MEMORANDUM TO PARLIAMENT

SUBMITTED BY

DR. MATTHEW OPOKU PREMPEH (MP)
HON. MINISTER FOR EDUCATION

ON THE

IMPLEMENTATION OF THE BASIC SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (BSTEM) PROGRAMME

JUNE 2019
1.0 PARLIAMENT DECISION REQUESTED

1.1 Parliament is respectfully requested to consider and approve the contract for the implementation of the Basic Science, Technology, Engineering and Mathematics (BSTEM) Programme to Messrs. ITEC Global International (ITEC Global) at a contract price of Seventy-Six Million, Nine Hundred and Twenty Thousand, Five Hundred and Sixty-Two British Pounds, Fifteen Pence (£76,920,562.15) for delivery and installations of educational BSTEM equipment and training to improve the quality of science and mathematics education within Basic Education system in Ghana and in addition to introduce basic engineering and technology into Basic Education.

1.2 This request also seeks approval for a multi-year contract as per the provisions of the Public Financial Management Act 2016 (Act 916) Section 33. (1)(a) and (b)

2.0 BACKGROUND INFORMATION

2.1 Ghana has made significant progress in terms of increasing access to education. However, the education sector faces several major challenges in terms of performance and learning outcomes.

2.2 Results of the Early Grade Reading Assessment (EGRA) did not change between 2013 and 2015 and indicated that just 2% of Primary 2 (P2) pupils were able to read at an appropriate grade level. The 2015 Early Grade Mathematics Assessment (EGMA) found that higher order mathematical concepts were a challenge with 75% of P2 pupils unable to answer a single conceptual knowledge subtask (i.e., word problem) correctly. At the secondary level, learning outcomes are also low. Only 33% of students passed the WASSCE for Mathematics in 2017.

2.3 The examination results in science and maths indicate a lack of proficiency – less than 20% proficiency at P2, P4 and P6 in 2014. Therefore, in 2014 Ministry of Education (MoE) sought to confront this problem by commissioning a group of eminent education specialists chaired by Prof. Jophus Anamuah-Mensah, former VC, UEW and chairman of National Council for Curriculum and Assessment (NaCCA) to study the situation and recommend a solution.

2.4 The findings of the committee were that there was inadequate preparation of students in maths and science at basic education level which affects performance and interest at the
secondary and tertiary level. Further, there was a wide gap in intake of science and maths compared to humanities at the higher level.

2.5 Three main conclusions drawn from the deliberations of the committee to improve science and mathematics education were:

2.5.1 the need to place emphasis on the preparation and inspiration of the learners;
2.5.2 the need for the provision of a coherent strategy and institutional leadership capacity for science and mathematics education; and
2.5.3 the curriculum in mathematics and science should be inspiring and should emphasize fewer topics, which are taught in detail.

2.6 In 2016, the NPP recognising the issue as a significant bottleneck in achieving the desired learning outcomes, outlined in its manifesto a commitment to “ensure the development of a healthy, knowledgeable, well-trained and disciplined labour force with the capacity to drive and sustain private sector-led growth in Ghana. The broad areas of intervention here will include education especially in Science, Technology, Engineering, and Mathematics (STEM)”

2.7 In line with MoE’s vision to focus on introducing STEM into the Basic Education curriculum and have an educational overhaul in Basic Education, the programme was broadened to Basic Science, Technology, Engineering and Mathematics (BSTEM) thereby increasing interest of the students in the early grades.

2.8 Under the aegis of the MoE, ITEC Global conducted a pilot in early 2018 involving 100 Junior High Schools (JHSs) with the following objectives:

2.8.1 To create a team of 25 Science and Mathematics Regional Advisors
2.8.2 To provide BSTEM equipment to 100 selected JHSs
2.8.3 To ensure that the 25 Science and Mathematics Regional Advisors deliver in-service training to 100 JHS science teachers from the selected schools

2.9 The key components of the programme are:

2.9.1 To develop teaching of science and mathematics to stimulate students through practical, inquiry based, problem-solving approaches, and develop skills that they will apply in their lives and future careers;
2.9.2 To improve quality of science and mathematics education and resources;
2.9.3 To introduce engineering and technology concepts into basic education; and
2.9.4 To increase the uptake of science and mathematics at SHS level
2.10 The pilot was successful in achieving objectives of the BSTEM programme of introducing STEM into the JHSs through both basic and more complex equipment. The project also impacted learning outcomes by providing mathematical equipment and ICT resources and new pedagogical techniques such as maths games.

