected international university and Al-Quds University. *Section IV. Scope of Work* details the specific tasks to be carried out by the international university. *Annex 1*, summarizes the sequencing of work between the international university and Al-Quds University, and should therefore be regarded as an integral part of this terms of reference (TOR) document.

IV. Scope of Work

Task 1. Prepare a situational analysis of STEM in Palestine.

The international university will prepare a situational analysis of STEM in Palestine. The situational analysis should provide a comprehensive overview of the landscape of STEM in West Bank and Gaza, covering all education levels (kindergarten, primary, secondary and tertiary education) and the connection to the labor market, examining:

- Teaching practices in STEM subjects
- Available data on student learning outcomes in STEM subjects, disaggregated by gender
- Available data on students' preferences and perceptions about STEM, disaggregated by gender (including the share of students that select the STEM stream in secondary education, the share of students that choose a tertiary education degree in a STEM field, etc.)
- Present and projected education-to-work transition trends in STEM fields in Palestine, disaggregated by gender (including labor market outcomes for students with tertiary education degrees in a STEM field, etc.)
- Documentation on existing policies and strategies by MOE to promote STEM education inside and outside of the classroom
- Scope and scale of initiatives, programs and interventions by MOE and development partners to promote STEM education inside and outside of the classroom

To this end, the international university will conduct the following subtasks:

Subtask 1.1. Develop the methodology and corresponding data collection instruments needed for a situational analysis of STEM in Palestine, which will be administered by Al-Quds University. The methodology and corresponding data collection instruments should be shared with MOE and the WB for review, and a final version of the methodology and data collection instruments should be submitted incorporated MOE and WB comments/feedback.

Subtask 1.2. Train Al-Quds University on how to implement the developed instruments and provide hands-on technical support throughout the fieldwork, to ensure the high-quality administration of the instruments and reporting of the data.

Subtask 1.3. Analyze the data collected by Al-Quds University.

Subtask 1.4. Lead the drafting of the situational analysis, incorporating any relevant written input from Al-Quds University, and submit it for MOE and WB review. The international university will incorporate any feedback/comments received by MOE and WB and submit a finalized version of the situational analysis.

Task 2. Develop an outline of the STEM Framework for Palestine based on international best practice

Subtask 2.1. Identify relevant international examples of STEM Frameworks/Strategies.

Based on findings from the situational analysis, the international university will identify relevant international examples of STEM Education Framework/Strategies. These examples should include:

a) Countries that have had an upward trend in their PISA and/or TIMMS scores in math and/or science;
b) Countries that have implemented a cohesive package of evidence-based interventions in the classroom that have improved STEM learning outcomes;
c) Countries that have articulated and implemented a successful education-to-work transition strategy focused on STEM.

Subtask 2.2. Plan and co-deliver workshops and consultations to disseminate results and collectively develop an outline with the main pillars for the STEM Framework.

The international university will lead the planning of workshops and consultations with relevant stakeholders in the West Bank and Gaza, with the following objectives:

(i) Share findings from the situational analysis conducted under Task 1;
(ii) Share relevant international examples of STEM Frameworks/Strategies identified under subtask 2.1;
(iii) Based on objectives (i) and (ii), develop an outline with the main pillars for Palestine's STEM Framework

The international university will leverage Al-Quds University's local knowledge to identify relevant stakeholders to invite to these workshops/consultations in both West Bank and Gaza. Further, the international university will work together with Al-Quds University to co-deliver the workshops, leveraging, as appropriate, Al-Quds University's presence in the ground and knowledge of the Arabic language. Finally, the international university will share the resulting outline for the STEM Framework with MOE and the WB for review, and will incorporate received feedback/comments into the outline.

Task 3. Develop the main body of the STEM Framework

Subtask 3.1 Lead drafting the STEM Framework

Based on the agreed upon outline, the international university will lead the drafting of the STEM Framework/Strategy, seeking inputs from Al-Quds University, as relevant. The STEM Framework should lay out the objectives and strategy for STEM education in Palestine until 2030, and should include an overarching monitoring and evaluation (M&E) framework, that allows MOE and development partners to monitor and evaluate progress in implementation throughout the duration of the STEM Framework.

