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

QUARTERLY PROGRESS REPORT

APRIL - JUNE 2014

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

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Acronyms

21PSTEM	The 21st Century Partnership for STEM Education
ACT	American College Testing (exam)
AIP	Annual Implementation Plan
AUC	American University in Cairo
BOT	Board of Trustees (school)
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
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
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 ECASE Activities this quarter

This Quarterly Progress Report illustrates the progress achieved through the implementation of the USAID- funded Education Consortium for the Advancement of STEM in Egypt (ECASE) Program, from April 1, 2014 to June 30, 2014. The report demonstrates in details the work carried out by the World Learning and its partners (TFI, 21PSTEM, and TIES).

- **Students from Maa'di STEM School for Girls won a Grand Award at the Intel International Science & Engineering Fair** in the Los Angeles for their research project titled '**Vacuum Evaporator for Water Purification.'** This team of young, eager and enthusiastic girls took Egypt's name to the podium winning a third place medal in the most prestigious and renowned competition in the field of science and technology.

About the Student Project (excerpt from student's presentation): *Vacuum evaporation isn't quite popular in Egypt, however, it has caused a huge revolution in the industrial wastewater treatment systems around the world. It depends on the idea of boiling water at room temperature thus decreasing the amount of energy needed to boil water. Can you imagine that we are finally capable of abandoning using the conventional expensive ways of distillation?!! Indeed we are, because water boils at lower temperature than usual by putting it in a vacuum-like environment. That's why we will use the vacuum evaporation technique to purify different types of industrial wastewater. The Vacuum Evaporator will turn the wastewater into distilled water that can be reused in the industrial process. Only with a well-closed stainless-steal chamber and a vacuum pump, we were able to create the suitable system in which water can be evaporated and condensed. The vacuum evaporator has been proven efficient in removing salts from water and reducing the amount of total dissolved solids.*

About ISEF: More than 600 individual and team awards are presented every year at the Intel ISEF with category awards given in first, second, third and fourth place. Awards are $3,000, $1,500, $1,000 and $500 respectively in each of the 17 ISEF Grand Award categories. The top winner of the Intel ISEF receives the Gordon Moore Award, and $75,000, with the next top two winners each receiving a $50,000 award. Additional awards worth over $2 million are provided through the Intel ISEF Special Awards program, and include tuition scholarships, summer internships, scientific field trips, and laboratory equipment. They are provided by Intel and about 70 other corporate, professional, and government sponsors annually https://www.societyforscience.org/intel-international-science-and-engineering-fair

- **USAID Mission Director Visit to Maa'di School -** Ambassador Thomas A. Shannon, Counselor for the Department of State; Charge d'Affaires Mark Sievers; USAID Mission Director, Dr. Mary C. Ott; Mr. Mohamed Saad, Head of General Education and Thanaweya Amma at the Ministry of Educaiton; Ms. Yael J. Fischer, Senior Advisor to Ambassador Shannon; Mr. Micheal Cavanaugh, Embassy Economic Officer; Mr. Ian Campbell, Embassy Economic Counselor; Ms. Julie Fossler, USAID Press, and Ms. Nihal Rizk, Embassy Senior Media Advisor; accompanied by Ms. Hala ElSerafy, ECASE's Agreement Officer Representative, visited the STEM Secondary School for Girls in Maadi. The purpose of the visit was to witness achievements to date implemented by the ECASE on the ground and meet with the school's students and teachers. The girls at the Maadi school did an amazing job leaving a great impression on everyone. They spoke to the press about their school and how their education is different, and challenged the few who tried to question the STEM educational approach. Delegates from the students accompanied the visitors throughout the school to view the science labs, the Fab Lab and other school facilities. In the Fab Lab, the students showed their proficiency on the equipment available in the lab and produced small items that were shared with the visitors as souvenirs. A local online newspaper published an article about the visit:
http://m.youm7.com/News.asp?NewsID=1593036

- **Capstone exhibition -** ECASE collaborated with the MOE STEM Unit to implement the end of semester Capstones for all grades in both Cairo schools. ECASE is transitioning evaluation of the Capstones to the MOE STEM Unit. After introductory Capstone and evaluation training sessions for the MOE STEM Unit, various STEM Unit members participated as evaluators or organizers for the Capstone Events. Some STEM Unit members participated as evaluators of posters or prototypes or both, partnered with external evaluators to learn the process. Other STEM Unit members participated as organizers, helping ECASE support team manage the evaluators and the timetable. Armed with the timetable and evaluator assignments, they ensured the evaluators were at the correct stations, and if not, they solved the problem. The participating STEM Unit members experienced these Capstones for themselves and had several suggestions for improvement. This was an important step to transitioning the evaluation process to the MOE STEM Unit.

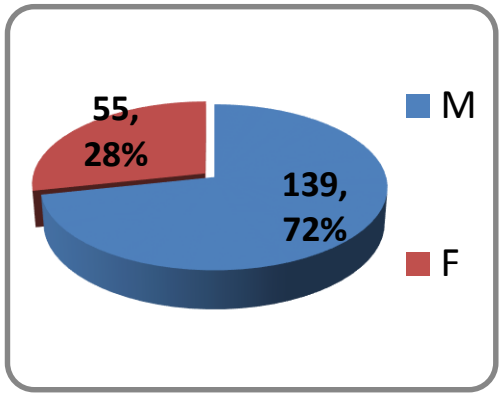
Clockwise from upper left: (1) Two STEM Unit members participating as Organizers (2) Traffic management project (3) Projectile project (4) Team shirts focused on the rubric.

