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Education Consortium for the Advancement of STEM in Egypt (ECASE)

QUARTERLY PROGRESS REPORT

JANUARY - MARCH 2015



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CONTENTS

- Acronyms 4
- 1. Summary of activities 5
- 2. Activities leading towards accomplishment of Program objectives 10
 - 2.1 Project Management 10
 - 2.2 Project Activities 12
- 3. Challenges and Resolutions 32
- Annex I: ELP Report 33
- Annex II: Training Report 33
- Annex III: Meetings Minutes 33

Acronyms

21PSTEM	The 21 st Century Partnership for STEM Education
ACT	American College Testing (exam)
AIP	Annual Implementation Plan
AUC	American University in Cairo
BOT	Board of Trustees (school)
CA	Cooperative Agreement
CGP	College Guidance Program
COP	Chief of Party
DCOP	Deputy Chief of Party
ECASE	Education Consortium for the Advancement of STEM in Egypt (USAID)
EGP	Egyptian Pounds
ELP	English Language Program
GILO	Girls' Improved Learning Outcomes Project (USAID)
GOE	Government of Egypt
HR	Human Resources
ICT	Information and Communications Technology
MAP	Management Assessment Protocol
M&E	Monitoring and Evaluation
MOE	Ministry of Education
MOHE	Ministry of Higher Education
NCEEE	National Center for Educational Evaluation and Examination
PARLO	Proficiency-based Assessment and Reassessment of Learning Outcomes
PAT	Professional Academy of Teachers (MOE)
PD	Professional Development
PMP	Performance Monitoring Plan
QPR	Quarterly Progress Report
SCOPE	Standards-based Classroom Observation Protocol for Egypt
SEPUP	Science Education for Public Understanding Program
STEM	Science, Technology, Engineering, Math
STTA	Short Term Technical Assistance
TIES	Teaching Institute for Excellence in STEM
TFI	The Franklin Institute
TILO	Technology for Improved Learning Outcomes (USAID)
WL	World Learning
US	United States of America
USAID	United States Agency for International Development

1. Summary of activities

This Quarterly Progress Report (QPR) details activities and accomplishments of the USAID – funded Education Consortium for the Advancement of STEM in Egypt (ECASE) Program, from January 1, to March 31, 2015. The report discusses work undertaken by World Learning worked collaboratively with consortium partners (21PSTEM, TIES, and TFI) in close cooperation with the Ministry of Education and its affiliates.

- **Visit to Maadi STEM School** – On March 24, Sherry Carlin, USAID Mission Director in Egypt, visited Maadi STEM School for girls with Tom Crehan, Hala ElSerafy and Julie Fossler. Mr. Mohamed Saad joined the visit representing the Ministry along with ECASE staff.



Upon arrival to the school the tour was escorted by students who were well aware of the school grounds and aspects they needed to show to the visitors. The students were all well-spoken in English and started with the Fab Lab. There, the students demonstrated the different instruments and machines, what each one does and how the products made are used in the students' capstone projects. All visitors were taken by the proficiency of the students and their abilities to work the machines and produce samples during the short visit.



The visit then preceded to the capstone projects where displays of selected capstone posters and the students were available to explain their projects and field questions from the visitors. The posters were laid out so that the visitors would see projects done by each of the three grades of students thus enabling the visitors to see the development of the students in their capabilities and in the evolution in their thinking

Last year's ISEF winners showed their project for this year, and the local ISEF finalists who are preparing to compete this May in the ISEF International competition in Pittsburg, PA, were also there to explain their projects and discuss the experience they faced in their local ISEF competitions.



Other students talked about their STEP scholarships, how they applied for it last year and how that more students applied this year hoping to win an undergraduate degree in the USA.

The students gathered with the rest of the school in the multipurpose hall where a student delivered an emotional speech about her learning experience in the Maadi STEM School and how she battled being away from her family during the first year, why that helped shape her character and make her a better person. She also talked about the subjects she learns at the school and how such subjects are provoking certain interests in her that may very well affect her undergraduate studying and career. This was followed by another speech from the school's English teacher, Mr. Moahmed Abdel Aziz and Sherry Carlin who mentioned how much she is touched by the abilities of the students, their command of the English language and that this school is one of the best projects she visited. The students greeted Sherry at the end of the visit.



- **ISEF- Egypt 2015** - For the second year in a row, the students at Maadi STEM School won in the preliminary competitions held in Egypt, and will travel to the Intel International Science and Engineering Fair (ISEF) finals in Pittsburg, Pennsylvania, U.S.A. this summer.

The Egypt ISEF selected eight projects from all over Egypt, three of which were selected from the Maadi STEM School, to participate in the international competition that will take place May 10-15, 2015. This means that almost 40% of the projects representing Egypt were picked from the STEM school which will eventually help in promoting the school locally and internationally at the fair. In addition, this year STEM has a representation of three projects; one project more than last year when they only had two projects participating in the international competition.



The four students who will participate in ISEF U.S.A. are; Noha Shoukry and Asmaa Atef from Cairo for the project 'Crystal Clear' in the category Environmental Management that attempts to make potable water available to more people at affordable prices using advanced technologies, Rahaf Mohamed Kamel Abdel Samad from Upper Egypt for the project 'An Artificial Leaf Driven Water Splitting by Affordable Materials for Solar Fuel Generation Using Pico- Nano Technique' in the category Materials and Bioengineering that attempts to use solar energy as an environmentally sound alternative of energy, and Yasmine Yehia Abdo Mostafa from Alexandria for the project 'Bye Pollution and Hi Revolution' also in the category Environmental Management that attempts to treat polluted water using very simple local materials. Again, with an excellent regional representation from Upper and Lower Egypt in addition to Cairo governorate.

Preparation for New School Openings

During this quarter ECASE team coordinated with the head of the STEM unit to hold a meeting with educational leaders in Alexandria. During the meeting, ECASE team presented the STEM model, and the regulatory structure that was established to date including the ministerial decrees for STEM schools and STEM unit. A group of STEM alumni participated in the presentation and engaged in a discussion with the participants who were both interested and impressed by the students. ECASE team also facilitated a discussion around Alexandria STEM School and the preparation for opening in the coming academic year.



During this quarter several visits to three schools have been done to follow up on the construction process. Details will be covered later in this report.

- ***Semester 1 Capstones*** – A modified design of the capstones was supported for the 2014-2015 school year, with scaffolding for each grade, leading to freedom of topic selection by Grade 3. Students were required to select five learning outcomes from PARLO Tracker and discuss how their work supported these learning outcomes, highlighting greater integration across the curriculum. The responsibility of capstone design and journal questions was shifted to teachers, with the STEM unit participating in various training sessions to enable their leadership role in the evaluation and organization of the Capstone assessment events. In January 2015, the STEM Unit essentially managed the evaluation process and represented upwards of half of the external evaluators for the events.



- ***Support for Mid-Terms, Finals and Practicals*** - First semester final exams were administered to Grades 1 and 2 students in January 2015, with members of the MOE counselor's office developing these exams. As was the practice with the first semester midterm exams, a completed statistical analysis for each of the exams was developed by ECASE. A discussion was held with the Egyptian content test developers to discuss the final exams. As in past meetings, the emphasis was placed on

developing items with high levels of Depth of Knowledge and on adequate item coverage for each of the semesters' learning outcomes. ECASE project continues to work with the STEM Unit with a goal of continual improvement of the midterm and end of term examinations. A new set of assessment review sessions will be set up for the second semester midterm exams. These mid-term exams were administered in March of 2015. Also in February 2015, Grade 3 practical exams were administered. A manual for the development and administration of these practical exams was developed and will be part of the ECASE assessment manual.