Task 4. Consult and disseminate the STEM Framework

Subtask 4.1. Provide guidelines for a national consultative process on the STEM Framework

The international university will develop guidelines for a national consultative process on the STEM Framework. It will also provide training on these guidelines to Al-Quds University, who will lead the national consultative process on the ground. Throughout the consultative process, the international university will provide ongoing and hands-on technical guidance to Al-Quds University to ensure that consultations are of high-quality and findings/feedback received at each consultation are documented rigorously.

Subtask 4.2. Review feedback and incorporate relevant comments into the STEM Framework
The international university will review the feedback compiled by Al-Quds University, incorporate relevant comments into the STEM Framework, and share a revised version for MOE and WB review. The international university will then incorporate comments received by MOE and WB and share a final version of the document with a designed layout.

Subtask 4.3 Co-develop a dissemination plan for the STEM Framework
The international university will co-develop with Al-Quds University a national dissemination plan for the STEM Framework, incorporating any feedback received from MOE and WB.

Task 5. Develop an Action Plan for Year 1, with an accompanying costing and monitoring and evaluation (M&E) plan

Subtask 5.1. Prepare a draft Action Plan for the implementation of the STEM Framework in Year 1
The international university will draft an Action Plan for the implementation of the STEM Framework in Year 1. The Action Plan should:

(i) Articulate the roles of different actors (including MOE departments, district offices, educators at universities, subject teachers, development partners, the private sector, the community, families, etc.);
(ii) Provide a user-friendly coordination tool that helps MOE keep track of different initiatives, programs and/or interventions by development partners and improve coordination amongst them;
(iii) Cost the envisioned activities under the Action Plan for Year 1, and their national scale-up;
(iv) Provide a user-friendly costing tool that helps MOE cost the activities under the STEM Framework, annually and overall;
(v) Develop a monitoring and evaluation plan that helps MOE track progress and lessons learned during Year 1.

Subtask 5.2. Plan and co-deliver workshops and consultations to validate the Action Plan for Year 1

The international university will develop guidelines for a consultative process to validate the Action Plan for Year 1, along with its costing tool and M&E plan. The international university will work together with Al-Quds to co-deliver the workshops, leveraging, as appropriate, Al-Quds University's presence in the ground and knowledge of the Arabic language.

Subtask 5.2. Review the feedback compiled and incorporate relevant comments into the Action Plan
The international university will review the feedback received during the consultations, and share a revised version for MOE and WB review. The international university will then incorporate comments received by MOE and WB and share a final version of the Action Plan, the costing tool and the M&E plan with a designed layout.

Task 6. Document the process

The international university, with inputs from Al-Quds university if appropriate, will prepare a manual, documenting the development process of the Action Plan for Year 1, its M&E plan and its costing, highlighting practical guidance that MOE can follow yearly to develop annual Action Plans for the implementation of the STEM Framework. The international university will then incorporate comments received by MOE and WB and share a final version of the manual with a designed layout.

IV. Deliverables and timetable

Deliverable	Description *(Please see full description under Section IV. Scope of Work)*	Delivery date
1. Data collections tools and methodology for the situational analysis	Data collection tools and methodology for the situational analysis, incorporating feedback from MOE and WB.	July 5, 2023
2. STEM Education situational analysis report	The situational analysis, incorporating feedback from MOE and WB. It should provide a comprehensive overview of the landscape of STEM in West Bank and Gaza, covering all education levels (kindergarten, primary, secondary and tertiary education) and the connection to the labor market, examining: - Teaching practices in STEM subjects - Available data on student learning outcomes in STEM subjects, disaggregated by gender - Available data on students' preferences and perceptions about STEM, disaggregated by gender (including the share of students that select the STEM stream in secondary education, the share of students that choose a tertiary education degree in a STEM field, etc.) - Present and projected education-to-work transition trends in STEM fields in Palestine, disaggregated by gender (including labor market outcomes for students with tertiary education degrees in a STEM field, etc.) - Documentation on existing policies and strategies by MOE to promote STEM education inside and outside of the classroom - Scope and scale of initiatives, programs and interventions by MOE and development partners to promote STEM education inside and outside of the classroom	September 30, 2023
3. Relevant international examples of STEM Frameworks/Strategies	A document that synthesizes relevant international examples of STEM Education Framework/Strategies. These examples should include: a) Countries that have had an upward trend in their PISA and/or TIMMS scores in math and/or science; b) Countries that have implemented a cohesive package of evidence-based interventions in the classroom that have improved STEM learning outcomes; c) Countries that have articulated and implemented a successful education-to-work transition strategy focused on STEM.	October 15, 2023
4. STEM Framework Outline	STEM Framework Outline, based on the situational analysis, the international best practice identification exercise, and the national consultative process.	Nov 5, 2023
5. Final National STEM Framework	The STEM Framework should lay out the objectives and strategy for STEM education in Palestine until 2030, and	Dec 15, 2023