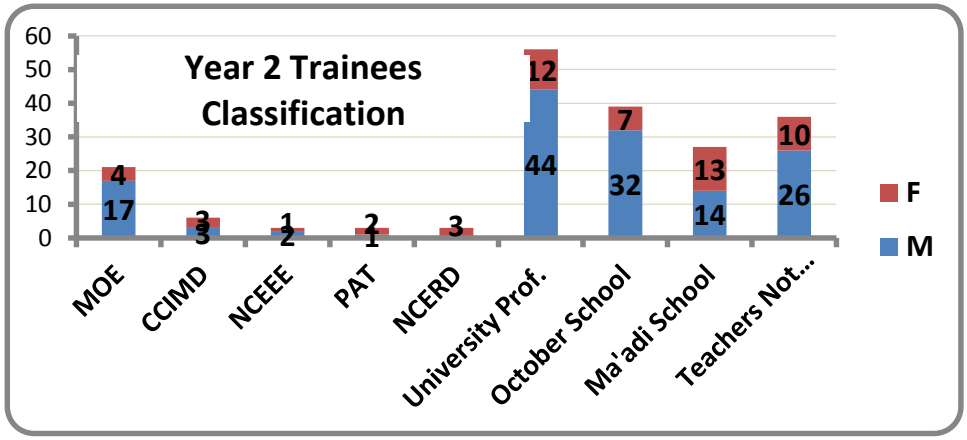
- **Curriculum Design Studio** – ECASE conducted a revision of the integrated STEM curriculum through expertise and feedback garnered from teachers through a Curriculum Design Studio, held in June 2014. Immediately following the end of the second semester, from June 1 to 12, 2014, ECASE led a Design Studio 2.0 involving 47 teachers and 16 members of the MOE STEM Unit and MOE Experts. This two week long session focused on the changes needed to the Integrated STEM curriculum V 1.0. During these two weeks' time, revisions were made to all science and math courses, in addition to technology and humanities. Over 16 course descriptions were finalized and will be used to as a technical foundation for the procurement for texts and kits to support the curriculum V2.0 in the next quarter.

- **Led a Professional Development Institute (PDI)** for a cohort of both new and existing teachers in June 2014. During the last two weeks of June 2014, ECASE led the first two weeks of the Summer Professional Development Institute (PDI). Two separate cohorts and sessions occurred during this time frame, one for new teachers (11) and one for existing teachers (46).

Because of the lack of recruitment of viable teachers for the schools in this timeframe, the entire team is moving to year-round recruiting and building in turn-around-training to enable veteran STEM teachers to orient new teachers in the future, with a focus on project-based learning. During PDI, 7 members of the MOE STEM Unit also participated in an effort to deepen their understanding and build their capacity to be able to conduct professional development for STEM teachers in the future.

- **English Language Program** - The ELP, English Language Program, provided support to grade 10 and 11 STEM students in both October and Maadi schools. Grade 10 students in both schools joined 13 English classes; Pre-Intermediate and Intermediate levels. Moreover, Grade 10 students in Maadi school were reenrolled in the Extended Reading classes. Additionally, Grade 11 students in both schools joined 15 English classes; Conversation and Academic Skills levels. Furthermore, grade 12 students received the ELP support in ACT during the Second Academic semester. Moreover, by the end of the academic school year, the ELP assisted the students in reviewing and revising their Capstone projects. All classes sat for proficiency exams to help ECASE monitor their progress. **Annex (I)**
- **Training –** ECASE implemented two separate professional development trainings for both new and experienced current teachers. One training week was dedicated for the experienced teachers and two training weeks for the new teachers. Additionally, ECASE continued to implement the MOE STEM Unit workshops and nine workshops were held successfully during the last quarter. Moreover, ECASE held a Curriculum Design Studio that aimed at enhancing curriculum version one. The total number of trainees was 194; 139 males and 55 females. **Annex (II)**





2. ECASE activities leading toward accomplishment of program objectives

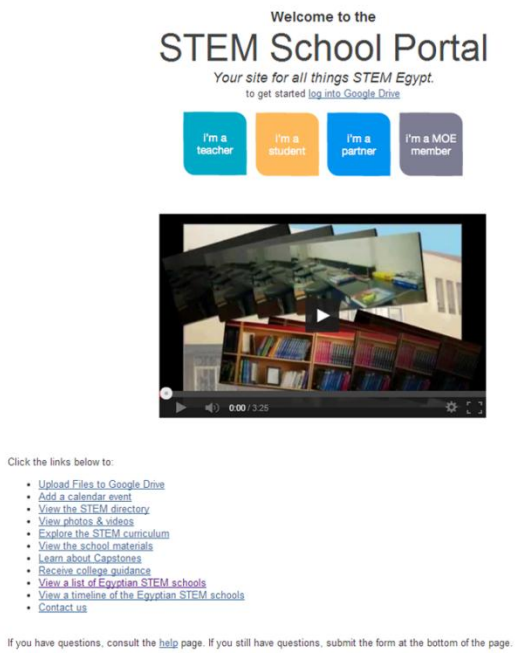
2.1 Project Management

During the past quarter, the team has focused on implementation of another revised plan now that the "wind-up" period has been lifted by USAID. As such, the team has been asked to revert the work back to its original focus and objectives. However, over seven months passed with a focus on "winding up" the program and accelerating the work with an eye toward early termination of the program and a revised annual implementation plan (AIP). Thus, the project experienced a financial toll during the acceleration period that may impact the ability to fully refocus on the original scope. Because of this, a revised AIP has been provided to USAID for approval.

Currently, ECASE is using a revised AIP, issued in late April 2014, to USAID for planning of activities on a monthly basis. Because the anticipated work will enable the start-up of additional schools, ECASE awaits final determination from the Ministry as to whether one to three additional schools will open in September 2014. At the time of this report, no decisions have been made as to the opening of these new schools. This delayed decision will have a further impact on the AIP, as critical design and other activities will be not be feasible in the timeframe allowed prior to school opening (if it occurs in September 2014). The team continues to await decisions by USAID and the MOE and remains flexible to adjust the overall scope with the time and budget remaining, but in a way that assures quality of delivery, sustainability and reputation of the work. Because decisions have been in flux and on-going political changes occur which impact the program, the team has reinstituted a regular ECASE update to all team members to ensure close coordination.

The STEM school online portal is progressing as planned and is on schedule to launch this fall. The site is in beta testing with the second round of test users and is anticipated to launch in the 2014 - 2015 school year for the full suite of users. Feedback from the first round of beta testing was gathered and incorporated into the site before the second round began and will continue in this "rolling" fashion. The site is designed to meet users' needs and assist with the tasks most relevant to their involvement with the STEM school. The site is built in an extremely adaptable platform, which allows content to be added and modified per the evolving needs and constraints of ECASE. In addition to being a user portal for all ECASE team members, this site will also serve as an informational site for STEM teachers, parents and students in Cairo and beyond.