- ***Teacher and Leader supports*** – The project provided professional development for teachers and leaders in late January and early February 2015 during the mid-year break. During this time, 69 teacher candidates, new and experienced STEM and Humanities teachers participated in the Mid-Year PDI (January 25 – February 5, 2015). This professional development included workshops and training for participants, including pedagogy, capstones, curriculum, and laboratories. During this time, a special leadership training was also provided to prospective principals. For the teacher training sessions, a cohort of master teacher trainers selected from the two existing schools provided support and gained useful experience in preparation to lead sessions during the summer PDI and to show knowledge transfer. Such examples demonstrate the ability of producing STEM trainers from the schools. While the experience is still limited, ECASE is working on expanding this base to include more individuals who can graduate to be trainers.



- ***Manuals for Accreditation*** – All partners worked in a concerted effort over the past quarter to define requirements for PAT accreditation of teacher training materials. As such, the team devised a plan to offer training with various sessions/modules geared toward different teacher audiences: Beginning, Experienced, and Advanced teachers. The sessions can be modified and structured appropriately for the training times available, such as a summer professional development institute. Each series consists of teacher training for pedagogy, curriculum, capstones, laboratories, and assessment. Beyond these trainings, the team has maintained a list of all manuals to be developed to support the STEM schools with appropriate due dates and delivery to PAT for accreditation where needed.

- ***Sustainable Solution for English Language Support in STEM Schools*** - Currently ECASE provides a face-to-face after-school ELP to support students in developing their English and academic skills, with the aim of improving student performance in their STEM content areas and STEM school educational activities. Although results have been positive, the cost of the program renders it unsustainable given the unlikelihood that the MOE will absorb such costs after the life of the project. IBM has provided the MOE with IBM Reading Companion.

Although this program can provide learners with reading and pronunciation support, it does not provide comprehension development, or structured practice with key STEM vocabulary and phrases, writing or speaking.

To ensure that STEM schools possess a sustainable solution for providing students with the additional English language support they need, ECASE is replacing the ELP with English for STEM Online (e-STEM Online), a web-based English language learning program for STEM school students. e-STEM online provides interactive English language activities that help learners better access STEM content delivered in English. It will be also designed so that it does not only provide such essential services to the STEM schools' students, but to be also used as a tool to improve English language skills for preparatory students who aspire to join the STEM schools. This will assist ECASE in implementing its outreach program for preparatory schools in a more equitable manner, since the s-STEM Online is available over the internet and can advance each student's abilities based on their own efforts. e-STEM Online will, therefore, provide the following:

- Between 50 and 100 hours of English for STEM practice to Prep school students interested in STEM education
- Approximately 100 hours of English for STEM content to grade 10 STEM School students
- Approximately 100 hours of English for STEM content to grade 11 STEM School students
- Approximately 30 hours of soft-skills development for Grade 11 STEM School students.

Prep content will introduce common STEM topics in English, while also exploring working in teams, collaboration and leadership. Grade 10 and 11 content will predominantly focus on specific language and academic skills needed to manage STEM subjects and activities, and Grade 12 will provide students with guidance on/practice writing personal statements for college applications, and on general test-preparation strategies. In grades 10 and 11, e-STEM Online will link the online work students do to specific STEM language required for each STEM subject, as well as to project-based classroom activities that scaffold students toward delivering strong Capstone presentations and reports. Accordingly, e-STEM Online work will be assessed in STEM School core English courses by Ministry teachers who will be trained to do this work.

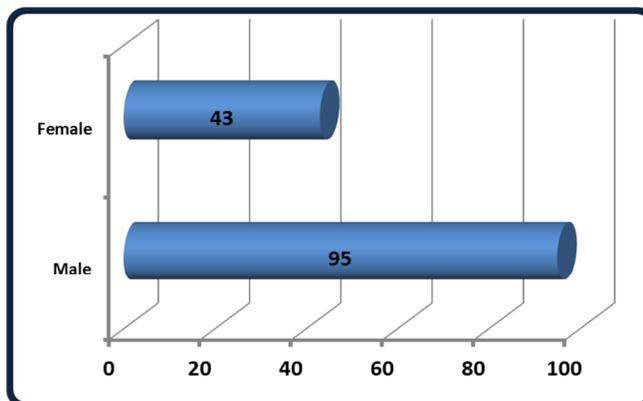
As a part of the broader STEM Outreach Initiative, e-STEM Online Prep will be made available to preparatory school students (grades 2 and 3) who are interested in STEM education. Through the STEM Outreach Initiative, core stakeholders will be oriented to the program and provided with the tools they need to support Prep students who wish to improve their English for STEM learning. (**Annex I**).

Training – During this quarter ECASE implemented two separate professional development trainings for both new and current teachers. Two training weeks were dedicated for the new teachers and one training week for the experienced teachers including 3 days lab practical for STEM teachers. Additionally, one week was dedicated for leadership training. Moreover, nine members of the Ministry of Education Technology Development Center (TDC) participated in Fab Lab training over five days. Finally during this quarter, the project continued to handle the MOE STEM Unit

workshops and as a result 15 workshops were held successfully during the last quarter including sub-committees for safety and extra-curricular activities. The total number of trainees to date was 138 (95males and 43females). (**Annex II**)

2. Activities leading towards accomplishment of Program objectives

2.1 Project Management



ECASE's Annual Implementation plan for year three was submitted last October 2014, and returned by USAID, after review, in mid-December with a long list of comments. ECASE presented a late response to the comments, after it collected input from all partners, with an edited version of the AIP in mid-February. A meeting was suggested by USAID in early March to review the comments presented. During this meeting several of ECASE's responses were debated and a new version of the AIP was reissued, discussed with USAID and finally approved before the end of March. The current version is now approved by USAID and distributed to all partners to be the base for ECASE's work during year three.

USAID shared their Objective 3 Health & Education Handbook with the project last quarter and meetings were held between the project and USAID to discuss the overhauling of ECASE's PMP to include indicators that match USAID's Objective 3 indicators. The request from USAID was that any ongoing project that had more than one year left in its life time needs to realign its indicators with that of USAID's as much as possible. ECASE's M&E reworked the project's indicators as per its CA to match those of USAID's, had a meeting last quarter and followed up with meetings this quarter where a draft list of indicators was submitted to USAID for approval. That list constituted ECASE's indicators upon which a new PMP will be designed. Those indicators mostly matched USAID's Objective 3 indicators where applicable and more indicators were added by ECASE to report on the particular aspects of the project that do not lend themselves to the content of Objective 3. The list of new indicators was submitted to USAID and a favorable response was received from USAID by end of February stating a 'significant improvement' on the previous PMP. ECASE had worked out the rest of the PMP based on the new list of indicators and is presently under house review to be submitted to USAID this coming quarter. By then ECASE believes that a new PMP should be in place and approved by USAID.

