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# STEM New Practicum Learner Assistant (LA) Model in Egypt: Successes and Challenges

**ABSTRACT**

This qualitative study examined the implementation of the Learner Assistant (LA) Model across five Egyptian Faculties of Education through systematic document analysis of STESSA program reports and the USAID Mid-term Evaluation Report (2024). Originally developed in the United States and adapted for Egyptian contexts, the LA Model addresses challenges in STEM teacher preparation programs. Thematic analysis revealed significant pedagogical benefits including enhanced peer cooperation, improved teaching competencies, safe learning environments, and strengthened English instruction. Implementation challenges included initial stakeholder resistance, role ambiguity between Learner Assistants and Teacher Assistants, operational complexities, and sustainability concerns. The study found marked improvement from Year 1 to Year 2, suggesting sustained support can overcome initial barriers. Key mitigation strategies included experiential learning, role clarification, and collaborative planning. While the LA Model demonstrates pedagogical effectiveness in Egyptian STEM teacher preparation, successful institutionalization requires addressing operational and attitudinal barriers inherent in educational reform. The research contributes to understanding peer learning models in international contexts and provides insights for implementing educational innovations in resource-constrained environments.

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## Introduction

Steering away beyond the bounds of individual academic disciplines towards an integrated, multidisciplinary approach in science, technology, engineering and mathematics (STEM) education in order to address the grand challenges of the Egyptian society, the STEM teacher preparation programs are delivered through a USAID-funded partnership project of five universities in Egypt, namely the universities of Ain Shams, Mansoura, Zagazig, Assiut,and Minia and four universities in the USA: the Universities of California State, Fresno, California Polytechnic State (Cal Poly), Temple, and Arcadia. The ultimate goal of this STESSA project (STEM Teacher Education and School Strengthening Activity) is to develop a pool of professional teachers to teach STEM school students in Egypt.

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# STEM Teacher Preparation in Egypt

The philosophy of the science, technology, engineering and mathematics (STEM) education model in Egypt is driven by the demands of the twenty-first century and is aligned to the goals and objectives of Egypt Vision 2030 so as to build an education system that drives the economy and sustainable development through building of modern and advanced curricular materials that foster basic skills, develop human talents, and ensure the alignment between the higher education outputs and the labor market demands (Education Sector Committee, 2022).

The STESSA Teacher preparation program is unique in its curriculum design, implementation and assessment. The 4-undergraduate program advocates a 10+6 model i.e., six transdisciplinary courses taught during year one and the first semester of year 2, whereas specific courses in students' STEM specializations (N 10) are taught starting from year 2, semester two till year 4, semester two. The new features of the program include English courses over the four years, pedagogical courses, practicum incorporating the Learner Assistant model, specialized capstone projects, and the action research graduation project, among other faculty and university course requirements. The following table shows the distribution and percentages of courses over the four undergraduate years.
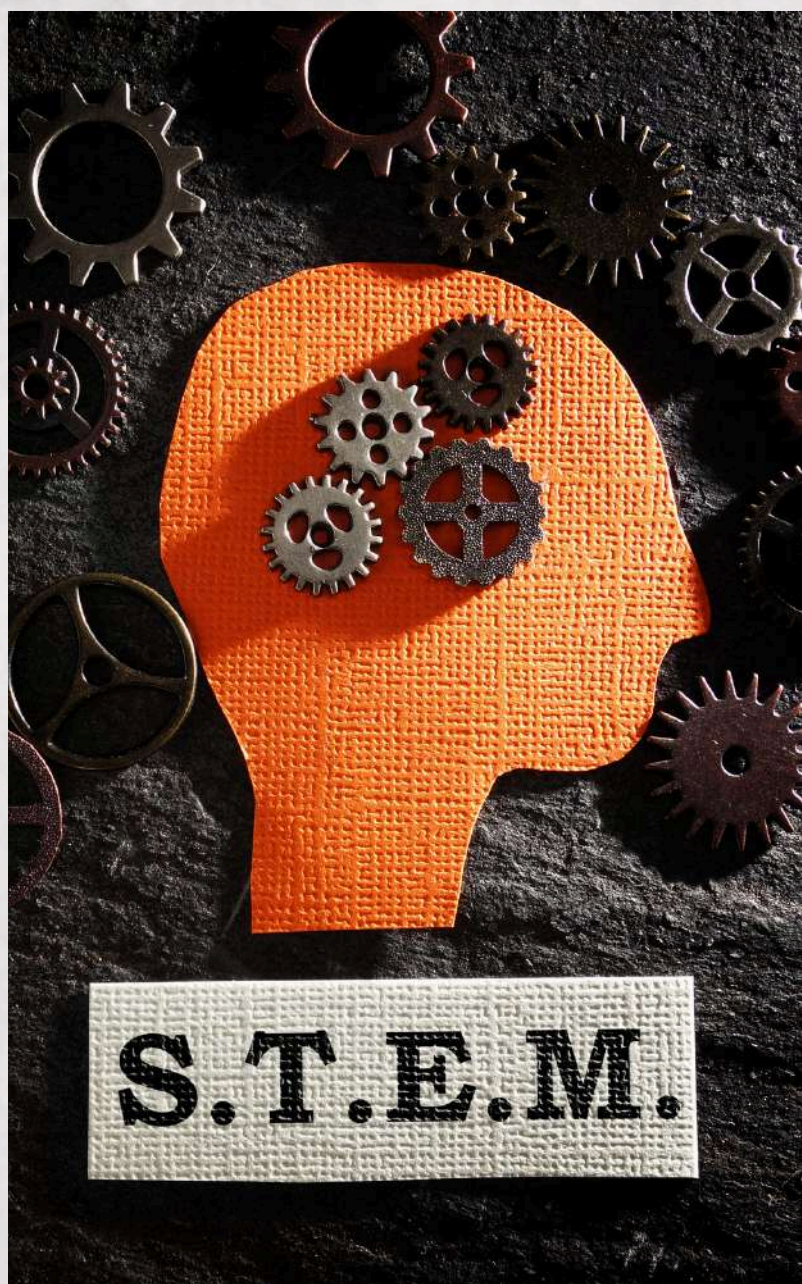
**Table [1]:** The Components of the Program*