	should include an overarching monitoring and evaluation (M&E) framework, that allows MOE and development partners to monitor and evaluate progress in implementation throughout the duration of the STEM Framework. The final National STEM Framework should incorporate relevant feedback received throughout the national consultative process, address all comments received by MOE and WB, and be ready for dissemination (with a designed layout).	
6. STEM Framework Dissemination Plan	A document that lays out a comprehensive dissemination plan for the newly developed National STEM Framework.	November 5, 2023
7. Final version of the Action Plan for Year 1	An Action Plan for the implementation of the STEM Framework in Year 1. The Action Plan should: (i) Articulate the roles of different actors (including MOE departments, district offices, educators at universities, subject teachers, development partners, the private sector, the community, families, etc.); (ii) Provide a user-friendly coordination tool that helps MOE keep track of different initiatives, programs and/or interventions by development partners and improve coordination amongst them; (iii) Cost the envisioned activities under the Action Plan for Year 1, and their national scale-up; (iv) Provide a user-friendly costing tool that helps MOE cost the activities under the STEM Framework, annually and overall; (v) Develop a monitoring and evaluation plan that helps MOE track progress and lessons learned during Year 1. The final version of the Action Plan (and corresponding costing tool and M&E plan) should incorporate relevant feedback received throughout the consultative process, and address all comments received by MOE and WB, and be ready for dissemination (with a designed layout).	March 5, 2024
8. Manual	A manual documenting the development process of the Action Plan for Year 1, its M&E plan and its costing, highlighting practical guidance that MOE can follow yearly to develop annual Action Plans for the implementation of the STEM Framework. The final version of the manual should incorporate comments received by MOE and WB and be ready for dissemination (with a designed layout).	May 1, 2024

V. Minimum Required Qualifications

- Proven experience in conducting similar assignments.

- Extensive experience in STEM education.
- The university's team must include 3 internationally renowned STEM professors with expertise in: strategic planning, education systems development, teacher education in STEM, pedagogies for STEM teaching and learning, and the education-to-work transition in STEM fields.
- Experience in conducting situational analyses in the education sector is required. Experience in conducting situational analyses in STEM is strongly desired.
- Experience in conducting strategic planning exercises, such as the development of action plans, costing tools, and M&E plans is required.
- Fluency in English is required, and knowledge of Arabic is considered a plus
- Experience working in Low and Middle Income Countries is preferred.

VI. Estimated Time Frame

1. The estimated time to complete this consultancy is 12 months between June 2023 and May 2024. At minimum, two in-country visits are expected for the completion of the work. Given COVID-19, in consultation and agreement with MOE, Some or all visits may be organized virtually and/or through a hybrid in-person/virtual modality.

2. A total of 120 staff days is estimated for the international consultants under this assignment.

VII. Selection Method and Type of Contract

The university will be selected in accordance with *"the World Bank's Procurement Regulations for IPF Borrowers"*, dated November 2020. "*The Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants*", dated October 15, 2006, and revised in January 2011 and as of July 1, 2016, shall apply to the program.

The selection method is Qualification and Cost Based Selection (QCBS).

Payments will be disbursed according to the deliverable schedule.

IX. Institutional Arrangements

The consulting firm will work under the supervision and guidance of the Palestinian Ministry of Education, Ramallah. The focal point and chief administrative counterpart will be the Assistant Deputy for Educational Affairs, focal point of STEM at MOE and the Director of the Project Coordination Unit (PCU).

A Technical Task Force for the STEM Framework is in place, as described in section III. Coordination Structure. The international university will be a core member of this Technical Task Force. A Task Management Team at the Ministry of Education was also established to manage the day-to-day implementation of STEM activities under Component 2 of this project. The Task Management Team includes members from the Supervision Department, the National Institute for Educational Training (NIET), the Creativity and Entrepreneurship Department, the School Health and Career Counselling Department, as well as the Curriculum Center.