During this quarter, the ECASE the teams conducted a variety of meetings, and created some additional planning documents and resources, including:

- ***Leadership calls every other week*** – these calls provide key updates from the field to Home Office and partners in the US, and also allow the team to discuss critical topics. These calls have remained standing since the project launched and maintain an important means to keep the team members, regardless of their geographical boundaries, continuously connected and in tune of what is taking place on the ground.
- ***Content leader calls every other week*** – these calls are for the technical staff directing the work from 21PSTEM, TFI, and TIES and offer a time to share learnings, project updates, and discuss collaborative work. These calls were initiated in January 2015.
- ***USAID Planning documents*** – these files were created in January 2015 for all work for 21PSTEM (curriculum document and assessment document), TFI, and TIES. These documents were provided at the request of World Learning.
- ***MOE Planning documents*** – these files were created in January 2015 for all work supporting the transfer of information to the MOE STEM Unit for 21PSTEM (curriculum and assessment documents), TFI, and TIES. At the time of this report, it was recommended by World Learning that TFI and 21PSTEM (curriculum only) provide updates on these plans to the MOE STEM Unit while in country during this quarter.
- ***Centralized Documents on Google Drive*** – documents for the project and team remain on Google Drive, with a few planning documents in heavy use. They include:
 - ***Egypt STEM Schools Portal*** – a current front end to all documents available to the ECASE project, with expandability to teachers, students, and other users.
 - ***Calendar*** – a google calendar of confirmed events at the schools, including test dates and capstone dates. Approved calendar items for schools are updated by the field office only.
 - ***ECASE File*** – this is the primary file containing all elements of work associated with ECASE. Most items, except those for ECASE leadership and/or administrative files, can be found via the Portal. However, many users will find it easier to navigate from this central folder. All new documents should be added through the Portal.
 - ***STEM Unit Meetings Plan*** – a list of standing STEM Unit meetings and possible topics for discussion throughout the semester to aid in planning and agenda finalization for these meetings.
 - ***Travel Plans*** – a final list of all travel logistics for confirmed travelers so that arrangement in the field can be made.
 - ***Content and Manuals*** – a centralized list of all manuals being generated, with due dates, content descriptions, and links to existing content. At the time of this report, 55 manuals are planned for completion. With a large part of those manuals completed by May 2015. Manuals may be in the form of training documents, handbooks, or reference documents.

2.2 Project Activities

This section summarizes key accomplishments against the revised AIP for each objective area. All project activities are part of a larger iterative process and many aspects of individual activities overlap with other activities. The summary, below, is presented according to the AIP sequence.

Objective 1: Increase student interest, participation, and achievement in science and mathematics with special effort to underrepresented groups such as girls and economically marginalized students

Nearly six months ago, a manual was updated and enhanced to support *implementation of a STEM school admissions system that is criteria-based, inclusive, and transparent (Activity 1.1)*, the Student Selection Manual, including the process and criteria for attracting, interviewing, and accepting students for admissions to the STEM school, was presented to the MOE STEM Unit for review and approval. ECASE project decided to change the strategy for this activity and cooperate with NCEEE to develop an admission exam for STEM Schools based on merit and talent not only grades.

Further guidance is also needed to enable advancement of training of the Board of Trustees to *promote the STEM school within the surrounding community through BOTs (Activity 1.2)*. BOT in both schools still not functional due to various reasons. Again ECASE project will change its strategy to avoid unavailability of BOT by starting to direct work with schools' administration to identify key parents with potential to promote the STEM School within the surrounding community.

Fab Labs are operational in both Maadi and 6th of October, and both have Fab Lab Managers assigned to them. They both receive support from Fab Egypt in Cairo and continue to participate in bi-weekly meetings with the ECASE support team in the US. To *promote the STEM school within the surrounding community through Fab Labs (Activity 1.2b)*, ECASE project has provided training to the Fab Lab managers to enable student and teacher training and has provided direct training to the TDC, however, more buy in is needed from the TDC leadership to commit personnel to the training and further establishment of Fab Labs in three new schools. A brief in Arabic was presented outlining the needs from TDC and further action from their side is needed.

The training is according to a Fab Lab Training Plan approved and initially implemented last quarter. All Fab Lab training falls into three categories, TIER ONE...Basic; TIER TWO...School-based competencies; TIER THREE...University-based competencies. Training of students for Fab Lab Tier 1 continued with the goal to move into Tier 2 during the second semester.

Training also proceeded according to plan (Tier 2) with Ministry TDC participants being introduced to electronics through activities involving Arduino kits. The activities were centered

on “learning by doing” and were planned as a progressive series of basic exercises aimed at demystifying electronics.

TDC participants were receptive and progressed well during the first day. On the second day a similar activity was proposed, this time using the Lilypad kits which allow for circuits to be created using needle and (conductive) thread. Participants brought items from home such as gloves and bags to be used in the activity. Four teams were formed and using the available sensors (temperature, light, buttons, and sliders) and actuators (buzzers, vibration motors, LEDs) participants produced simple wearable devices in three stages: conception, design, and implementation.

Results from this activity were very impressive, with some really good ideas being brought to life, such as a bandana which measures the wearer’s temperature and changes the color of an LED to reflect it. This project essentially is a medical device, which was conceived, designed and built in a few hours.

Looking forward to next quarter, Fab Lab student training continues into the Tier 2 level with the assistance of Fab Managers at both schools. Ministry TDC participants will receive Tier 3 training and be prepared to contribute to additional Fab Lab application at the schools, and school Fab Lab Managers will receive additional training to support their delivery of student training for Tiers 2 and 3. Also, ECASE will be collecting information about Fab Lab usage and impact from students and Fab Managers to inform future use of Fab lab at Maadi and 6th of October as well as new schools. Information collected includes occasional survey questions focused on how students are using Fab Labs and counting of students using the labs.

During this quarter, the project started to enable procurement process for the new schools of future labs in new schools. The design specifics for each school will be based on the experience of Maadi and 6th of October, feedback from the Fab Managers, and project consultants. It is anticipated that further collaboration on the Fab Labs would occur with Local STEM Units, but these have yet to be formed.

Finally, the ECASE partners supported creation of elements toward a Technology Curriculum Plan, with elements drafted for *supporting the use of PARLO Tracker and free e-portfolio resources for students to demonstrate proficiency in the application of technology learning outcomes/competencies including competencies in Fab Lab (Activity 1.3.8)*. The draft Technology Plan (Technology Plan Elements and the Technology Outcome Grids) was presented to the MOE STEM Unit at their meeting last quarter as discussed in the previous quarterly report. No further work toward execution of this plan was completed in the second quarter. The tool has been going through updates and improvements. The new User Interface continues to be designed and coded for roll out for the Fall Semester 2015. The teacher, student and parent roles in Tracker are set for roll out, but it was decided that it was best not to switch the technology interface mid-semester. The Teacher User Guide has been updated and the Power Point and Teacher Training manual will be finalized early next quarter. The School Administrator, Researcher, Counselors and System Administrator roles continue to be coded and the School

Administrator User Guide will be updated accordingly. User Guides will need to be created for Researchers, Counselors and System Administrators and this work is slated for Year 4 of the project.

During the next quarter, drafts of the PARLO teacher training materials will be completed by mid-April and later modified/finalized as feedback is given. The PARLO student and parent user guides will be updated and the student power point modified to reflect the new interface. The School Administrator User Guide will be modified during the following quarter (July to September). Design and coding for researchers, counselors and system administrators will start after the School Administrator role reaches the point to be rolled out.

During this quarter, ECASE held a policy dialogue with the counselor of Science to improve the existing structure in the preparatory schools for holding extracurricular science activities to develop students' scientific thinking skills to enable *Outreach to Egyptian Preparatory Schools (Activity 1.4)*. ECASE also held a focus group discussion with STEM unit on a systemic structure to ensure preparatory students are informed of STEM schools and have access to application forms if they are interested and able to meet the criteria. The discussion focused on the following:

- Disseminating information about STEM schools and the criteria through existing MoE structures all the way to the school
- Designing a school based activity for developing students' scientific thinking skills that is part of the school activities and available for interested and gifted students.
- Developing a mechanism for initial screening of candidates for STEM schools that provides gifted students with the advantage to get a waiver from part of the achievement score required for acceptance at STEM schools

Both the policy dialogue with the Counselor of Science and the focus group discussion with STEM unit resulted in a suggested memo of the above three items that was shared with USAID. Once revised and finalized, ECASE will use the memo to continue policy dialogue with key STEM professionals to make it part of the system.

