



MEPI Connect—An Open Source Graduate Tracking Software System:

Resource Requirements to Customize and Implement the System

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The views expressed in this document do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

WHAT IS MEPI CONNECT?

MEPI Connect is a software system that supports medical schools to track and engage with their graduates. The system allows users to view and analyze graduates' demographic and professional information. The information is obtained initially from the school registrar's office, then from the graduates themselves, and, when possible, from human resources information systems at ministries of health and/or professional councils.

MEPI Connect is designed to help medical schools understand the impact that education and policies have on:

- The retention and distribution of graduates in the country and externally
- The preparedness of graduates in core competencies
- The quality and relevance of curricula, educational programs, and facilities.

The MEPI Connect software was developed by the PEPFAR-funded Medical Education Partnership Initiative (MEPI) [Physician Tracking Technical Working Group](#) in collaboration with the PEPFAR-funded USAID [CapacityPlus project](#) and the MEPI Coordinating Center.

Key Features

MEPI Connect has a number of features that make it easy for both medical schools and graduates to use. As an open source computer application that is free and fully customizable, MEPI Connect:







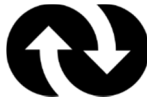
- Can be hosted locally, either on a secure server or on a remote hosting service in the cloud
- Can be integrated with professional registries maintained by national or local health authorities and/or professional councils
- Easily uploads graduates' responses to paper-based or electronic surveys
- Can be operated by a variety of users with different levels of access based on their role
- Allows graduates to log into the system through their preferred Internet browser to update their own records
- Can be designed so that the user interface matches a school's website.

IMPLEMENTATION ROADMAP AND RESOURCES REQUIRED

MEPI Connect is open source, which means a school does not need to purchase the software or pay an annual licensing fee to use it. Nevertheless, implementation and ongoing maintenance of the software require some dedicated resources. This document outlines the implementation

process and resources required at each of the seven steps in the process, which begin with forming an implementation team and end with support and ongoing maintenance (Figure 1).

Figure 1: Implementation Steps for MEPI Connect

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
						
Form implementation team	Engage stakeholders and plan	Develop document specifications	Carry out specifications	Test and refine	Scale up	Support and maintain

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For each stage of implementation, time and financial, human, and material resources are necessary to effectively ensure proper design, installation, and use of the MEPI Connect software. Many of the tools listed in the tables that follow can be found on the MEPI Network website at: <http://www.mepinetwork.org/physician-tracking>.

Time



Human Resources



Financial Resources







Material Resources



Step 1: Form an Implementation Team

The school leadership should appoint an implementation team, comprising a project manager, an information technology (IT) specialist, and a training and utilization leader (Table 1). The team will be responsible for engaging with stakeholders, leading the development of an implementation plan, documenting and implementing specifications, testing and refining the system, and scaling up. It is critical that the implementation team have a clear endorsement from the school’s leadership to carry out its responsibilities.

Table 1: Resources Required to Form an Implementation Team

 <p>Time</p>	<ul style="list-style-type: none"> • One week to build a team and establish roles and two additional weeks to develop an implementation plan. During this time, the team develops the implementation plan, reviews the generic version of the software, and begins drafting materials for stakeholders to review and approve in advance of future stakeholder leadership group meetings.
 <p>Human Resources</p>	<p>Members of the implementation team should include the following, with the percentages of their full-time level of effort allocated as shown:</p> <ul style="list-style-type: none"> • Project leader: Experienced in managing projects and coordinating efforts with partners outside the implementation team (75%, Steps 1-6) • IT professional: Capable of administering a network and installing software (40%) • Training and utilization leader: Responsible for conducting training and ensuring the software is used as intended and that users obtain value from the software (20%, Steps 1-4; 50%-100%, Steps 5-7) • Ideally, the training and utilization leader assumes the role of graduate tracking coordinator at Step 4 and leads the training, scale-up and maintenance stages (Steps 5, 6 and 7) at 50%-100% level of effort.
 <p>Financial Resources</p>	<ul style="list-style-type: none"> • The implementation team may require some financial resources to engage stakeholders, prepare an implementation plan, draft specifications, and support the testing, refinement, and scale-up of the software.
 <p>Material Resources</p>	<ul style="list-style-type: none"> • Office space for the implementation team should include desks, access to electricity, and an Internet connection. • Each team member should have an Internet-ready computer and access to a printer. • Tools: Terms of reference for the implementation team