3.0 JUSTIFICATION FOR GOVERNMENT ACTION

3.1 Research has shown that the best practice in early childhood education is to break away from passive instruction and allow for more play, investigation and collaborative learning. This kind of learning early in life builds skills and interests that serve children better.

3.2 As an outcome of the pilot, it was found that a strategic programme needs to be laid out over the next five (5) years to support the Basic Science Technology Engineering and Mathematics (BSTEM) education. Under this programme, the key task was to improve science and mathematics education at Kindergarten, Primary and JHS levels.

3.3 This programme aims at:

3.3.1 addressing the long standing poor performance in maths and science at the basic level;

3.3.2 creating a pipeline of critical thinkers to lead socio-economic development; and

3.3.3 facilitate achievement of long standing policy goal of 60:40 sciences to humanities ratio in Tertiary Education sector and lay a strong foundation early on.

3.4 It also intends to introduce students to ICT and STEM equipment to facilitate acquisition of numeracy skills in earlier school years. In order to increase interest and aptitude in STEM, the programme will introduce inquiry-based, active learning techniques to teachers to encourage students to approach learning using critical thinking and problem solving techniques.

3.5 The programme has been designed in the new curriculum developed by NaCCA which is being rolled out under the guidance of MoE in September 2019.

3.6 Further, the programme also aims at training teachers as well as developing STEM training Teacher’s Guide and Teacher Activity book to fully integrate them into the programme.

3.7 To compete favourably on the world stage, our students have to be adequately prepared to take advantage of STEM-related jobs. STEM-related careers include computing,
engineering, physical sciences, life sciences, mathematics, scientific researches among others. All these are becoming dying professions in the country.

3.8 Through this programme, Ghana’s quest to improve its competitiveness in Programme for International School Assessment (PISA), a test conducted by OECD for 15-year-old students from all over the world in reading, mathematics and science. Ghana was found at the bottom of the ranking of 76 countries in 2015.

4.0 PROJECT SCOPE AND COST
4.1 This programme seeks to:
   4.1.1 Provide all 38,715 JHSs, Primary Schools and Kindergarten schools with Science and Mathematics equipment
   4.1.2 Train 19,810 teachers (9,905 science and 9,905 Mathematics teachers), 14,665 Primary teachers and 14,145 Kindergarten teachers within the basic education curriculum.

4.2 The original price quoted was around £80 Million. However, the procurement unit obtained a discount of 5% and the approved sum is therefore Seventy-Six Million, Nine Hundred and Twenty Thousand, Five Hundred and Sixty-Two British Pounds, Fifteen Pence (£76,920,562.15).

5.0 OPTIONS AND IMPACTS CONSIDERED
5.1 The MoE examined two (2) distinctive options for the provision of BSTEM Programme in order to incorporate and cultivate the interest in BSTEM early while in JHSs across the country by introducing ICT equipment and training of teachers.

5.2 OPTION 1. PROVISION OF ICT EQUIPMENTS TO ALL JHS AND SHS ACROSS THE COUNTRY
5.2.1 This Option proposes to provide only ICT equipment and Teacher training manuals and teacher workbooks to all schools including JHSs and SHSs. This option will not entail familiarising teachers with the equipment and training of teachers. This will basically focus on providing and installing the equipment.

5.2.2 Impact –
The proposal will only provide the teachers with the equipment and literature. However, the intervention may not be sufficient as the teachers will not be imparted with the skills and knowledge to allow them to facilitate ICT (or technology) and engineering activity as part of the BSTEM Programme.