| The Instructional Components | Credit Hours | Percentage |
|---|---|---|
| The total number of the credit hours within the program | 150 | 100% |
| Disciplinary courses, including 44 hours for disciplinary courses; 24 hours for transdisciplinary courses; 14 hours for technology courses; and 13 hours for disciplinary projects | 95 | 63.4% |
| Core courses that are mandatory for all the candidate teachers | 17 | 19.3% |
| Educational courses offered by the faculty of education (FoE requirement) | 12 | |
| Core cultural courses that are mandatory for all the candidate teachers (University requirement) | 6 | 9.3% |
| Cultural courses offered by the faculty of education | 8 | |
| Field based Practicum | 9 | 6% |
| Graduation project | 3 | 2% |

* As stipulated in the Bylaws endorsed by the Egyptian Education Sector Committee in 2022.

# The Learner Assistant (LA) Model

The LA is a student who passed certain courses the previous year and is currently is assigned to help a small group of students studying the same course this year, through: transferring his/her experience to the new students, posing various types of questions to help them understand the content, co-planning with the course instructor, providing feedback on students' understanding of content, and creating a learning environment that encourages students' growth mindset and constructive feedback.

In 2001 the LA model originated in Colorado University at Boulder – USA in Physics Teaching Domain as a collaboration between Drs. Valerie Otero (School of Education) and Dick McCray (Department of Astrophysics and Planetary Sciences) and winners of the Excellence Award in Teaching Physics from the American Physics Association (University of Colorado school of Education website). So far, it has spread, according to the University website, to more than 500 institutions worldwide (LA Alliance website).To the writer's best knowledge, so far Egyptian STESSA Teacher Preparation Programs are the only ones in the Middle East adopting the LA Model and adapting it to suit its context. The LA model seeks to achieve curriculum course transformation through the use of Active Learning, discipline-based educational research, institutional change by supporting instructional innovations, and encouraging the recruitment of effective teachers' pipeline.

## LAs vs TAs Roles

For a successful implementation of the LA Model in achieving its goals, it is really crucial to understand the roles and responsibilities of both the learner assistant and the teacher assistant. Misunderstanding of these roles could cause many problems to all concerned and could constitute unnecessary obstacles to the successful implementation of the model. The following table summarizes the role differences of each.

**Table [2]:** The different roles of both the LAs and the TAs

| Learner Assistants (LAs) | Teacher Assistants (TAs) |
|---|---|
| Help groups of students make progress by asking helpful open-ended questions, not providing explanations. | Explain difficult ideas to individual students. |
| Facilitate group activities. | Help set up laboratory equipment |
| Receive ongoing pedagogical preparation. | Give mini lectures as they are graduates. |
| Reflect on their experience | Help students with homework. |
| Convey students' frequently asked questions to the course instructor. | May grade lab reports or other assignments. |

## Implementation of the LA Model in the STESSA Project

The requirement in the U.S. is for LAs to receive 2 courses in effective and recent teaching methods before they assume their job. They apply to be recruited as LAs and paid for it. However, the LA model in the STESSA five Faculties of Education is an essential component of the Practice Teaching/Practicum courses.