The portal automatically replicates the security permissions of the ECASE Google Drive and while some team members have full access to the site and the ability to view all content, other members — and the general public — will only be able to view specific pieces of information.



Updated features during the last quarter include:

- The photos & videos page has been modified to allow select images to be accessible by the general public, but the larger image galleries remain secure in the drive.
- An interactive timeline has been created to provide external audiences with an at-a-glance look at ECASE and its progress over time. This piece is designed to be a presentation tool and project artifact.
- The personnel directory has been re-engineered to be more easily searchable by project participants.
- The visual design of the site has been adjusted to create a cleaner interface and better suit mobile browsers and small screens.

2.2 Project Objectives

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 with other activities. The summary, below, is presented according to the modified AIP. Tasks submitted as part of the AIP to USAID are provided in "**bold**".

Objective 1: Increase community and student participation in science and mathematics through outreach to girls, economically marginalized students and BOTs

During this quarter, the ***implementation of an admissions system that is criteria-based, inclusive, and transparent (Activity 1.1***) has remained a point of conversation with the Ministry and STEM Unit with the objective of have said systems incorporated into future student selection processes. We anticipate changes to the process such the addition of more English competency in the admissions exams, as well as a possible restructuring of science and math questions. The purpose is to better evaluate students' ability to comprehend technical information in English. During the next quarter, the admissions process will proceed, as previously designed, with the possible exceptions mentioned above. At the time of this report, it is unknown whether new schools will open in 2014 and if student recruitment should be initiated in other regions.

While a ***Board of Trustees (Activity 1.2)*** at each of the schools will be critical to sustainability, the original BOTs were disbanded. Ad hoc representatives are in place, but the schools will need to formalize this process in the next quarter to enable adherence to the decree. ECASE will work as needed with the schools and the MOE STEM Unit to facilitate this process and to provide guidance and training.

During the quarter, the English Language Program (ELP) supported STEM school students (Activity 1.3), The ELP provided support to grade 10 and 11 STEM students in both October and Maadi schools. Grade 10 students in both schools joined 13 English classes best suited to each student's language proficiency level from pre-intermediate to intermediate levels. In addition, Grade 10 students in Maadi were reenrolled in the Extended Reading classes. Additionally, grade 11 students in both schools joined 15 English classes for conversation and academic skills levels. Furthermore, grade 12 students received the ELP support in ACT during the second academic semester. By the end of the academic school year, the ELP assisted the students in reviewing and revising their Capstone projects. All classes sat for proficiency exams to help ECASE monitor their progress. (Annex II)

At start of the program 71% of 10th grade students rated at A1 and across A1- levels. All others rated at A1+ or A2. At the end of the school year results show that 100% of test takers improved at least one level. 23% were rated at A2. 67% moved into an entirely new level – up to CEFR B1 (44%) or B2 (23%), realizing a significant jump in language capacity. These results were achieved in 80 hours over one academic year.

Regarding the activity 1.4 **'Propagate STEM education by opening new STEM schools in underserved areas and providing essential educational infrastructure' -** Discussion continues in Q3 about the ***opening of three new schools in Alexandria, Mansoura and Assiut).*** The project stands ready to support these openings, and are prepared to modify their approach as a function of the planning time available. If a decision is made to open any of these schools in the fall of 2014, ECASE team will pivot from a design-planning approach to a design for immediate implementation. In this mode, the support shifts to opening the schools and scaffolding STEM design elements at an appropriate pace. If schools are designated to open in the fall of 2015, ECASE will implement the original design-focused approach to the planning year, resulting in full deployment of an integrated STEM school.

A list of items have been procured for both schools, such as; Graphic Calculators, Docking Station, Laptops, and others.

Item	**October School**	**Maadi School**
Remark office software	**1**	**1**
Graphic Calculators	**120**	**120**
Docking Station	**3**	**3**
Laptops core i5 with carring case	**131**	**101**
Extended reading material "English short stories"	**packge**	**Packge**

Stabilizer Sollatek SVS04-22 1000VA, 4A		**6**
Linksys switches 8 ports		**6**

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

In the third quarter, ECASE drafted a narrative illustrating the importance of ***extracurricular activities (Activity 2.1)*** within the context of STEM schools. The team also developed a rubric for the evaluation of potential extracurricular offerings, which was vetted by the entire ECASE team and went through several rounds of revisions before being finalized. Each of the existing extracurricular programs was run through this rubric, and the results of that analysis are currently being synthesized.

In the next quarter, ECASE will share the results of the extracurricular analysis. Identifying the next steps to implement EiPIC will also take place. ECASE has inquired about the mobilization of the Ministry of Scientific Research to advance the program and is awaiting a response. In the meantime, ECASE has proposed offering the aforementioned "bench-to-business" workshop to all 66 of the student applicants, which is a wider scope of work than originally proposed when student registration in the program was declared to be limited at 25 students per school. Whether or not ECASE will deliver the 3-5 day workshop at each school is to be determined by World Learning and USAID. Those decisions are pending.

To support Public Private Partnership integration (Activity 2.2), The Public Private Partnership team seeks to create sustainability and mutually beneficial partnerships from the schools stakeholders. These partnerships should add value to the schools' different aspects: curriculum, extra- curricular, services, finances, and logistics, with outlook to securing undergraduate opportunities in named universities. On this regard, the PPP has developed a rubric to evaluate and assess the extra- curricular and co-curricular activities. This rubric is mainly considered as the back stone of choosing suitable activities. The following illustrates the achievement done throughout the quarter and states the expected outcomes from meetings, discussions and/or visits to potential partners.

ECASE continued the relationship with National Instruments to increase their participation at the schools through LabView and related hardware training for faculty and students. This training will benefit Fab Lab, Capstones and subject laboratories that choose to utilize the National Instruments tools.

During this quarter, two teams from Maadi School were fully sponsored to compete in the **Intel ISEF competition** in Los Angeles California in May 2014 which is the most prestigious science competition in its category. Both teams competed in the environment category and one team won the third place of the category with ECASE 'Vacuum Evaporator for Water Purification'. Prior to being selected for the international competition in Los Angeles, the students competed locally at the ISEF Egypt competition among their STEM peers. The success of the

students has increased the profile of the STEM schools in Egypt and has increased interested from local stakeholders and potential private sector partners.