Objective 2: Strengthen the STEM School local initiative through developing an effective model of specialized high schools focusing on science, technology, and mathematics for gifted students.

Tailoring the STEM School to the surrounding community through school specialization (Activity 2.1) is most relevant to the pending new schools that are more regionally based. The Maadi and 6th of October schools draw students from many governorates, which suggests localization is useful to create a relationship with the local community. A Board of Trustees will aid this process when becoming functional.

As new schools join the network, it is expected that the students will come from the governorate where the school is built and surrounding governorates and this will provide an opportunity in the design phase to address Egypt's Grand Challenges through local community

impact. The project team has begun asset mapping discussions to prepare for implementation in each new school region. Asset mapping will determine how the schools might be able to localize some of their design and activities. At this time, however, no asset mapping was conducted due to the delay in forming Local STEM Units for each school.

It is intended that asset mapping will be an element of the Design Studio process to begin for the new schools in the coming quarter, assuming approval is granted to form the local STEM Units by that time. However, coordinating meetings and working with local stakeholders will stay on schedule. Efforts to present results and school specialization options/capstone designs, for new schools, to the STEM Unit for endorsement will be built into the Design Studio process in the upcoming quarter. Pending the formation of Local STEM Units and timing, the project will work to create a prototype design for localization of the Capstones as part of the curriculum.

In the current quarter, the Fab Lab, Capstones and Labs are all contributing to *provide essential educational infrastructure to support experiential classroom activities (Activity 2.2)* at varying levels. A few teachers have reached out to their school's Fab Lab Manager to use the Fab Lab to support learning in their classroom. ECASE expects an increase in similar activities each semester. Looking forward, the Capstone Leaders will reflect on tying more the learning outcomes to the Capstone Portfolio and use this reflection to inform the input to the Capstone elements of the Design Blueprint for the pending STEM schools.

During this quarter ECASE team arranged a visit for GAEB engineers from Alexandria, Assiut, Dakahlia, Red Sea, Kafr Elsheikh, and Menofia where the new STEM schools will start. The visit included both Maadi and 6 October STEM schools where the Engineers listened to explanations from STEM professionals on the different aspects of school design, the essential elements that need to exist in STEM schools, and the lessons learnt vis-à-vis the school and accommodation buildings. GAEB engineers used the information from their visit and wrote a technical report with the modifications and additions they needed for the new STEM schools. ECASE facilitated the dialogue between the MoE and GAEB officials to get approval for making the needed works.

During this quarter ECASE team visited the new schools in Alexandria, Assiut and Dakahlia and established initial links with the GAEB officials. In Assiut, the educational building is 98% complete and the accommodation building is expected to be completed by the second term of the coming academic year. In Dakahlia, the educational building is about 50% complete and the design of the accommodation building is complete, but construction has not started yet. In Alexandria, the educational building is expected to be completed in April while the accommodation building is expected to be completed in January 2016 with the assumption that construction will begin in April. Also, ECASE team coordinated



with the Undersecretary of Education in Alexandria to suggest a list of candidates for a local form of STEM unit in light of the discussions during the orientation meeting organized by ECASE in which the Egyptian STEM model and the existing regulatory structure was presented and discussed. The Undersecretary of Education sent a suggested list to the head of STEM unit for MOE approval.

Finally, in preparation for supporting the establishment of the new schools, ECASE held a design review workshop with representatives of the schools and STEM unit. A tool was designed that aimed to capture the lessons learnt from the current schools vis-à-vis goals, the infrastructure, the preparation for opening, the operation of the schools, the current decrees and regulations, and elements of attraction in the schools, teachers PD, curriculum, assessment of students. A set of focus group discussions were held with school staff, students, and STEM unit representatives to identify the lessons learnt from the team’s experience in establishing the Egyptian STEM model in both Maadi and 6 October. Findings of the focus group discussions with the student, teachers, STEM unit, will educate the design studio workshops planned to be conducted with new Local STEM units in the three governorates where the new STEM schools will be established.



A list of items has been procured for both schools, such as; Chemical machines, Practical labs material, Fab Lab Kits and others.

Item	October School	Maadi School
Biology items Physics and Chemical items for exams	√	√
Sound Speakers CREATIVE- Model SBS A320	5 units	5units
Dictionaries and Books from USAID storage	√	√
Fab Lab Kits		√
English stories	√	√
Chemical machine:		
Melting point.	√	√
Water Still		√
Spectrophotometer	√	√
TDS Meter	√	√
Fab lab material	√	
Stationary items	√	√

Throughout the past two years, the project developed a new inquiry-based integrated curriculum in science and mathematics. Aligned with the new curriculum, a new assessment system was developed that is different from the national system implemented in all public high schools in Egypt. The STEM school assessment system for students' performance consists of multiple components to measure the aptitude, university readiness and progress of students against learning outcomes outlined in the curriculum. These multiple assessment components are collectively called the Exit Exam held at the third and last year of STEM education. A University Readiness Test (URT) is one of these components and the ACT has been the temporary URT for the STEM schools up until now. ECASE, however, prefers to explore the possibility of using a more sustainable alternative that is owned and implemented by the Ministry of Education.

In identifying such need, ECASE aims to enact a robust test to measure the students' readiness and aptitude to enter university following the completion of their high school. The project needs to develop a permanent and sustainable solution and envisions support to be provided to the MOE, or its subsidiaries responsible for examinations design, to develop a URT in Egypt for STEM high schools.

The development of a URT will require the production of three distinctive although interrelated outputs: A URT, an item bank and an upgraded capacity within the MOE.

A URT: The STEM schools need a robust test to measure the students' readiness and aptitude to enter university following the completion of their high school. The concept is to build on the previous USAID funded effort to develop the CAPS (Critical Thinking, Achievement and Problem Solving) test which is standardized and used up to grade 10 students in Egyptian public schools, or implement similar process that produces a critical thinking, readiness, and aptitude test. The development of the URT for STEM Schools, if expanded from CAPS, will need to adapt and expand it for use by students at the Grade 12 level. The MOE officials are already well versed in the design and implementation of the CAPS test and bidders can further develop capacity of identified MOE members to acquire the skills to develop and maintain the URT.

An Item Bank: While CAPS was designed mainly around the Program for International Student Assessment (*PISA*), developed by the Organization for Economic Co-operation and Development (OECD), ECASE will present sources from where an item bank will be developed. ECASE will identify a process to define the sources of an item bank, the process for the development and sustainability of the item bank, the nature of the items, and the number of items expected to be developed by the end of the process.

Upgrading MOE Capacity: ECASE will upgrade the capacity of the MOE in a manner that will effectively measure the improvement and capacity development of its officials. Tools of such measurement will include a needs assessment study, a baseline test, an interim and final assessment of MOE officials' capabilities. ECASE will present a comprehensive method to upgrade the capacity of a group of MOE personnel, identify its preferred cohort of trained MOE

officials, and its understanding of sections within the MOE that need to be engaged. By the end of this process, there will be a minimum cohort of persons supplied by the MOE who can sustainably maintain the URT, replenish the item bank from the sources identified and train others on how this can be done without additional external support.

Last December ECASE bid the implementation of the URT and a long process ended with the selection of a final awardee who is expected to be contracted early next quarter to start their implementation in Egypt by late April.