Key Outcomes





1. An implementation team is composed with defined responsibilities.
2. The school leadership has expressed its support to the implementation team.
3. The implementation plan and first drafts of the system’s attributes are completed.

Step 2: Engage Stakeholders and Plan

Representatives of key groups that are affected by, influence, or are important to the success of the graduate tracking system should be engaged early in the process (Table 2). Ideally, the school’s leadership will support the implementation team to invite stakeholders to serve in a stakeholder leadership group (SLG). A typical SLG might include the registrar, the dean of the school of medicine, a faculty member experienced in measurement and evaluation, and at least one graduate. Representatives from the Ministry of Health and the professional medical council are also suitable and should be sought to serve on the SLG. The SLG acts as an advisory board and contributes to the development of the implementation plan and systems specifications. SLG members also are responsible for making key decisions such as determining the data fields that

should be present in the system, the types of reports required, and how and by whom the system can be accessed. The SLG should advise and approve the customizations recommended by the implementation team to the generic version of the software.

Table 2: Resources Required to Engage Stakeholders and Plan

 Time	<ul style="list-style-type: none"> • Two months (with ongoing engagement throughout the process). During Steps Two and Three, the SLG should meet at least twice, firstly to review initial planning documents and openly discuss the core purpose and goals of the system, then again to approve the required data fields, report types, and implementation plan and budget. The SLG should continue to meet on a quarterly basis to provide oversight and to review the software’s impact for at least one year.
 Human Resources	<ul style="list-style-type: none"> • Implementation team: Identifies stakeholders, forms an SLG, organizes meetings, documents decisions • Stakeholders: Attend meetings, review documents, provide feedback • School leadership: Sends letter to stakeholders on behalf of implementation team • Graduate tracking coordinator (GTC): The focal person using and maintaining the system (see Step 4). Note: The part-time or full-time GTC position can be assumed by a member of the implementation team, but if it is not, steps to hire this position should begin.
 Financial Resources	<ul style="list-style-type: none"> • Possible travel for government officials or non-local stakeholders to attend key SLG meetings (e.g., 6 people/4 days of SLG meetings: approximately USD \$3,000) • Telecommunication/Internet costs for communicating with non-local stakeholders
 Material Resources	<ul style="list-style-type: none"> • Meeting room space, projectors, USB Internet modems, and printed materials and posters of proposed designs • Tools: Terms of reference for SLG, implementation plan template, budget template, MEPI Connect generic version data specifications table, graduate tracking coordinator job description

Key Outcomes





1. Key stakeholders have convened and contributed to key planning documents, including the implementation plan, software specifications, and reporting and governance requirements.
2. The implementation team has completed key planning documents.
3. A stakeholder leadership group has been formed with defined terms of reference and the next quarterly meeting scheduled.

Step 3: Develop Document Specifications

Based on inputs from key stakeholders, the implementation team should document the agreed and validated specifications for the software system, including the data fields and the types of reports to be produced based on the data collected (Table 3). The specifications must be

documented in such a way that software developers can customize the generic version. This requires a level of detail to be documented using specific templates that note all possible responses, the desired formatting, and whether a particular data field is required to be populated by the user. A cross-check should be conducted to ensure that all the variables needed to run all planned reports are being collected. Team members should determine up front how they want the results in the reports to be filtered or cross-referenced (e.g., by gender, location, or specialty).