## The Place of the Learner Assistant Model within the 4-year Practicum courses

As shown in Table [1] above, the field-based practicum is allocated nine credit hours starting from the first academic year. During **Year One**, student teachers' Practicum is focus on observation of STEM Schools in action as linked to learning in STEM Education courses: Active learning Instruction, how teachers engage students in learning and writing reflective logs of these observations (Years 2 & 3 Practicum Course Descriptions, 2022-2023). Furthermore, they are required to explore the whole environment of the STEM schools with all its facilities and operations.

**Year Two** marks the beginning of the implementation of the LA model, where part of the practicum course, 5 weeks per semester, is devoted to year two students to help year 1 STEM students in their courses and practice their newly-acquired skills in questioning techniques, managing small learning group discussions, working with faculty to prepare for small group active learning sessions, providing feedback to students along with peer and faculty feedback and reflections.

LAing also constitutes an important part of **Year Three practicum course** where student teachers are assigned to exercise their knowledge and skills with **year two students**. **Year Three** student teachers deepen their knowledge of creating a learning environment conducive to learning. For example, the following topics such as motivation, growth mindset vs fixed mindset, meta-cognitive skills and their relationship with possessing a growth mindset as well as being a reflective practioner are introduced and practiced (Dweck, 2016). Assessment of LAs and viable assessment tools are also discussed with students to achieve transparency of assessment.

**Year Four** is wholly devoted to the pedagogical graduation project, where student teachers are practicing at schools. The first semester focuses on classroom action research: identification of a small teaching problem/challenge they face while teaching, discussing it with their instructors, and reading about it in the literature and previous studies. Application of a solution is identified, and implemented during the second semester, data analyzed and discussed and then finalized and provided for an assessment panel, in a paper or a poster form.

## Method

This qualitative study employed systematic document analysis to examine the implementation of the Learner Assistant (LA) Model in STEM teacher preparation programs across five Egyptian Faculties of Education. The research analyzed comprehensive program documentation, namely, 1) **STESSA Program Coordinators' Reports and 2) USAID Mid-term Evaluation Report (2024)** to identify implementation successes and challenges within the STESSA (STEM Teacher Education and School Strengthening Activity) project.

## Data Sources

Primary data were extracted from:

- **STESSA Program Coordinators' Reports:** Annual implementation reviews from five participating universities (Ain Shams, Mansoura, Zagazig, Assiut, and Minia) covering Year 1 & Year 2, 2023-2024.
- **USAID Mid-term Evaluation Report (2024):** Independent external assessment of STESSA project progress, including LA model implementation and impact.

## Data Analysis

Extracted data underwent thematic analysis following Braun and Clarke (2006), involving: 1) data familiarization, 2) initial coding, 3) theme identification, 4) theme review, and final 5) theme definition. Cross-referencing between coordinator reports and the independent evaluation enhanced analytical trustworthiness through triangulation.

# Findings

### Successes of LA Model Implementation

The LA Model demonstrated significant positive outcomes, namely, **1) Enhanced Learning Environment, 2) Professional Development, 3) Pedagogical Benefits, and 4) Faculty collaboration.**

**1) Enhanced Learning Environment:** The model fostered effective peer cooperation, creating collegial relationships between Learner Assistants and students while establishing safe practice environments for developing teaching skills.

**2) Professional Development:** LAs showed marked improvement in teaching competencies, including open-ended questioning techniques, small group facilitation, and constructive feedback delivery. Participants also demonstrated increased self-confidence and social skills.

**3) Pedagogical Benefits:** Students improved their English medium instruction capabilities, while the model compensated for limited STEM school placements by providing internal practice opportunities.

**4) Faculty Collaboration:** Joint planning between LAs and course instructors strengthened working relationships and enhanced the overall learning environment.

# Implementation Challenges

Despite the successes, the LA model's implementation encountered a number of challenges emerged during implementation, among which: **Initial Resistance, Confusion and Role Ambiguity, Operational Complexities and Sustainability Concerns:**

**1. Initial Resistance:** Stakeholder resistance was evident in Year 1, typical of educational change initiatives, though this diminished significantly by Year 2 as understanding and acceptance increased.

**2. Confusion Role Ambiguity:** Initial confusion existed regarding distinctions between Learner Assistants and Teacher Assistants, though this improved with experience and clarification efforts.

**3. Operational Complexities:** Scheduling difficulties, large student numbers, and coordination between practicum and disciplinary course professors presented ongoing logistical challenges.

**4. Sustainability Concerns:** Project termination raised questions about long-term institutionalization of the LA model beyond external funding periods.