A Company Program is provided to the students as an extracurricular activity through the cooperation with INJAZ and Dow and will finish mid-August of next quarter. It is a high profile entrepreneurship program aiming to give the students enough knowledge to use in their practical life. The program tackles topics of high interest to the students such as intellectual property, finance, investment, marketing, boards and other topics. The program was tailored to fit our students' interest and their capabilities. INJAZ provides the program while Dow finances the program. A milestone to the program is for the students to be able to create products from their Capstone ideas.

With an aim to describe and explain the main objectives of ECASE and to highlight the main achievements to date; a presentation was conducted to the EMC2 management and staff in the **EMC2** corporate social responsibility (CSR) day. The STEM presentation was very well received by EMC2 and created more interest for cooperation with the STEM management and students.

The PPP has arranged for the Maadi students to attend the Cisco ICT Girls day. The ICT day is an annual event that the Cisco international sponsors to empower girls and women working in the ICT field. This year's event featured high profile women in ICT from Egypt as well as other girls from different developing countries considering ICT as their interest and future career. This exposure provides the girls with push forward to rise in fields mainly dominated by men.

The PPP team has successfully established contact with the Alfi Foundation to explore potential cooperation with STEM schools. The Alfi Foundation is renowned for its support to education in Egypt and their interest in STEM education in specific. For the time being there is a lot of data and information sent to the foundation in order for the management to take decision on further steps concerning funding the students' undergraduate studies. Last but not least, the PPP team has developed a system which allows the students to participate in as many as competitions while maintaining a focus on their academic work and ensuring that the competitions that they do enter are of high quality.

In Q4, ECASE will assist the schools to focus PPP activities on fewer, but more impactful fieldtrips, and to identify solid PPP partners for future Capstone support. Additionally, ECASE is willing to offer a design studio to revamp the focus on PPPs.

In order to implement **College Guidance for Local International College Admittance (Activity 2.3)**, the College Guidance Program (GCP) works on developing new areas of collaboration with the universities, academic programs, and educational oriented organizations. A

concerted effort is exerted to establish links with the universities, to raise awareness about the STEM education, to highlight the STEM students' performance and achievement which has finally resulted in securing 85 scholarships in ten private universities. This achievement is considered as one of the most important outcomes accomplished this quarter. Those universities are as follows; October 6 University, October for Modern Science & Arts (MSA), Misr University for Science & Technology (MUST), Misr International University (MIU), British University in Egypt (BUE), Modern Academy for Information & Technology, Sinai University, Future University, Egyptian Russian University, and Delta for Science & Technology. (Annex III)

The College Guidance Program started this quarter with developing an online survey about the admissions to universities in Egypt. A total of 41 students have answered with the following results; 68% of the students applied to GUC, 50% applied to the AUC and 18% applied to the BUE. There are other universities mentioned by the students such as the Arab Academy for Science & Technology, MSA, MUST, Zewail University, and others. Most of the students are applying to more than one university in order to secure places in case of no scholarships or financial aid received. In this regard, the College Guidance Program started to request for additional meetings with the AUC and the GUC in specific to explain the STEM education system, the achievements of the students, and their high project based and research learning levels. The main purpose of the meetings is to request for financial support in scholarships form for the STEM students. Therefore, a meeting has been held with Ghada Hazem, Executive Director of the Office of Admissions at the AUC. The meeting started with a brief on ECASE, the STEM education system, the curriculum, the role of ECASE and the College Guidance in specific, etc… the AUC has shown great interest in the STEM system and agreed on holding several other meetings to further discuss the STEM issues on the possibility to tailor scholarships only for STEM students.

In addition, another meeting has been held with Sherine Khalil, Head of Admissions at the GUC to give an insight about the education system and the students. During this meeting, an introduction was given about the ECASE, list of the students who applied to different majors at the university, and the probability of providing scholarships to STEM students. Up till now, the GUC has given no reply on the scholarships tailored to STEM students, all what it could offer is the scholarships to the Thanaweya Amma students.

On the programs level, the CGP tries to develop links and cooperate with different parties and programs to better provide opportunities to the STEM students. A strong cooperation has been established with the STEP project (funded by USAID) starting with a meeting with Mr. Joseph Ghanem, STEP Manager, during this meeting the ECASE/ STEM schools project has been fully explained and several ways of cooperation have been explored given the common areas of interest that in both projects. STEP provides scholarships to underserved girls in the fields of Science & Technology with merit base which is one of the outcomes of the ECASE. Given that the STEM girls are the best fit to the requirements of the STEP project, it was agreed that the students will be helped to apply in this program and that a number of them will be granted with scholarships.

The College Guidance is looking forward to guiding the students to apply to universities in Europe and UK. Developing connections with European universities and establishing some links to better guide the students is one of the main objectives that the CGP is seeking to achieve. Starting with Germany; a meeting has been held with Christian Melchert, Programme Coordinator

at the German Academic Exchange Service in Cairo (DAAD), in order to present the ECASE/STEM project outcomes, to highlight the level of achievements of the STEM students, and on the other hand, get linked with some of the German Universities and information, updates needed for admissions. Most of the universities are interested to enroll international students however; the students who are not Abuter Graduates should attend a one-year long program to learn Germany.

Last but not least, 'Teachers Recommendation Letters' sessions have been conducted with the teachers at both schools. The teachers were introduced to the whole admission process and the importance of the recommendation letters for the students' acceptance. It is very important that the teachers keep a good relation with the students and know a lot about them, this will enable the teachers to efficiently write these letters.

In Q4, ECASE will coordinate college guidance for Maadi and 6th of October, starting with parent and student meetings within the first weeks of fall semester. While content for the college guidance manual has been collected, additional focus will be on bringing this activity to fruition.

Objective 3, Activity 1: STEM PD for New and Existing Teachers

During this quarter, there was a concerted effort toward **STEM Professional development and Curriculum Training for New and Existing Teachers (Activity 3.1).** In April 2014, ECASE convened members from all organizations to create an overall framework for the Summer PDI. This team collaborated to identify learning objectives and priorities for teachers and the sequencing of the content over a four-week period. It was determined that two weeks of PDI would occur after the end of school, in mid-June 2014, with the last two weeks scheduled for mid-August 2014. In May 2014, ECASE focused on planning and material preparation for the PDI.