Table 3: Resources Required to Develop Document Specifications

 <p>Time</p>	<ul style="list-style-type: none"> • Two weeks to one month. It could take considerable time to determine and obtain the lists of possible responses for each drop-down window. When possible, the list of responses for data fields should match lists in other health worker databases, such as those at professional councils or ministries of health. In this way, data can be easily exchanged. Addressing security and governance issues such as access rights for different types of users can require considerable time and input from the SLG.
 <p>Human Resources</p>	<ul style="list-style-type: none"> • Implementation team: Compiles documentation needed by software developers to make custom changes to the software • Stakeholders: Conduct informative interviews with the implementation team in between SLG meetings
 <p>Financial Resources</p>	<ul style="list-style-type: none"> • Transportation and telecommunication costs associated with meetings with government authorities and/or professional councils, and meetings to ensure that data are collected in similar formats
 <p>Material Resources</p>	<ul style="list-style-type: none"> • Computers, printers, and Internet access • Tools: Data governance and data sharing agreements (only necessary if data will be exchanged between multiple information systems); data dictionary and reporting requirements table

Key Outcomes





- Data governance policy has been reviewed and finalized. These documents outline what data elements will be shared, how often, and who has access rights to view or edit the data. (If there is no data exchange between systems, governance is limited to user roles and rights, including what graduates have access to if they are granted log-in credentials.)
- Using the generic version’s data specification table as a starting point, a data dictionary is completed that expresses the customizations to the data fields and the lists to appear in the drop-down windows. The data dictionary is the authoritative document that software developers use to customize the generic versions source code.

Step 4: Carry Out Specifications

The implementation team should work with software developers to customize and install the software according to documented specifications (Table 4). Initial entry of graduate data should

also begin, either by importing data electronically from a spreadsheet or by manually entering data from paper records. At this stage, a part-time to full-time equivalent graduate tracking coordinator (GTC) position should be nominated (or hired, if necessary) as the person with primary responsibility for updating graduate records, responding to reporting requests, and surveying graduates. It is highly advised that when the implementation team is initially formed, one member be selected with the intent to transition their role to GTC at this stage.

Table 4: Resources Required to Carry Out Specifications

 <p>Time</p>	<ul style="list-style-type: none"> • Two to three days for customization of the generic version if the software developer is familiar with the source code language that MEPI Connect is written in and has the completed specification documents (data dictionary and reporting specifications) • If available software developers are not familiar with the source code language, it may take them several weeks to learn and seek free help from the MEPI Connect software developer online community (ihris@googlegroups.com) • Two days to install the custom version once customization is complete • Weeks to months to enter the backlog of graduate data in the system, depending on how many records there are and depending on the data format (electronic or paper)
 <p>Human Resources</p>	<ul style="list-style-type: none"> • Software developers: Should be familiar with the graduate tracking software (e.g., CapacityPlus expert software developers) • School IT staff member: Assist expert software developers to install the software • Data clerks: Enter backlog of graduate data • Implementation team: Provide answers and clarification to software developers • Core users: Graduate tracking coordinator and other medical school staff who could benefit from accessing the software
 <p>Financial Resources</p>	<ul style="list-style-type: none"> • Procurement of remote hosting service or local servers (approximately USD \$80 per month for a remote hosting service, or \$1,000 to \$3,000 to purchase a local server) • Initial user training (securing group meeting space and group access to Internet)
 <p>Material Resources</p>	<ul style="list-style-type: none"> • A server or computer must be secured to host the software and connect to the network. Alternatively, the software can be hosted in the cloud (see financial resources above). • Tools: MEPI Connect Launchpad site https://launchpad.net/ihris-graduate (provides technical support to school IT staff); MEPI Connect user's manual

Key Outcomes





- The generic version of the software is customized to meet the school's needs and specifications.
- The customized version of the software is deployed locally on a server at the school or in the cloud.
- Graduate paper records are imported or entered by hand into the system.
- The software's primary user and the point person for all graduate tracking efforts begins training and assuming her/his responsibilities.

- The graduate tracking coordinator is identified and prepared for training.