ECASE project support to *create sustainable and mutually beneficial PPPs (Activity 2.3)*, a series of different activities were undertaken in order to expand outreach within the government institutions and the financial institutions:

Networking Meetings and Events: a number of networking meetings and events were pursued with the aim of expanding the database and establishing solid contacts within the government institutions relevant to the STEM schools as well as within the finance sector; these events resulted in establishing contacts with:

- 1- Ministry of Industry, Chairman of the Industrial Council for Technology and Innovation
Eng. Hanan El Hadary
 - a. Resulting in an interest from the schools in cooperating with the council in different activities:
 - i. Students access to the council labs
 - ii. Students CAPSTONE serving the industrial community challenges
- 2- Banque Du Caire, Manager of the Public Relations Department Mr. Gamal Abdel Aziz
 - a. Resulting in an interest from Banque Du Caire to partner with the schools through the Ministry of Education directly
- 3- CitiBank, Vice President of Government Relations Mrs. Lamis Negm
 - a. Resulting in a preliminary interest from CitiBank to get more information on the schools and the STEM project supporting them
- 4- Egypt Patenting Office, President Mr. Adel Oweda
 - a. Resulting in an interest to cooperate with the schools in the area of patenting of students projects and R&D

To *organize extracurricular Activities feeding STEM program implementation (Activity 2.4)*, The project continues to work with the MOE STEM Unit on the refinement of a manual supporting “supplemental curricular” activities. The meetings with the STEM Unit task force will continue to be the primary method for transferring ownership of supplemental curricular work to local authorities. These meetings have historically been held on Sundays, and will continue on an ad hoc basis until the work has been completed. By next quarter, the Supplemental Curricular Activities manual will be in its final form, enabling the Unit to administer all supplemental curricular programs using the procedures and methodologies outlined therein. In the 2015-16 school year, the Unit will be the primary authority on these activities, running the entire process on its own, including the evaluation of current activities, selection of new activities, and enrollment of students. By May 2016, the Unit will have had a

full year of experience in administering the programs and be prepared to manage this area of activity for the STEM schools over the long-term.

ECASE project organized 20 field trips during last quarter for both Maadi and October schools including ISEF participation and other trips to support Capstone projects.

The extra-curricular activities being currently addressed are still being approved by the ministry of education; the activities are listed below:

Company Program - INJAZ

- IT Essentials – Cisco Network Academy
- Open Source Coding - Anova
- Mobile Application Coding – EDP and Orchtech
- Microsoft Coding - Microsoft
- Microsoft Girls Program - Microsoft
- TEDx talks – TEDx Cairo

These extracurricular activities have been agreed upon with the STEM Unit Extracurricular Task Force and presented to the Ministry during the first semester of this academic year (December 2014). All activities, however, still await MOE security clearance before implementation.

Objective 3: Build the capacity of highly qualified cadre of STEM professionals and provide opportunities for training and sustained, intellectually rigorous professional learning.

Over the second quarter, ECASE project continued to build upon the previously conducted professional development of teachers in both the Maadi and 6th of October schools. Activities included:

- Delivering professional development to beginning teacher candidates and to new and experienced STEM and Humanities teachers currently employed by the Egyptian STEM

Scientific Trips for STEM Schools January - March 2015					
Ser.	Date	School	Destination	Grade	No. of students
1	16-Feb-15	Maadi school	Educational city for ISEF competition	1,2,3	51
2	16-Feb-15	Oct. school	Educational city for ISEF competition	1,2,3	55
3	4-Mar-15	Maadi school	National Authority for renewable angry	1	26
4	4-Mar-15	Maadi school	Cairo Electricity Company	1	29
5	4-Mar-15	Maadi school	Tora Cement Factory	1	18
6	4-Mar-15	Maadi school	Faculty of Engineering - Ain Shams university	1	31
7	10-Mar-15	Oct. school	Energy Research Center	1	25
8	10-Mar-15	Oct. school	National Authority for renewable angry	1	25
9	10-Mar-15	Oct. school	Ceramica Art Company	2	25
10	10-Mar-15	Oct. school	Heritage Documentation Center	1	50
11	11-Mar-15	Maadi school	Zwail University	1,2	29
12	18-Mar-15	Maadi school	Alex for ISEF competition	1,2,3	16
13	25-Mar-15	Maadi school	Faculty of Engineering - Ain Shams university	1	24
14	25-Mar-15	Maadi school	57357 Hospital	3	10
15	25-Mar-15	Maadi school	National Authority for renewable angry	1	16
16	25-Mar-15	Maadi school	Zwail University	1	22
17	25-Mar-15	Maadi school	Cairo Electricity Company	1	18
18	25-Mar-15	Maadi school	National Research Center	1	21
19	25-Mar-15	Oct. school	Alexandria Library	3	93
20	31-Mar-15	Maadi school	French Cultural Center	1,2	12

schools through a Mid-Year Professional Development Institute, January 25, 2015 - February 5, 2015. This professional development training included workshops and trainings for new teachers (who were hired after the start of the 2014 school year), STEM teacher candidates, and experienced teachers.

- Continuing training members of the ToT cohort from Maadi and 6th of October in preparation for their participation and leadership in the Summer PDI and certification by PAT to conduct further trainings.
- Assisting principals with the Classroom Observation Scale by co-conducting observations, and gathering data.
- Facilitating engagement in these activities by the STEM Unit with the intent to transfer knowledge.

To adapt teacher and administrator performance standards for a STEM school context (Activity 3.1), ECASE initiated coordination with PAT and the head of the STEM unit to update and publish the advertisement for vacant positions in the new and existing schools. The advertisement was modified to indicate educators from which governorates can apply each specific school. The advertisement is expected to be published in April.

ECASE previously designed STEM School teacher selection procedures or model. This model includes the following procedures and frameworks:

- Online
 1. Assessing teaching philosophy.
 2. English reading and writing assessments
- Face to Face

Applicants who pass online assessments are invited to an:

1. Assessment of their major knowledge of their specialization.
2. Face to Face Listening and Speaking English language assessments

To ensure sustainability of this process, a hand-over process began in January 2015. The hand-over process aims to orient the MOE officials and the PAT English language specialists with the current selection process and to engage them in actual implementation. PAT assigned an IT person to manage the marking process and producing final result with cooperation with ECASE. Another PAT English language expert managed, along with MOE supervisors, the English language written, listening and speaking tests preparation, delivery and marking with ECASE staff only overlooking the process. It is clear that capacity presently residing with PAT can fully function to enact such teacher's evaluation processes in the future without ECASE support.

Between January 25 and February 5, 2015, ECASE project provided a mid-year professional development institute to build teacher capacity to effectively implement STEM curriculum in the classroom through *Best Practices in STEM Pedagogy (Activity 3.2a.) and to*

provide STEM Professional Development and Curriculum Training for New and Existing Teachers and Administrators (Activity 3.4). The Project provided training to 69 teachers: 13 in the hiring process, and 63 New and experienced teachers from Maadi and 6th of October schools. Some of the intended and achieved outcomes of this training included:

- Preparing teachers to work with colleagues to recognize the benefits of collaborations.
- Providing opportunities to participate as active learners to experience inquiry-drive constructivism in action.
- Ensuring teacher candidates demonstrate an understanding of “backward design” and can apply the concept to lesson and unit planning.
- Ensuring that experienced teachers demonstrate an understanding of the integrated curriculum.
- Assisting teacher candidates in constructing a “toolbox” of best practices instructional strategies and experienced teachers with added additional strategies.
- Ensuring that teacher candidates recognize inquiry as both a learning goal and a teaching method.
- Working with new and existing Humanities teachers at both schools to refine and create lessons, formative assessments, and learning outcomes.
- Preparing Cohort of ToTs for facilitation of Summer 2015 professional development and beyond.