In June 2014, ECASE team began to implement the PDI with both new and experienced Egyptian teachers. In the last two weeks of June 2014, two separate training sessions took place. The first was a two-week session to introduce project-based learning to teachers unfamiliar with the STEM schools. The curriculum for this course was based upon previous work that ECASE has done with all of the teachers at Ma'adi and 6th of October. The second session was for experienced teachers from both schools. The main objective for this cohort was to provide a refresher on the basic elements of project-based learning and then prepare experienced teachers to present critical material to the new teachers in PDI Week 4 (in August 2014). This turn-around-training is preparing teachers who are veterans of the STEM Schools to become teachers of project-based learning in the future.

In the next quarter, ECASE team will finalize the schedule and content for PDI Weeks 3 and 4. The 2014 Summer PDI will continue with two additional weeks of training from August 10-21, 2014. This training will be for a group of teachers consisting of all existing STEM teachers and the new teachers that attended the first session of the 2014 Summer PDI. Additional Teacher Candidates from the next round of recruitment are additional potential participants. As such, a 5th week of PDI may be added to the summer schedule to accommodate this incoming group.

The first week of training will consist of sessions covering Curriculum, Assessment, Capstones, and Pedagogy. The second week will consist of sessions where experienced teachers will work with the new teachers in planning, presenting, and reviewing lessons in Professional Learning Communities. To accommodate the needs of new schools potentially opening in the coming school year, recruiting of new teachers will continue through July and August 2014. A session repeating the first two weeks of the 2014 Summer PDI has been prepared as well, to begin the training of Teacher Candidates identified in this period.

Year-round recruitment and training plans are under development. These plans are intended to meet the growing needs of the current and planned STEM schools for new teachers, and to identify and prepare Master Teacher Trainers to build capacity for sustainable, localized training of new teachers.

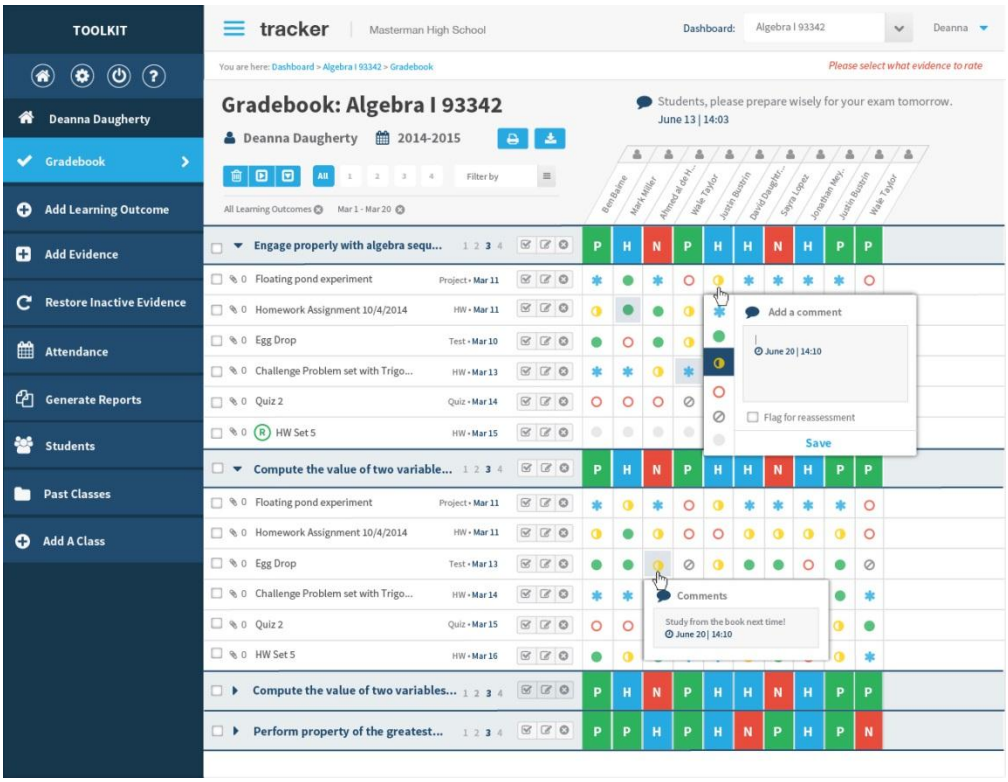
Beyond pedagogical training, ECASE offered ***training of assessment instruments for student course work and college admission (Activity 3.2).*** ECASE content experts worked with teachers on a one-to-one basis weekly or bi-weekly to provide them assistance with the implementation of formative assessments that would facilitate student learning and higher levels of achievement. Assistance came in the form of review and feedback on lesson plans, learning materials, and student assessments along with the provision of suggested materials and assessment questions. Specific feedback was provided to teachers around their development of formative and summative assessment questions. ECASE also worked with teachers to co-develop laboratory-based end of semester examinations and provided them with the necessary guidance to prepare students for these exams. New teachers were provided with a formal workshop on formative assessment in June 2014.

Training will continue in the coming quarter for new and existing teachers around formative and summative assessment via formal workshops as part of the PDI and informally via content expert direct work with teachers to support their implementation of the curriculum.

Workshops were provided to the MOE on the following topics: 1) assessment scoring using specialized software; 2) capacity transfer planning; 3) high cognitive demand assessment items; and 4) university readiness test theory and research. Future work focused on MOE capacity building is scheduled to begin in August 2014. A Capacity Transfer Plan has been developed and presented to the Minister.

In addition, teachers were supported in the PARLO Tracker system through regular Go-To-Meetings (GTM) by ECASE and provided individual assistance on the utilization and functionality of the system. It was decided during this quarter to forego the extended training as teachers and students become familiar with the PARLO philosophy and documenting ratings in Tracker.

ECASE worked with a designer to revamp the front end of the system to accommodate mobile devices and to be a more intuitive/user friendly system. The new User Interface is projected to go online mid-October, 2014. Teachers will need a refresher on-the-ground training for the transition to the new UI as well as additional Tracker training including running reports, modifying class sections, reordering/removing/re-adding learning outcomes and evidence. MOE STEM Unit training was deferred to Q4 2014 to allow time for teachers and students to acclimate to the system. Continued support via GTM and email will be given to all users utilizing the software.