5.2.3 This could lead to improper use of the ICT equipment thus impacting the efficiency and outcome of the BSTEM Programme. The exclusion of teacher training will not allow the teachers to deliberate and learn new pedagogical techniques to generate and retain interest of the students in STEM especially Science and Mathematics.

5.3 OPTION 2: PROVIDING TEACHER TRAINING AND ICT AND MATH AND SCIENCE EQUIPMENT FOR SCHOOLS ACROSS THE COUNTRY (RECOMMENDED OPTION)

5.3.1 This option involves covering all Basic Schools across the country in a phased manner over five (5) years period in three (3) phases.

5.3.2 The ITEC Global will provide ICT tools and STEM equipment to Basic Schools as well as provide training for teachers in JHSs and Primary Schools. Under this option, ten (10) regional BSTEM offices will be set-up as well as two (2) National STEM office in north and south of Ghana respectively will be introduced.

5.3.3 Understanding the importance of the role of the teachers, under this option, training of teachers in primary schools and JHSs will be undertaken.

5.3.4 In order to improve effectiveness, thirty (30) regional advisors will also be trained for primary school level.

5.3.5 Impact –

This option will not only provide ICT equipment, but also have training modules for regional advisors and teachers in JHSs and primary schools. Under this option, teacher familiarisation workshops and trainings would be held. This will help teachers develop strategies that will improve the effectiveness of teaching and learning STEM in JHSs.
6.0 STAKEHOLDER CONSULTATION RECORD
6.1 The proposal has been discussed with the Ministry of Finance, MoE, its agencies and representatives of JSHs in Ghana, Ministry of Environment, Science, Technology and Innovation, Non-Governmental Organisations in the STEM environment, through consultations and presentations. The proposal has also received approval from the Public Procurement Authority.

7.0 IMPLEMENTATION PLAN
7.1 The programme is intended to cover all Basic Schools across the country in a phased manner over five (5) years period from the date of signing of contract in three (3) phases, each phase being 18 months.
7.2 In line with the establishment of BSTEM Programme across basic schools in the country, will entail the following:
7.2.1 Introduction of the STEM infrastructure: Development of two (2) National STEM Centres, one in the south and one in north of Ghana
7.2.2 Expansion of STEM infrastructure: ten (10) Regional BSTEM Offices set-up
7.2.3 Provision of ICT and STEM equipment
7.2.4 Training of JHS, Primary and Kindergarten teachers
7.2.5 Development of primary STEM training Trainer Guide and Teacher Activity Book
7.2.6 Regional Advisors Training (30 candidates) for Primary School level
7.2.7 Provision of STEM equipment to Primary Schools
7.2.8 Training of primary teachers

8.0 LEGISLATION/REGULATORY PLAN
8.1 No new legislation or changes to existing legislation is required. The programme has been designed in the new curriculum developed by NaCCA which is being rolled out under the guidance of MoE in September 2019.

9.0 FINANCIAL IMPACT AND CONSIDERATION
9.1 The Government through the MoE has been allotted funds to cover the Establishment of the Basic Science, Technology, Engineering and Mathematics (BSTEM) Programme.
9.2 The total cost of the project is Seventy-Six Million, Nine Hundred and Twenty Thousand, Five Hundred and Sixty-Two British Pounds, Fifteen Pence (£76,920,562.15)

10.0 COMMUNICATION
10.1 The proposed establishment of the development of the two (2) National STEM centres will be officially launched by His Excellency the President of the Republic. The Ministry will through press conferences, addresses and public engagements communicate to the Ghanaian populace on the proposal.
10.2 Massive publicity in the media including social platforms will be carried out to reach the youth, parents and prospective stakeholders. Thereafter, recipient schools and their trained teachers will undertake a registration of all their students.