Materials used for these sessions included:

- Mid-Year PDI Manual Introduction
- Mid-Year PDI Trainer’s Companion
- Mid-Year PDI (New) Teacher’s Companion

During the ten days of PDI, all topics were covered, which included classroom management, STEM methodologies in teaching and learning, active learning strategies, curriculum investigations, introductions to various forms of assessment, lesson planning and the Classroom Observation Scale. In addition, all experienced teachers were surveyed regarding their needs for deeper discussion and training in order to prepare for the summer PDI.

From February 1 - 5, 2015 a formal training was provided to STEM school existing and prospective leaders, (a total of 6 current and candidate principals from different governorates) to augment current principals’ skill set as well as begin training for candidate principals for the suite of STEM schools. The objectives of the training included:

- Identify knowledge and skills needed to be effective principals
- Explore factors associated with effective student discipline
- Engage in a process used to develop a common purpose (mission & vision) within schools
- Determine factors associated with creating a climate (culture) conducive to learning
- Examine how to work effectively with teachers, parents and students
- Investigate what makes great leaders
- Investigate factors associated with adult motivation and job satisfaction
- Engage in classroom supervision of teaching and explore how to conference with teachers
- Begin training in the Classroom Observation Scale (COS)
- Overview the use of data to improve instruction

A focus on sharing of best practices, whole school management, appropriate scheduling for professional learning communities, and effective observation practices, was emphasized. Further, the principal at Maadi was, unfortunately, available on an interim basis only, so no formal training has been conducted with a principal there.

Going forward, all training for PDI will undergo accreditation by PAT. This process has begun and is expected to result in accreditation for manuals over the coming months.

To build teacher capacity to effectively implement STEM curriculum in the classroom through creating formative classroom assessments (Activity 3.2b), the project supported the administration of mid-terms and end-of-semester in addition to practical exams. Details of these activities are described in more complete detail and cross referenced under Activity 4.2 to develop assessment instruments for student course work aligned to STEM curriculum.

With respect to the implementation of PARLO Tracker by teachers, the system is underutilized. Although teachers have been trained that they only need to enter and rate evidence that is relevant to the rating of the learning outcomes, the number of evidence entries appears sparse and in some teacher cases, not existent. Multiple times were set aside during the previous quarter to train new teachers at both schools, but those meetings were cancelled and not rescheduled by the Principals at the schools. One main reason for the lack of utilization is that the teachers need more training and coaching and this have not been provided because PARLO is undergoing an improvement in interface. This technical process should end this summer so that training is conducted and teachers are ready to implement PARLO next fall.

To ***assess progress through classroom observations (Activity 3.3, 3.1.3)***, ECASE facilitated a discussion with STEM unit around teacher observation process. The discussion aimed to identify procedures, tools, responsibility, and uses of teacher observation in STEM school. The tool has been finalized and an Aid to the tool also developed to help users properly utilize the tool. The lack of a principal at Maadi is hampering the implementation of the tool there and the October principal has collected some information and need to structure it in the tool

format for the teachers observed. A small team of STEM members are currently working on drafting a document that clearly describes the process of STEM teacher observation in preparation for sharing it with STEM director for approval.

To develop a comprehensive matrix for STEM professional development of the STEM Unit, ECASE team held an internal discussion around the spectrum of professional development for STEM educators. The discussion resulted in a matrix that outlines the variety of professional development material used to train STEM educators in the various functions including, teaching, administration, assessment, capstone support, and laboratories. The matrix includes a description of the content of each training manual and where it fits within the general framework of STEM professional development.

Manuals	Org Responsible	Sub Content/Topic Areas Included	Brief Description	Certified on needed?	Manual Type	St. Co.
PEDAGOGY						
Pedagogy Training Manual - Beginning Teachers	TFI	Team Building and Common Visions, Experiencing Inquiry, Teaching Strategies, Student Centered Teaching	Pedagogy manual for newly recruited teachers, possibly prior to formal hiring/introduction - will be part of overall series for Beginning Teachers		Training	
Pedagogy Training Manual - Experience Teachers		Teacher Leadership, Teacher as Researching, Teaching Strategies, Experiencing Inquiry	Pedagogy manual for experienced teachers - will be part of overall Series for Experienced Teachers		Training	
Pedagogy Training Manual - Advanced Teachers		Teacher Leadership, Teaching Strategies, Experiencing Inquiry	Pedagogy manual for advanced teachers - will be part of overall Series for Advanced Teachers		Training	
ASSESSMENT						
Assessment Training Manual - Beginning Teachers	21PSTEM	Introduction to formative assessment	Assessment manual for new			

Also, to initiate coordination with PAT to accredit STEM training material and certify trainers, ECASE team also met with PAT leadership to present the STEM model and the professional development associated with it. PAT is already represented in the STEM unit, but this meeting was a formal introductory to PAT’s new leadership, which focused on describing the unique aspects of STEM education and hence the professional development for educators working with this type of education. The meeting also aimed to establish mechanism for presentation and certification of STEM professional development materials within the regulations of PAT. The meeting also included initial discussion of a certification system for STEM teachers.

During the meeting PAT leadership expressed interest in being involved in the professional development process in all its stages and stated that they will assign a team to oversee the certification of STEM material as soon as presented.

In August 2014, teachers from the Cairo schools were identified during teaching presentations at the PDI and selected to become members of a first Cohort of Master Trainer trainees (Activity 3.5). They have been engaged regularly and participated in a variety of meetings and led portions of the mid-year PDI in January and February 2015. Currently 3 ToTs at Maadi and 4 at 6th of October School were selected.

ECASE team initiated the formation of a team of trainers for STEM education. That included inviting PAT to be part of the process during the introductory meeting with them, holding a focus group discussion with STEM unit to identify experienced members who can carry out specific training functions, and also searching data of potential trainers with adequate qualifications to be potential trainers in STEM. Selection of potential trainers took into consideration previous experience as trainers preferably in STEM, English language proficiency,

representation of subject area specialization and governorates where the new schools will be established. A long list of trainers is now available that will be discussed with PAT and the MoE and then go through a screening process that includes an orientation on STEM education and a demonstration of training skills. Once the final list is approved, a capacity building plan will be put in place and implemented to prepare them for participation in future training of STEM teachers.

During this quarter ECASE team accelerated the development of training package for STEM educators in preparation for presenting them to PAT for certification. Final drafts of five beginning teacher manuals were produced and are currently being reviewed in preparation for certification by PAT. The manuals are pedagogy, assessment, curriculum, Capstone, and Laboratory. The rest of the manuals identified in the above mentioned matrix are well underway for final production.

ECASE team initiated discussion with PAT leadership and oriented them on the STEM model and the unique aspects of professional development for STEM educators. PAT leadership promised to assign a team for the certification of STEM professional development material as soon as they are presented, which is expected to take place in the coming quarter.

To *create a virtual STEM Professional Development Learning Platform (Activity 3.6)*, the ECASE team continues to utilize Google Drive for content management, including finalization and development of the STEM Model with specialized manuals, handbooks, and the ultimate Design Blueprint, a compendium of all content for replication, including curriculum, capstones, tools, and processes. As the various elements and manuals are created, they are stored within this environment, and utilized for ongoing training sessions in the field. The status of each manual for training and its associated subcomponents is being maintained in a master Manual list. This list includes the content elements, responsible parties, status, and final completion dates for all manuals from the ECASE partner organizations. Most manuals have been discussed with the STEM Unit and various subcommittees are reviewing content. A set of training manuals have been identified, comprising a combination of training content, handbooks, and reference guides. This list is expected to evolve, but a major refinement and delivery dates is expected in April 2015.