Finally, teachers need to be further trained on Proficiency Assessment and Re-assessment through Learning Outcomes (PARLO) and this will take place in the next quarter. Although they have been given some training, it is evident through their entries in Tracker that further training is necessary as teachers are learning a new way of evaluating their students. It is anticipated training will be woven into the second portion of the Summer PDI.

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

To ***refine and adapt the Integrated STEM Curriculum and to enable completion for training (Activity 4.1***), ECASE's curriculum specialist in country, worked throughout the quarter with teachers to not only support the curriculum and its use, but to assess the fidelity of implementation and effectiveness. After holding dialogues and focus groups with teachers and conducting a survey of the curriculum and Capstones, ECASE offered a detailed Curriculum Design Studio 2.0 during the weeks of June 1-5 and 8-12, 2014. During this time, 29 STEM school regular teachers, 4 university graduate teachers, 2 principals, 12 members of the MOE STEM Unit and 6 consultants from ECASE worked together in teams to review the implementation of the Integrated Curriculum, V. 1.0 piloted during the 2013-2014 school year; to modify as needed and to create course descriptions for the Integrated Curriculum V. 2.0. Going forward, Curriculum 2.0

will be used by teachers and schools in the 2014-2015 academic year. Results of the design studio also offer:

- Details for procurement of texts and resources for implementation in the 2014-2015 school year – for use by both new and existing schools (new schools pending)
- Basis for future teacher professional development
- Framework for activity design and lesson planning by teachers under the guidance of ECASE consultants

In addition to new course descriptions for the science and mathematics courses, descriptions were created for technology, humanities and enrichment courses; an adjustment to the weekly schedule was made to add four more class sessions every other week; a recommendation was put forward for establishment of a mechanics laboratory at each school that offers extensive training for teachers on the use of the equipment and for the teaching of mechanics through inquiry and practical applications. Course descriptions created during the Design Studio 2.0 were further reviewed and accepted in working draft form by the Center for Curriculum and Instructional Material Development (CCIMD) for submission for textbook procurement. Because the Design Studio was detailed and critical to the path forward, a separate and distinct report on the Design Studio is linked to the attachments section of this report.

In addition to the primary objectives of the Curriculum Design Studio, this session also provided an opportunity for members of the consultant team to observe the curriculum design process and provide teachers with a pedagogical point of view when constructing learning objectives and, later, activities. The information from the Design Studio during Weeks 1 and 2 of the Summer Professional Development Institute (PDI – discussed in Activity 3.1) used to present candidate teachers with an introduction to the design process, the curriculum and the connection to Capstones and the Grand Challenges. Further, the work of the Design Studio uniquely informs the work to be done in Weeks 3 and 4 of Summer PDI, where the output will be used as the basis for units, lessons and activities that will be presented and co-created with the candidate teachers during Weeks 3 and 4.

To further develop the ***curriculum and to continue capstone curriculum implementation and training for all grades (Activity 4.2),*** ECASE collaborated closely with the Capstone Leaders throughout the quarter to support Capstone implementation. Capstone Leader meetings continued throughout Q3, meeting weekly for one hour with each team via GTM with both Maadi and 6th of October. The meetings were interactive and productive, addressing topics such as Capstone prototype and poster questions, as well as how to communicate and motivate Capstone Advisors - teachers assigned to the Capstone Sessions. Communication also continued through email. A form for students to submit questions was created for all students to access to ensure all Capstone questions are directed to the "right" people and all students have a way to get questions answered. In addition, answers to questions that would help all students were posted on a Frequently Asked Questions page on Google Drive that was accessible by all.

The focus of Q3 was the management of Semester 2 Capstone events, including prototype evaluation and poster evaluation events for both schools. This included some evaluator training.

The events met all goals, containing improvements compared to previous Capstone events and recommendations for the next iteration. This included two rounds of external evaluator training for prototype and poster evaluation, the engagement of the MOE STEM Unit in the Capstone events, six days of prototype and poster evaluations for Maadi and 6th of October, all grades, at the PAT facility in Education City with MOE STEM Unit participating as evaluators and organizers.

Clockwise from upper left: (1) Capstone banner produced by students (2) Poster evaluation (3) Panorama view of a prototype exhibition and (4) Poster evaluation.

There were very few, minor challenges to logistics. The training of the MOE STEM Unit and external evaluators was challenging because of the language barrier. Evaluators likely accepted too much work on this project, some evaluating all three grades for posters. Data will reveal whether this had an impact on the results. However, major improvements to data access and time available meant evaluators completed and recorded 100% of their pre-assessment assignments compared to much lower pre-assessment completion rates that led to significant issues in the previous semester.

Each training/orientation session and event offered the opportunity for reflection and improvement for the next session. A number of observations were collected from the team, and are awaiting survey feedback from participants to improve on the next round of Capstone events.

Going forward, the Capstones are being transferred to the Cairo schools. The schools are increasing their responsibility for implementing the Capstones and in Q3 they began to take accountability for design of the Capstones as well. In Q2, the Capstone Leaders and principals participated in refining the Capstone Challenges recommended by the Capstone Support Team, and teachers refined the English used in the rubrics for clarity.

Intentional planning and work is underway to transition the design and implementation of the Capstones to the 6th of October and Maadi Capstone Leaders, with support by the MOE STEM Unit. Work was conducted onsite by ECASE with the Capstone Leaders in May, and also in June 2014 during the Curriculum Design Studio. One of the key Capstone Leaders co-facilitated a workshop with ECASE on Capstones with all of the teachers during the Curriculum Design Studio. This same Capstone Leader agreed to be the lead facilitator with all Capstone Leaders for Capstone Design work in Week 2 of PDI. Through GTM and email, ECASE provided support to this team during that week. During this time, Capstone Leaders generated the first iteration of the 2014-2015 Capstones, along with identification of a few related discipline-learning outcomes.

Going forward, the work produced during June 2014 needs to be prepared for the teacher professional development scheduled for August. PDI, Week 3, has two days for all teachers to prepare for the 2014-2015 Capstones. The US Capstone Team will meet during July and early August 2014 to create the next iteration of the Capstones to recommend to the Capstone Leaders and prepare a recommendation for the PDI Week 3 professional development. The Capstone Leaders plan to meet in early August 2014, prior to PDI Week 3, to review and update the recommendations and prepare for the 2 days of professional development with all teachers.