X. Services and Facilities Provided by the Client

The Ministry of Education will provide the international university with assistance in scheduling meetings, workshops, site visits if needed, and provide all required logistics for workshops and meetings. When necessary, suitable office space will be made available.
The Ministry of Education will also provide background information on the existing STEM Education Framework and previous and current STEM activities in Palestine and relevant project documentation for SERATAC.

Annex 1: Technical Coordination on the Scope of Work

Table 1. Summary of Scope and Sequencing of Work between the International University and Al-Quds University

Areas of work	**Tasks to be conducted by the international university** *(hired under WB financing)*	**Tasks to be conducted by Al-Quds University** *(hired under UNICEF financing)*	**Timeline** *(contingent on adherence to the Timeline for the Contracting Phase)*
1. Prepare situational analysis of STEM in Palestine	• Develop methodology and data collection instruments for the situational analysis • Analyze data shared by Al-Quds University • Draft and finalize the situational analysis	• Implement in-country the data collection instruments developed by the international university, in both West Bank and Gaza • Compile and translate collected data and share with international university • Provide written inputs to the international university for the situational analysis	July 15, 2023
2. Develop an outline of the STEM Framework based on international best practice	• Based on findings from the situational analysis, identify relevant international examples of STEM Frameworks/Strategies. • Together with Al-Quds university, co-deliver workshops and consultations to: - Share findings from the situational analysis - Share international examples of STEM Frameworks/Strategies - Develop an outline with the main pillars for Palestine's STEM Framework	• Together with the international university, co-deliver workshops and consultations in both West Bank and Gaza to: - Share findings from the situational analysis - Share international examples of STEM Frameworks/Strategies - Develop an outline with the main pillars for Palestine's STEM Framework	Nov 5, 2023
3. Develop the main body of the STEM Framework	• Based on the agreed upon outline, lead the drafting of the STEM Framework, along with a monitoring and evaluation (M&E) framework, with inputs from Al-Quds University.	• Provide relevant inputs to the international university, for the drafting of the STEM Framework and accompanying M&E framework • Translate the STEM Framework into Arabic	Dec 15, 2023

4. Consult and disseminate the STEM Framework	• Provide guidelines and ongoing, hands-on technical support to Al-Quds University for a national consultative process on the STEM Framework • Review the feedback compiled by Al-Quds University and incorporate relevant comments into the STEM Framework • Prepare a final, designed version of the STEM Framework, ready for dissemination. • Co-develop with Al-Quds University a dissemination plan for the STEM Framework.	• Based on the international university's guidelines, identify key national stakeholders in both West Bank and Gaza and lead a national consultative process on the STEM Framework • Compile and translate relevant feedback obtained through the national consultations, to share with the international university • Translate the final version of the STEM Framework to Arabic. • Co-develop with the international university, a dissemination plan for the STEM Framework in both West Bank and Gaza.	Nov 5, 2023
5. Develop an Action Plan for Year 1, with an accompanying costing and monitoring and evaluation (M&E) plan	• Prepare a Action Plan for the implementation of the STEM Framework in Year 1. The Action Plan should be accompanied by a user-friendly coordination tool, a costing tool and an M&E plan. • Develop guidelines for a consultative process to validate the Action Plan and accompanying tools/documents, and co-lead the consultation process with Al-Quds University • Review the feedback compiled by Al-Quds University and incorporate relevant comments into the Action Plan and accompanying tools/documents, sharing a final product ready for dissemination.	• Translate the Action Plan and accompanying tools and documents into Arabic, and co-lead consultations with relevant stakeholders in both West Bank and Gaza. • Compile and translate relevant feedback obtained through the national consultations, to share with the international university • Translate the final version of the Action Plan for Year 1, and accompanying tools and documents to Arabic.	March 5, 2024
6. Document the process	• Prepare a manual, documenting the development process of the Action Plan for Year 1, its M&E plan and its costing, highlighting practical	• Provide inputs to the international university for this manual. • Translating the manual into Arabic.	May 1, 2024

	guidance that MOE can follow yearly to develop annual Action Plans for the implementation of the STEM Framework.		