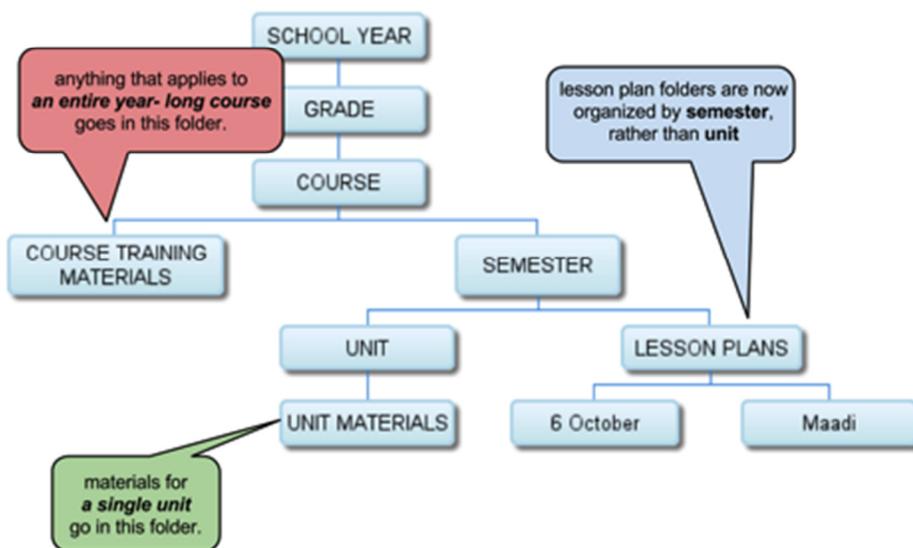
Last quarter, several pros and cons were provided regarding an MOE desire to shift content from Google Drive to Microsoft One Drive. At this time, a shift of content remains the decision and responsibility of the MOE. Currently, while much content could be migrated, efforts to modify scripts for custom functions, such as lesson planning creation, curriculum management, capstone journal management, and exhibition grading, will require a significant time investment for modification to a new platform.

During the second quarter, a couple of updates were also made to Google Drive:

- Capstones: New journal evaluation web app allows for multiple journals to be input at

once and is currently being beta tested by teachers at Maadi. The response sheet was modified to rely less on scripts and provide better real time results.

- Curriculum: A simplified lesson plan folder structure was created by moving lesson plans to semester levels. This modified structure was retroactively applied to all courses for this semester and lesson plan folders were linked to top levels of curriculum sheets.



Objective 4: Strengthen MOE capacity at the systems and policy level to sustain and replicate these model schools

To enable STEM Curriculum Training and Coaching (Activity 4.1), ECASE project provided a variety of activities, as described below:

Practical Exam Design & Administration (4.1.1; 4.1.3; 5.1.2; 5.1.3)

Working with the MOE STEM Unit members this quarter, to coordinate the writing, administration and scoring of the math/mechanics, chemistry, physics and earth science practicals for grade 3 and further worked with the STEM Unit to write a Guide to the Writing, Administration and Scoring of Practical Examinations.

Going forward, the STEM Unit is now responsible for all the second semester practical exams; however, ECASE will monitor and mentor as needed from a distance and will guide them in a review of the procedures after the completion the practicals.

Laboratory Equipment & Procedures (4.1.1; 4.1.2; 4.1.3; 4.1.4; 4.1.5; 5.1)

The goal this quarter was to have at least two members of the STEM Unit co-conduct each subject-specific session of the two-day February workshops, which occurred. Additionally, the Laboratory Training Manual was developed for New Teachers, with the Laboratory Training Manual for Experienced Teachers expected in the following quarter.

With the writing of the manuals near complete, the only concern remaining in this area is ensuring that there are enough STEM Unit members and experienced teachers available and adequately trained to actually conduct the training.

Curriculum Training & Coaching (4.1.1; 4.1.2; 5.1.3)

In addition to conducting the various cohort curriculums training in February in work was done to completed development of the Curriculum Training Manuals for Beginning Teachers. The Curriculum Training Manuals for Experienced will be completed in the next quarter. While there is a training plan and materials in place, it is not clear that there is a robust and sustainable plan for curriculum coaching, nor is there the capacity at the Ministry STEM Unit level for coaching. ECASE aims to start working to develop a plan for coaching.

Monitoring Learning Outcomes: Design and Function (4.1.3; 4.1.6; 5.1.2; 5.1)

This is an area of continuing weakness. Many teachers are still not putting data into the PARLO Tracker, many are not putting lesson plans where they belong in Google Drive, and the principals and MOE STEM Unit members are still not conducting regular classroom observations to ensure compliance with the pacing and enactment of the curriculum as designed. This quarter, the project worked with the STEM Unit and with the principals to ensure their compliance in these observations; however the demands of writing the training manuals impeded the kind of follow-up that is needed. Additionally, the lack of a principal assigned in Maadi greatly hampered implementation of monitoring there.

School & Laboratory Safety (4.1.4; 5.1.3; 5.1.5)

Project consultant met with the MOE STEM Unit Safety Task Force to complete work on the laboratory aspects of the School Safety Handbook. Going forward, there are 3 aspects of School and Lab Safety still remaining: 1) work with the Task Force to develop the teacher training module, 2) work with the Task Force to develop the student training module; and 3) find the appropriate people to work with to complete the part of the manual that addresses general

school safety, not the laboratories. ECASE plans to complete these activities this coming quarter.

Curriculum Review: Design, Conduct (4.1.3; 4.1.6; 5.1.2; 5.1.3; 5.1.5)

During the equipment training, some slight modifications was made to the biology and chemistry curricula, simply some shifting around and some slight revisions. Additionally, the humanities teachers worked on ' work on course descriptions. These were translated into English and all work was entered into the Google Drive. ECASE is in the process of conducting a complete curriculum inventory to assess the level of completion of course descriptions for all courses. A meeting was held with members of the MOE STEM Unit to work more on the teacher survey for the Curriculum Review. The plan is to distribute this survey online to teachers the end of April and to plan the actual Design Studio at that time.

The project will be working with the STEM Unit Design Review Task Force to complete the survey, conduct it, analyze results and utilize it to develop the Curriculum Design Review Studio. After completing the inventory, Project consultant will be working with small groups of teachers to try to complete the course descriptions as they describe current instruction prior to the curriculum review. It is expected that modifications during the Design Review will only include options that can be integrated prior to the start of the 2015-2016 school year. No major changes to the curriculum are expected at this time.

In addition, a support was provided to ***continue the capstone curriculum implementation and training for all grades (Activity 4.1b).***

Semester 1 of the 2014-2015 school year included some improvements and progress for Capstones. Capstones implemented this quarter are scaffold for each grade, with Grade 1 participating in a very prescribed Capstone Challenge, Grade 2 having an assigned Capstone Challenge but given latitude to select a problem, and Grade 3 given freedom to select any topic that can be connected to a curriculum theme of communication.

Teachers were responsible for designing the Capstone Design challenges and Journal questions prior to the semester, lending to a sustainable approach for both schools. The STEM Unit has participated in additional training sessions this quarter and will take a lead role in evaluation and organization of the Capstone assessment events at the beginning of next quarter.

ECASE provided oversight to the Semester 1 Capstone exhibitions in January. The project worked closely with the STEM Unit to transfer a larger part of the participation and management of these events to the STEM Unit and into the schools. These goals were met as the

STEM Unit essentially managed the evaluation process and represented upwards of half of the external evaluations for these events. Both schools did a good job of hosting the events.