Capstone Leaders and the US Capstone Team will continue to meet and communicate following the August 2014 PDI to prepare for the year. All documents, tools and processes will be updated and prepared for the first semester work.

Finally, ECASE team also provided curriculum and Capstone support through work enabling use and sustainment of the ***Fab Labs*** at the Cairo schools. In the third quarter, weekly Fab Lab meetings continued with some interruption as the schools came to the end of the school year and final projects and evaluations took place. Through these meetings, ECASE Fab team worked with the Fab Lab managers to support the work. A small amount of student training was conducted at 6th of October by the students who developed a training program for their Capstone project. This training was apparently conducted in the absence of a Fab Lab manager, and it is unclear if 6th of October has a Fab Lab manager going into the next quarter and the next school year. Lack of a manager is a problem that must be rectified so that 6th of October students can safely and effectively use their Fab Lab. The Fab team also had several members graduate from Fab Academy this quarter. ECASE Fab team also attended the curriculum planning session in early June and worked with the integrated curriculum and Capstone teams to prepare learning outcomes for Fab Lab competencies to enable Fab Labs to be fully integrated into the students' learning activities and the teachers' lesson planning. Work also continued on the development of student and teacher training modules for this summer's training.

In the next quarter, ECASE Fab team will continue working with the Capstone and curriculum teams to integrate Fab Lab use and competencies by developing the learning outcomes further, facilitating teacher-Fab Lab and manager-Fab team interactions, and by integrating the Fab Lab use into the teacher professional development this summer. The Fab team will continue to meet weekly, and tackle week-to-week problems, concerns and tasks such as the equipment list for the third Fab Lab. The Fab team is also working on further developing and implementing a week-long training course for a subset of students at 6th of October and Maadi. In this training, the Fab team instructors and Fab Lab managers will be supported by a team of instructors from

Fab Lab Egypt and a cohort of student teaching assistants. These teaching assistants will come from the core group of experienced students that have been working with the Fab Lab Mangers on projects, summer camps, and training materials. With this level of staffing, the training can support a class of up to 20 students at each school. The training will work with the students on basic design skills, machine use, and electronics. The intended outcomes of the training will be to provide the students with enough skills and experience to use the Fab Lab as a tool in their Capstone and subject area coursework. These initial 20 students will serve as coaches and assist in the training of their peers throughout the first semester.

During the first semester the Fab team and Fab Lab Managers will implement a Fab Lab training program to address the Fab Lab learning outcomes. Where these outcomes align to those of subject area and Capstone courses, Fab Lab Training will be taught as a part of the student's semester course work. The Fab Lab learning outcomes that do not align to the regular school-day coursework will be taught in afterschool courses that will be systematically implemented over the first several weeks of the semester so that all students will have the opportunity to obtain the knowledge and skills necessary to integrate the use of the Fab Lab into the development of their Capstone projects and subject-area course assignments.

Significant progress was made toward the ***development of assessment instruments for student course work and college admission (Activity 4.3).*** Progress is broken down into subcategories below:

Concept Inventories: During the quarter, Tests of Concepts (TOC) were successfully administered to Grade 3 students in cooperation with the MOE at the end of their second semester. All results were analyzed by ECASE. The results and recommended scoring approaches were reviewed by ECASE team members, and ultimately approved by the MOE. To enable this testing, existing concept inventories were adapted following an intensive process of research, synthesis, and review by content experts, ECASE team members, and outside consultants. Pilot tests of the TOC were conducted with the assistance of the MOE at two Experimental Schools, chosen to be similar in terms of student capabilities. A statistical analysis and testing theory (Rasch Analysis) were applied to pilot data to select the highest quality items. Final forms were then developed and reviewed by content experts.

Future work will follow a similar pattern of development, pilot testing, refined development, administration, and analysis and scoring. Work will also begin to plan for capacity building and transfer of activities to the MOE for these assessments. Future work could also involve attempting to test the predictive validity of these assessments, although no such plan or activities have been approved.

University Readiness Test

Previously, ECASE made formal arrangements with ACT, Inc. to obtain a copy of their internationally benchmarked test that could be translated into Arabic for the purposes of administration to the Grade 3 students as part of their required summative exams for graduation. The assessment was successfully administered in cooperation with the MOE. Student data was analyzed and suggested scoring approaches were developed and presented to the Ministry. All

student scores were approved by the MOE.

Going forward, work in this area remains unclear. ECASE is recommending that a University Readiness Test (URT) of some kind be used as part of the required assessments for graduation. However, it is not certain that the ACT itself will be used again. Future work may involve providing guidance and research assistance to the Ministry in obtaining an already developed URT or their development of an Egyptian URT.

Summative Exams for Grade 2

ECASE researched and developed final exams for all STEM subjects. With the aid of the school staff and the MOE, the exams were successfully administered. Student data was analyzed and suggested scoring approaches were developed and presented to the Ministry. The Ministry approved all student scores.

ECASE also developed a process to work with teachers to both monitor the progress of their instruction for the purposes of identifying learning outcomes taught and to provide them assistance with the implementation of formative assessments that would facilitate student learning and higher levels of achievement on the end of semester exam.

In the 4th quarter of Year 2, ECASE is prepared to support capacity building and guided transfer activities with the MOE to facilitate the successful transfer of the development, administration, and analysis/scoring of these exams by the Ministry.

As part of STEM School Design Model Codification (Activity 4.4), ECASE focused further on building the STEM School Design Blueprint that will serve all of the new schools. The Design Blueprint is intended to be used over the course of a design year to help the stakeholders put all of the essential pieces in place and to assist with replication. The Design Blueprint framework built in Q3 contains design features, indicators of success for each, and actions required to meet the goals with the new school stakeholders in mind. The framework will need to be implemented in the start-up of the new schools as they actually happen. ECASE is in the process of reviewing actions, updating actions and adding actions. The partners are also linking existing documents to the actions. With this design, revised and updated documents can readily be linked to the actions.