# Mitigation Strategies

The data revealed several adaptive responses for the challenges highlighted above:

- **Learning Curve and Adaptability: The Potential of Experiential Learning:** Year 2 improvements indicated that stakeholder familiarity and experience effectively reduced initial resistance and confusion
- **Clarification of Roles:** Ongoing communication and training helped distinguish LA and TA responsibilities to all involved parties.
- **Joint Planning:** Systematic collaborative planning between LAs and instructors served as an inherent mechanism for fostering cooperation and alignment at the institutional level.

# Discussion

The implementation of the Learner Assistant model in Egyptian STEM teacher preparation programs reveals the complex dynamics inherent in educational innovation within higher education contexts. The findings demonstrate that while pedagogical innovations can yield significant benefits, their successful integration requires careful attention to both human and systemic factors.

# Pedagogical Effectiveness and Learning Outcomes

The documented improvements in teaching competencies among Learner Assistants align with established literature on peer learning and collaborative pedagogical approaches (Topping, 2005). The enhancement of English medium instruction capabilities is particularly significant given Egypt's broader educational goals of internationalization and STEM education reform. The creation of safe learning environments addresses a critical gap in teacher preparation programs, where limited field placement opportunities often constrain practical skill development. This finding supports the concept of "legitimate peripheral participation" (Lave & Wenger, 1991), where novice teachers gradually develop expertise through structured peer interactions.

## Change Management and Institutional Adaptation

The marked improvement from Year 1 to Year 2 implementation reflects classic patterns in educational change theory, particularly Rogers' (2003) diffusion of innovations framework. As it is well-known in the academic field that introducing change is usually met with resistance until people involved understand the parameters of such change and become convinced of its importance and effectiveness. The adoption, or adaptation of the LA Model in Egypt, is no exception. The initial resistance followed by gradual acceptance demonstrates the importance of allowing sufficient time for stakeholder adaptation and understanding. This progression suggests that educational innovations require not only initial implementation support but also sustained commitment through the critical early phases when resistance is highest.

The role confusion between Learner Assistants and Teacher Assistants highlights the importance of clear role delineation in collaborative learning models. This finding resonates with broader research on role clarity in educational settings (Kahn et al., 1964), emphasizing that successful peer learning programs require explicit definition of responsibilities and expectations.

## Operational Challenges and Systemic Barriers

The operational complexities encountered—scheduling difficulties, large student numbers, and inter-departmental coordination issues—reflect systemic challenges common to large-scale educational reforms in resource-constrained environments. These findings echo international literature on implementing educational innovations in developing contexts, where institutional capacity and infrastructure limitations can significantly impact program effectiveness (Schweisfurth, 2013).

The coordination challenges between practicum and disciplinary course professors reveal deeper issues of departmental silos within higher education institutions (Mintz., 2024). This fragmentation represents a significant barrier to integrated teacher preparation approaches and suggests the need for institutional restructuring to support cross-departmental collaboration.

## Sustainability and Institutionalization

Perhaps most critically, the concern about project termination raises fundamental questions about the sustainability of externally funded educational innovations. The findings suggest that while the LA model proved pedagogically effective, its long-term viability depends on institutional adoption beyond project funding periods. This challenge reflects broader patterns in international development education projects, where short-term funding cycles often fail to support the extended timeframes necessary for sustainable institutional change (Samoff, 2009).

The successful mitigation strategies identified —experiential learning through sustained practice, role clarification, and collaborative planning—provide a framework for future implementations. However, these strategies require institutional commitment and resource allocation that extend beyond project timelines.

## Implications for Practice and Policy

These findings have several important implications for educational policy and practice. First, the success of peer learning models like the LA approach suggests that Egyptian teacher preparation programs could benefit from systematically incorporating collaborative learning structures. Second, the importance of sustained implementation support indicates that educational reforms require multi-year commitment and gradual scaling rather than rapid, wholesale adoption.

The study also highlights the need for institutional capacity building that addresses both human resource development and systemic coordination mechanisms. Future implementations should include explicit change management strategies, clear role definitions, and sustainable funding models that support long-term institutionalization.

## Limitations and Future Research

While this study provides valuable insights into LA model implementation, it is limited by its reliance on program documentation and evaluation reports. Future research should include direct stakeholder perspectives through interviews and surveys to provide a more comprehensive understanding of implementation experiences. Additionally, longitudinal studies tracking the model's impact on graduate teacher effectiveness would strengthen the evidence base for this approach.

The study's focus on the Egyptian context, while providing depth, limits generalizability to other cultural and institutional settings. Comparative studies across different national contexts would enhance understanding of the model's broader applicability and the role of contextual factors in implementation success.

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