Also, just as the team has collected a rich data set of student reflections on their STEM school experience in the formative assessments for Capstones, there is now an equally rich data set of student teams reporting on subject learning outcomes they applied in their capstone work (captured in capstone portfolios). Students were required to select five learning outcomes to receive an accomplished grade and at least ten learning outcomes to receive a distinguished mark. For each learning outcome, they were to identify the learning outcome from PARLO Tracker and write a paragraph explaining how they applied it to their project. Now we have around 1,810 examples from this first semester. Next semester, the project will help the schools to structure this in a way that makes the data much easier for the teachers and our team to collect and use. Otherwise, Semester 2 will be run in a manner very similar to these successful exhibitions. Key improvements for Capstone sustainability were the transfer of external evaluator training to the STEM Unit, many STEM Unit members participating as organizers and evaluators, and exhibitions successfully hosted by the schools. These approaches will be carried over into the Semester 2 exhibitions in the next quarter.

Fab Lab continues to be used for Capstones by students. The demand for the lab space in this quarter leading up to Capstone exhibitions was so strong that Tier 1 Fab Lab training had to be postponed. Fab Labs were used to help with communications (signage, labels, and handouts) as well as elements of prototypes such as boxes, frames, electronics, gears, and integrated examples including robotic hands.



ECASE also worked to *develop Assessment Instruments for student course work aligned to STEM Curriculum (Activity 4.2)*. These various activities are described in detail below and provide greater detail to Activity 3.2, to build teacher capacity to implement STEM

curriculum in the classroom through creating formative classroom assessments.

Refining the Assessments (4.2.1)

All tests have been refined and improved based on careful expert review, analyses of the assessment data, and work to make sure that they are closely aligned to any changes in the curriculum. The Capacity Transfer Plan, developed, lays out responsibility for actual lead development, but The Tests of Concepts remain under the supervision of ECASE.

Training on Formative Assessments/ PAT Assessment Training Manuals (4.2.2)

A series of STEM Assessment Professional Development Trainer manuals were developed. These manuals will be used by the PAT trainers when providing staff development for potential, new and veteran teachers in the area of assessment. The Beginning Teacher Assessment manual was drafted, that will be utilized for training potential teachers, newly hired teachers and teachers that were not trained previously. Content covered in this manual includes: formative assessment, assessment for learning, assessment of learning, sharing learning expectations, questioning, effective feedback, PARLO, evidence, cognitive demand levels, and reassessment. PAT trainers will use the Experienced Teacher Assessment manual (to be developed in Q3) with teachers who have worked in schools from one to three years. The focus of this manual will be the construction and analysis of assessment items. Advanced assessment manuals that will be used with veteran teachers looking to take their work deeper or to take a leadership role in their schools will be created in Year 4.

Midterm, Final and Practical Exams (4.2.3; Cross-reference: 3.2.6)

First semester final exams were administered to Grades 1 and 2 students in January 2015. Members of the MOE Assessment unit developed these exams. A completed statistical analysis for each of the exams was developed, as well as evaluated the items for LO alignment and assignment of the Depth of Knowledge level. Next, a virtual discussion was held with the Egyptian content test developers to discuss the final exams. As in past meetings, the emphasis was placed on developing items with high levels of Depth of Knowledge and on adequate item coverage for each of the semesters contents LOs. The goal is the continual improvement of the midterm and final examinations. A new set of assessment review sessions will be set up for the second semester midterm exams. These exams were administered in March of 2015.

Grade 3 STEM practical exams were administered in February 2015 after a delay. A manual for the development and administration of practical exams was developed. Practical exams for Grades 1 and 2 students had been administered earlier in the first semester.

Test of Concepts Training (4.2.4 Cross-reference: 3.2.1)

Specific TOC training was not completed during this period. This part of the Transfer Plan has been postponed until next year. In the fall of 2015, it was determined that the assessment Committee should retain control of its development. Reference section 4.2.1 for an update on the development of 2015 Test of Concepts and a meeting with MOE regarding its part of the Grade 3 graduation matrix.

A meeting with math/science members of the MOE to discuss the STEM Test of Concepts (TOC) and its part of the Grade 3 graduation matrix. In previous discussions it was determined that the Test of Concepts should be combined with a Grade 3 final semester exams since these final exams could be specifically aligned to the Grade 3 course Learning Objectives (LO). While there is an alignment with STEM TOCs and course content LOs, often this alignment includes Grade 1 and 2 LOs. It was determined that both a content TOC and a Grade 3 course final exam would be used as a part of the Grade 3 matrix for graduation. Both exams in a specific STEM content area will be administered in a common session in June 2015. ECASE will be responsible for the development of the STEM TOCs and the MOE will be responsible for the development of the Grade 3 content final exams.

Assessment Related Professional Development and Meetings

In January 2015, ECASE worked on the training manuals for MOE training that included exam item analysis and scoring as well as the use of data for system-wide improvement. In February 2015, multiple meetings occurred within the project consultants for the planning of the assessment part of PDI. Later in March 2015, a virtual meeting with the STEM Unit was held. The topic of this meeting was the upcoming midterm exams. This session included presentations and discussions on the alignment of items to course LOs and analysis of the item's cognitive level.

Also in March 2015, Assessment Co-Chairs visited Cairo to conduct a series of professional development trainings and hold meetings with their ECASE/MOE counterparts and members of the STEM committee. One of the first meetings was a two-day meeting with members of the MOE test development committee on test development and item writing/analysis. Items from the recently administered STEM first semester final exams were used to help prepare the test constructors to improve the items for the upcoming second semester midterm and final exams. Consultants also reviewed mid-term exam item statistics with individual test makers to select poor quality items that need to be removed prior to creating

scores, provided individual feedback about item development, and developed questions and issues for discussion with teachers about student performance. A follow up session was held with the MOE STEM Unit in-country to help them prepare and plan for discussions with the teacher about student learning as demonstrated by their midterm proficiency or PARLO scores.

Other individual meetings included one with the LO exam developers to review items statistics and prepare data for final student scores. This meeting included the production of a process template/guide and analysis of various statistics. There was a meeting with the MOE counselors to discuss Grade 3 assessment issues and policy. There were also meetings with the STEM unit with professional development on pre-test and post-test review procedures. Finally, there were visits to schools to review tests from student procedures and data input procedures.

Objective 5: Support the MOE, establish and build the capacity of the MOE STEM Unit

In efforts to *support the Ministry of Education STEM Unit and its member organizations (Activity 5.1)*, ECASE partners have continued to work with members of the Ministry of Education STEM Unit on a weekly basis throughout the quarter to enable collaboration and transfer of knowledge to enable the MOE to sustain the work. To better facilitate these meetings and their agenda/focus, the ECASE team has created an online STEM Unit topics to be discussed and their associated priorities. STEM Unit meetings happen weekly on Wednesdays, but additional task force groups meet outside of these meetings to support review and finalization of STEM School content such as manuals and processes. However, there have been issues in the last quarter with the STEM Unit holding to obligations and schedules as they have other full time jobs. Going forward, plans for transfer will be presented to the MOE STEM Unit during the next quarter. These plans must be discussed and aligned with the reality of availability of the STEM Unit and ability to create additional capacity to support and sustain this work.

Topics discussed or supported over the last quarter, include but were not limited to:

- Continued task force meetings on a variety of topics
- Introduction to case studies for Egyptian contextualization for the MOE STEM Unit.
- Capstone Transfer – including management of the exhibitions
- Training of the TDC for Fab Lab ownership
- New School Design plans
- Participation in PDI

3. Challenges and Resolutions

Required From Hany

Annex I: ELP Report

Annex II: Training Report

Annex III: Meetings Minutes