Objective 5: Establish and build the capacity of the MOE STEM Unit

In efforts to ***support the newly established MOE STEM Unit (Activity 5.1),*** ECASE partners have worked with members of the Ministry of Education STEM Unit on a weekly basis throughout this quarter to provide both an orientation to ECASE work and to also initiate transfer of knowledge to enable the MOE to sustain the work with the goal of having the STEM Unit lead appropriate activities in the coming life of ECASE. As such, STEM Unit members have:

- Supervised laboratory practical examinations
- Received training from ECASE on management and evaluation of Capstone projects
- Assisted in evaluation of Capstone projects

- Participated in the construction of the Tech Transfer Plan for assessment
- Participated in Design Studios
- Participated and, in some cases helped conduct, sessions in the Professional Development Institute for new teachers
- Collaborated with members from CCIMD in review of course descriptions

The schedule of activities over the next quarter is pending and relies on the capacity of the STEM Unit. Specific planned activities include:

- Support World Learning in procurement of texts and materials to support STEM curriculum
- Conduct training for new and experienced teachers on implementation of Integrated Curriculum V. 2.0
- Continue Tech Transfer to MOE STEM Unit leading ultimately to their taking full responsibility for the implementation and supervision of the curriculum

3. Challenges and Resolutions

ECASE has sought to implement the project as outlined and at the pace ~~as~~ described in the Cooperative Agreement, however, situations on the ground have shifted repeatedly and obligated ECASE to act accordingly. The most significant change was the Wind Up that was required by USAID in October 2013 through March 2014. Another equally significant challenge has been the political circumstances and their impact on the decisions that to be taken by the Ministry of Education such as solving problems facing the current schools and the decision to open new schools by September 2014. These situations have had the most bearing on ECASE shifting in accommodating ever changing realities and needs.

Under Programmatic Objective 1: *Increase student interest, participation, and achievement in science and mathematics with a special effort geared to underrepresented groups such as girls and economically marginalized students* and Activity 1.1 *Implementing an admissions system that is transparent, inclusive and criteria-based*.

ECASE worked with the MOE in the summer of 2013 to implement a new criteria based admissions system by developing a new student selection system and training on MOE personnel on implementing it. In spite of the coordination that took place in this regard, the MOE opted to implement its own student selection system and ECASE was faced with the same system of student selection as the year before ECASE. There was another attempt to enact this selection system more effectively in summer of 2014 once the Wind Up period ended and before the upcoming school admission process in July and August. Work in this area with the Ministry continues.

Under Programmatic Objective 1: *Increase student interest, participation, and achievement in science and mathematics with a special effort geared to underrepresented groups such as girls and economically marginalized students* and Activity 1.2 *Promoting the STM School within the surrounding community*.

The Wind Up halted these activities and because these activities require planning and long term implementation a new focus on these activities will be a part of Year 3. In addition, ECASE is limited to the two existing schools until the Ministry agrees to a plan for the new schools. However, we can note that student applications to the two existing schools have doubled for the 2014-2015 academic year. The schools have certainly built a reputation for success that students and parents want to be associated with. The work of promoting parent involvement through a school-level STM Board of Trustees could not materialize because of the temporary status of the BOTs in the last year. The BOTs are a key part of the education and mobilization process and ECASE can engage with the new BOTs once new elections take place.

Under Programmatic Objective 1: *Increase student interest, participation, and achievement in science and mathematics with a special effort geared to underrepresented groups such as girls and economically marginalized students* and Activity 1.4 *Outreach to Egyptian Preparatory Schools*.

ECASE was not able to implement this activity due to the Wind Up and once the Wind Up was lifted implementation required planning. This is a part of the planned Year 3 activities given we assume there will be three more schools and more communities to outreach to.

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

Although the school specialization did not go into effect including Activity 2.1 *Tailoring the STM School to the surrounding community through school specializations*, because of the Wind Up, ECASE, was able to act effectively upon Activity 2.2 *Providing essential educational infrastructure to support experiential classroom activities*, Activity 2.3 *Creating sustainable and mutually-beneficial public private partnerships* and Activity 2.4 *Organizing extracurricular activities that complement classroom content and school specializations including Extra-curricular Mini-courses, Applied Learning Centers, and Participation in International and National Student STEM Symposiums*. It should be noted that with only two schools and the limiting effects of the Wind-Up the extent of these activities were limited in scope although still successful and sustainable. Also, the two existing schools in 6th October and Maadi have acted as magnate schools, attracting students from across all governorates, and this does not lend itself to these two schools needing specializations. Via the student body they represent national needs. The the unavailability of new schools and the Wind Up combined to hamper the implementation of this specialization activity. This specialization will occur once new school sites are identified and planned.

Under Programmatic Objective 4: *Strengthen MOE capacity at the systems and policy level to sustain and replicate these model schools and Activity 4.3 Building the Capacity of the STM Model Schools National Board*.

ECASE worked hard with the Ministry and the National board, but the shift of power that took place in 2014 when the Minister became the STEM National Board Chairman limited ECASE's work with the Board due to the unavailability of the Minister. ECASE, in association with

USAID, opted to structure the MOE STEM Unit to become the Ministry's arm in STEM education and the authority in sustaining the STEM efforts beyond ECASE. The project, therefore, focused on building the capacity of the STEM Unit in an attempt to be able to shoulder all the project responsibilities before its end as opposed to the National Board and continues to see the STEM Unit as an integral of its implementation forward in addition to the presence of the National Board and its levels of interaction. The National Board will continue to take the policy matters and decisions into its own hands, while the STEM Unit takes care of the operations and day to day activities under the auspices of the Ministry,

Under Programmatic Objective 4: *Strengthen MOE capacity at the systems and policy level to sustain and replicate these model schools* and Activity 5.2 *Building the capacity of the CCIM and NCEEE to apply Egyptian STM best practices to mainstream science and math curricula*.

ECASE worked hard to invite the two institutions to attend its project activities as members of the STEM Unit, but their involvement was limited due to their workload and unavailability compared to other MOE subsidiaries like the Research Center and PAT who have been more forthcoming in this process. This has been voiced in several instances to the Minister and USAID, nonetheless, ECASE still worked with whoever was available and tried harder to court their involvement. We believe that the foundations of the STEM Unit will enable a dedicated group within the Ministry to engage with ECASE in the long term and for them to build the systems and policies needed to sustain the model.

Annex I: English Proficiency Report

Annex II: Training Report: Training Hours and Training Events

Annex III: Scholarship Listing

Annex IV: Meeting Minutes