Step 5: Test and Refine

Training for trainers and the first set of users should begin shortly after the software is installed. During the training process and once actual graduate records are in the software system, user testing should begin to generate feedback and reveal any issues or additional improvements that need to be made (Table 5). The implementation team should document the feedback and prepare to make the adjustments. The implementation team may then wish to officially launch the software by announcing it to the SLG, ministries, institutions, students, and professional bodies. This can be done by disseminating flyers or a graduate tracking overview via e-mail, social media, or other regularly used communication channels.

Table 5: Resources Required to Test and Refine

 Time	<ul style="list-style-type: none"> • One to three months to collect and document problems (bugs) and recommended improvements (feature requests); it is most efficient to collect proposed changes/fixes over a month's time and implement them in batches. • Launch events and campaigns to generate interest in the software should coincide with graduation, alumni, and health workforce-related events.
 Human Resources	<ul style="list-style-type: none"> • Graduate tracking coordinator: Updates graduate records, runs reports for stakeholders, and coordinates outreach to graduates. (Ideally, the GTC will be a member of the implementation team, such as the training and usability leader. If the individual is hired, the GTC position can be an entry-level position, but the person must be comfortable using computers and interacting with graduates.) • Software developers: Make small changes to the software based on user feedback (2 days' time may be needed) • Stakeholders: Receive regular updates on progress of testing and the changes being made to the system • IT leader: Must be readily accessible to assist and determine if an issue requires immediate attention or can wait until end of testing period to fix • Training and usability leader: Responsible for coordinating the trainings, producing the user manuals, and making her or himself available to answer questions on the use of the software
 Financial Resources	<ul style="list-style-type: none"> • Training of graduate tracking coordinator (2 days of intensive training if GTC is not already a member of the implementation team) • Additional subscriptions to online survey applications or e-mail newsletter applications such as Survey Monkey or Constant Contact (USD \$15-\$30 monthly) if not using Google Forms for free electronic surveying
 Material Resources	<ul style="list-style-type: none"> • Dedicated office space, computer, and printer, with Internet access for GTC • Tools: MEPI Connect Launchpad site providing bug tracker and logging of feature requests during testing phase; Google Forms or links to Survey Monkey and Constant Contact; scope of work for GTC





Key Outcomes

- The graduate tracking coordinator and other core users are trained to use the software.
- A significant number of graduate records are uploaded in the system.
- The software is improved based on initial user experience and feedback from the GTC.
- The software’s launch is announced to the alumni community, school staff, and stakeholders.

Step 6: Scale Up

At this stage, data clerks or the GTC should enter all graduate data into the system, and the GTC and team should launch implementation at additional sites (such as other universities that are part of the consortium) and train additional users (Table 6). If no additional sites need to launch the system, the GTC should continue to enter all remaining data from graduates’ paper records and conduct outreach campaigns with alumni to update their information.

Table 6: Resources Required to Scale Up

 <p>Time</p>	<ul style="list-style-type: none"> • Over time, the GTC will work to establish contact with and obtain current professional and demographic information from graduates. • Launching MEPI Connect at additional sites should use the same specifications; therefore, implementation should begin with Step 4. However, each new site should have its own implementation team and GTC.
 <p>Human Resources</p>	<ul style="list-style-type: none"> • Data clerks: Enter backlog of graduate data. For many schools, the number of graduates could be in the tens of thousands. During scale-up, all remaining graduates are entered. • Graduate tracking coordinator: Supervises data clerks, conducts outreach campaign using social media, uses e-mail and surveys to bring graduate records up to date • Monitoring and evaluation expert: Designs graduate surveys, analyzes the results • Website developer: Updates the alumni page of the school’s website and links it to the self-service modules of the graduate tracking system • Stakeholders: Contribute to design of surveys, review survey results
 <p>Financial Resources</p>	<ul style="list-style-type: none"> • Travel to hospitals and health facilities to conducting surveys of graduates • Costs associated with GTC attendance at alumni events or professional seminars to gather graduate information • Training of data clerks • Costs to print promotional and outreach materials • Salaries for part-time or temporary data entry clerks if a large number of graduate records need to be manually entered into the system
 <p>Material Resources</p>	<ul style="list-style-type: none"> • Paper surveys, retractable banners, and new graphic designs to enhance social media sites, website, and e-mail outreach • Tools: MEPI Connect Facebook pages or Facebook groups, Google documents, and Drop Box to share information and good practices among the open source graduate tracking community