11.0 CONCLUSION
In conclusion, Parliament is accordingly requested to consider and approve;

i. the proposal for establishment of the Basic Science Technology Engineering and Mathematics (BSTEM) Programme across the country, for development of two (2) National Centres, delivery and installation of educational BSTEM equipments and training of teachers and regional advisors.

ii. a multi-year contract to deliver the programme over the next 5 years as per the provisions of the Public Financial Management Act 2016 (Act 916) Section 33. (1)(a) and (b)

DR. MATTHEW OPOKU PREMPEH (MP)
HON. MINISTER FOR EDUCATION

June, 2019
Cabinet at its Fifty-fourth meeting held on Thursday, 23rd May, 2019 considered a report of the Joint Meeting of the Cabinet Committees on Economic Matters and Social Services on the above Memorandum submitted by the Minister for Education.

2. The Memorandum requested Cabinet to consider, approve and recommend to Parliament, the contract for the implementation of the Basic Science, Technology, Engineering and Mathematics (BSTEM) Programme to Messrs ITEC Global International (ITEC Global) at a contract price of Seventy-six million, nine hundred and twenty thousand, five hundred and sixty-two British Pounds, fifteen Pence (GBP76,920,562.15) for delivery and installation of educational BSTEM equipment and training to improve the quality of science and mathematics education within the Basic Education system in Ghana and in addition, introduce basic engineering and technology into Basic Education.

3. Cabinet approved the Memorandum for the consideration of Parliament.

4. I should be grateful if you could take requisite action on the decision by Cabinet.

MERCY DEBRAH-KARIKARI
SECRETARY TO THE CABINET

THE HON. MINISTER FOR EDUCATION

cc: Chief of Staff
    Secretary to the President
    Secretary to the Vice President
    Hon. Minister for Finance
    Chairperson, Cabinet Committee
    on Economic Matters
    Chairperson, Cabinet Committee
    on Social Services
    Hon. Minister for Parliamentary
    Affairs
COMMENCEMENT LETTER FOR THE ESTABLISHMENT OF BASIC SCIENCE, TECHNOLOGY ENGINEERING AND MATHEMATICS (BSTEM) PROGRAMME

Please refer to letter No. DA89/467/01 dated 27th April, 2018 addressed to this Ministry.

Copy attached.

2. Approval is hereby granted you to commit the Government of Ghana to the tune of GH₵ 492,834,090.15 being the cedi equivalent of £80,969,012.79 (Eighty Million, Nine Hundred and Sixty-Nine Thousand and Twelve Pounds sterling, Seventy-Nine pence) to enable the Ministry of Education establish Basic Science, Technology, Engineering and Mathematics (BSTEM) in all basic schools in Ghana over a five-year period.

3. The following should be noted for strict compliance in the award of contracts:
   I. There should be no Advance Mobilisation clauses
   II. No price variations
   III. There should not be indexation to or award of contracts in foreign currency
   IV. No interest on delayed payments.

4. You are to ensure full compliance with the provisions in the New Procurement Act with regards to goods, works and services as well as provide the annual cost on the budget over the medium term.

5. You are to apply to this Ministry for release of Funds with copies of this Commencement Warrant, Purchase Requisitions from GIFMIS, Payment certificates, and any other relevant documents upon completion of milestones of works.

6. MDAs and MMDAs are to note that, henceforth the understated clause is required to be inserted in all Contracts/Agreements in order for them to be paid.

   "Pursuant to Section 96(1) of the Public Financial Management Act, 2016 (Act 921), it is an offence to make an unauthorised commitment resulting in a financial obligation for the Government.

   I [name of Contractor] understand and acknowledge that any unauthorised letter of guarantee or undertaking issued under this contract is unlawful, null and void ab initio, and is not legally binding on Government. I understand, acknowledge and agree that any judgment or garnishee order that may be issued in my favor as a result of a breach of this contract shall only be enforceable against MOE and shall not be enforceable against any other ministry, department or agency of the Government of Ghana that is not a party to this contract.

   I understand that "unauthorised letter of guarantee or undertaking" means one that has not been approved by the Ministry of Finance."

7. Thank you.

THE HON. MINISTER,
MINISTRY OF EDUCATION
ACCRA