Key Outcomes

- All backlogged graduate data have been entered in the system, and the GTC has begun to update graduates' records based on their responses to surveys or outreach campaigns using social media or visits to health facilities where graduates work.
- If additional schools within a consortium wish to adopt the software, the implementation team has assisted in the formation of a local implementation team and has coached them, beginning the process at Step 4.
- The GTC has begun to run reports and provide stakeholders and school leadership with information to be used for decision-making and reporting purposes.

Step 7: Support and Maintain

Maintaining accurate data in the system is a constant activity that should be the top priority of the GTC (Table 7). Data quality begins with capturing data from students before they graduate and maintaining the data through alumni events, annual surveys, and visits to health facilities where graduates work. As the number of records in the system grows and the number of users accessing the system increases, the level of IT support and the size of the server must grow accordingly. It's often easier and more cost-effective to upgrade a cloud hosting subscription rather than purchase a larger server to accommodate the increased data load. The GTC should work with the SLG and institutional stakeholders to produce regular data reports that can be used to inform institutional decision-making.

Table 7: Resources Required to Support and Maintain

 <p>Time</p>	<ul style="list-style-type: none"> • The GTC should expect to use the MEPI Connect software anywhere from one to two hours a day. • IT support staff should expect to respond to one technical support call a week depending on the number of users.
 <p>Human Resources</p>	<ul style="list-style-type: none"> • Graduate tracking coordinator: Remains a half-time to full-time equivalent position—additional users trained to use the system can respond to reporting requests and update records • IT staff: Need to be familiar with the system and available to respond to requests for technical support
 <p>Financial Resources</p>	<ul style="list-style-type: none"> • As needs change, further customizations may be required and software developer support can be hired on a time and materials basis. • As more users log into the system and it begins to contain more records, the server must grow accordingly congruently. (Note: Hosting software in the cloud saves time and money.)
 <p>Material Resources</p>	<ul style="list-style-type: none"> • Tools: SMS and mobile applications can be linked to MEPI Connect, enabling graduates to update their own records. Web-based interfaces to databases at professional councils or the ministry of health could be used to exchange data between systems.

Key Outcomes

- After nearly a year, the majority of the graduate data in the system adequately reflects graduates' current demographic and employment status.
- For schools that wish to enable the "self-service" feature, graduates are aware of their user name and password and are logging into their record to make their own updates. (Consider providing incentives for graduates who log in once a year to make any changes).
- By this time, schools may wish to hold discussions with the medical council or Ministry of Health on how to share graduate data collected in MEPI Connect with their systems.




RESOURCE PLANNING AND ALLOCATION AT A GLANCE

There is a direct correlation between the time and resources invested in planning and implementing the software and the longer-term quality and sustainability of the system. The key to a successful deployment and lasting impact of MEPI Connect is to form a strong implementation team to engage with stakeholders during the customization process and manage the testing, refinement, and scale-up of the system. Furthermore, engaging regularly with a stakeholder leadership group that serves in both an advisory and decision-making capacity will ensure that the software tracks the right variables and achieves the necessary reporting requirements. Finally, it is highly recommended that a full-time staff person be assigned or hired to act as graduate tracking coordinator. Ideally, this person will be on the implementation team, but if not, the GTC should at least assume responsibility for handling reporting requests, updating graduate records, and surveying graduates after implementation and deployment of the software.



From the point of implementation onward, the resources required are mainly staff time and equipment. As the number of records and the number of users accessing the system increase, the capacity of the server may also need to be upgraded. If reporting needs change or whenever a customization is required, it may necessary to engage two days of a software developer's time. The school's or university's IT department should be capable of handling requests for routine maintenance and basic configuration.

ESTIMATES OF TYPICAL COSTS



Human Resources

-  Software developer: \$25 to \$35 USD per hour (to make custom changes when necessary)
-  Data entry clerks: \$18 USD per day
-  Data entry clerk supervisor: \$28 USD per day (to coordinate data entry clerks if GTC is unable to supervise)

Financial Resources

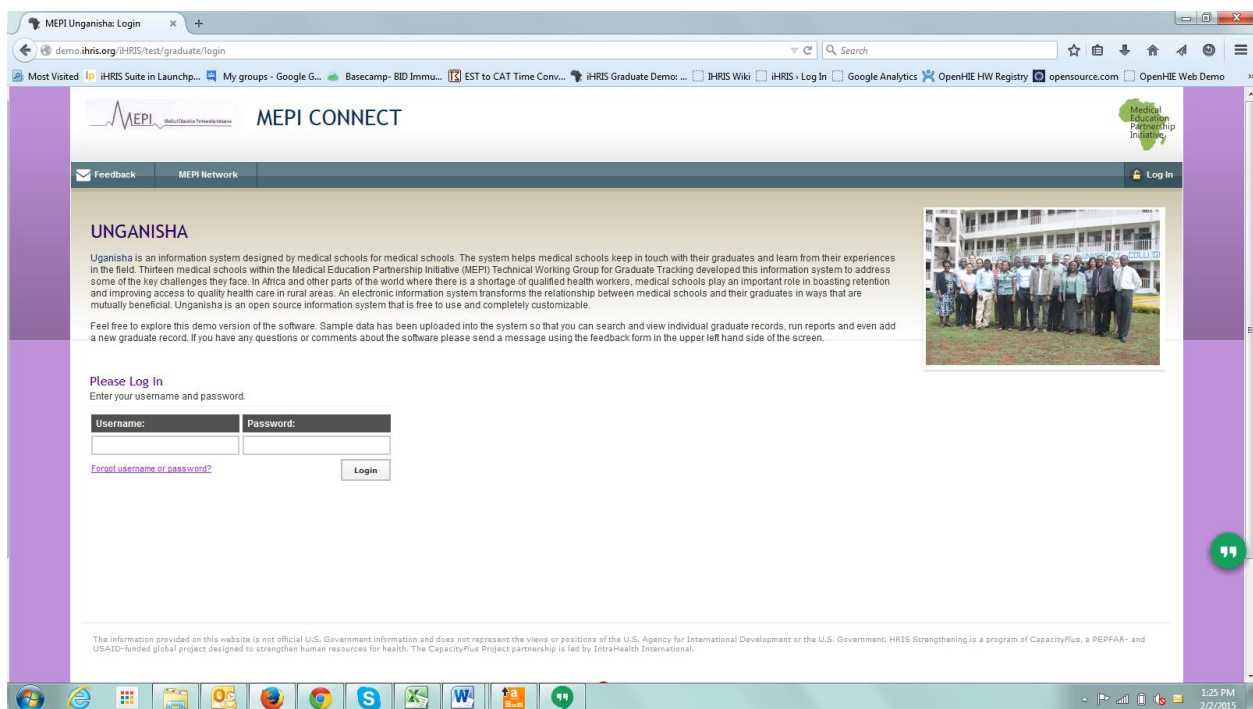
-  User training: \$70 USD per person per day
-  Stakeholder leadership group meetings: \$60 USD per person per day

Material Resources

-  Local server: \$750 to \$3,000 USD (to host software locally at the institution)
-  Remote hosting service: \$80 USD a month (hosting virtually rather than locally)

To demo the generic version of the MEPI Connect software please visit

<http://demo.ihris.org/iHRIS/test/graduate/login> Username: demo Password: demo





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