Data Economy

DIPC **Learning Pathways**
Digital Innovation in Pandemic Control

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Regenstrief Institute

Learning Pathways

Within the frame of the Digital Innovation in Pandemic Control (DIPC) initiative, the Regenstrief Institute has identified a series of learning pathways that outline the key knowledge areas and topics relevant to different roles within the field of Digital Health. Based on an analysis of training needs gathered during the project, these pathways have been mapped against the **Draft Digital Health Competency Framework (DHCF).** They are designed both to define the specific competencies required for a range of professional roles and to provide guidance for developing targeted learning materials. By linking identified training needs to structured learning opportunities, this work aims to support capacity building and strengthen the skills of the Digital Health workforce across diverse contexts.

It is noted that the learning pathways is not intended to be a complete instantiation of the DHCF. Instead, it represents a synthesis of the requested training based on input provided during the GIZ DIPC initiative. The Health Systems and Digital Health Solutions portion of the framework is more populated than other portions of the framework because the research for this initiative focused on training needs to implement and support digital health solutions. The other areas of the model were populated where data was provided.

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Overview

Processes For Establishing the Pathways

The processes for collecting and analysing the data are summarised below at a high level:

01 Survey and interview methods were used to capture learning needs from those planning, advising, implementing and supporting HIS in LIMS.

02 Qualitative data was analysed by tagging key themes and concepts and then clustering the input into affinity groups and themes.

03 Held 2 workshops to begin to craft objectives for the different types of learners.

04 Took the workshop results and the themes from the qualitative research and framed them within the outline of the emerging WHO **DHCF.** While most topics were more in-depth than the framework, the framework was used to help categorise the learning objectives that were synthesised from the desired topics.
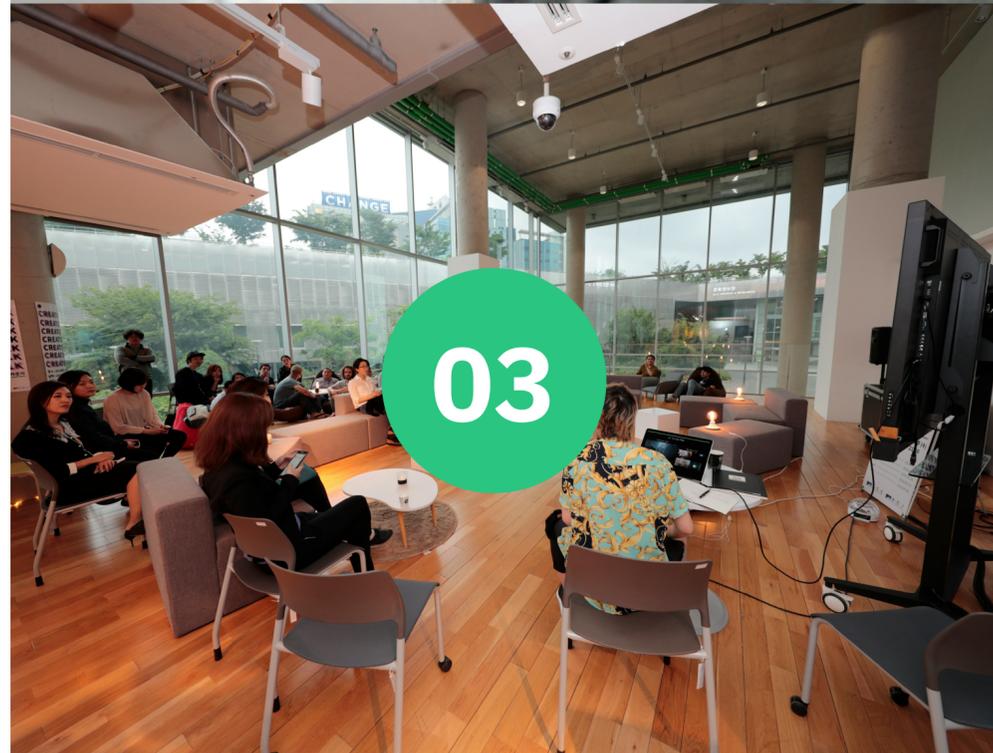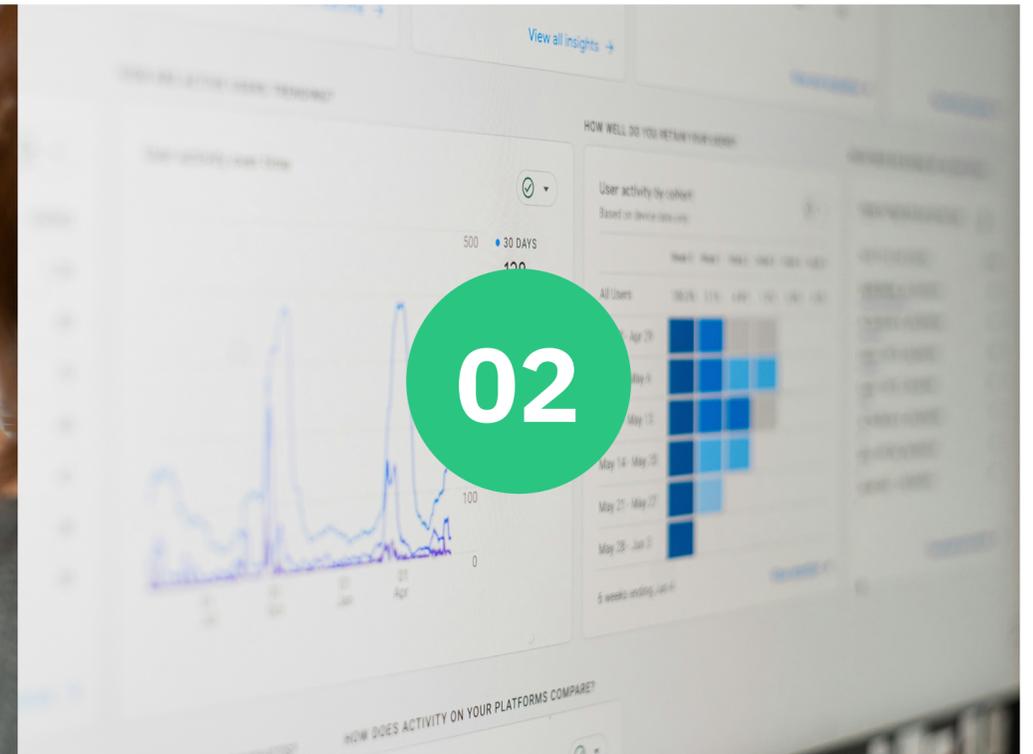
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About the Draft Digital Health Competency Framework (DHCF)

On June 14 and June 28, 2023 i-DAIR hosted the 2nd and 3rd/ review of the DHCF that The International Digital Health and AI Research Collaborative (I-DAIR) and a 170 person-strong global working group have been working on in collaboration with WHO. The final meeting was held on July 26 to close out this phase of work. It will be picked up again when WHO convenes its Digital Health Competency Framework Expert Advisory Group.

The vision of the working group was to establish a globally accepted digital health competency framework that defines standards for professional competence in digital health, leading to strengthened digital health capacity, more adaptive and resilient health systems and healthier populations. The DHCF is rather unique in trying to cover a broad audience:

1. Health policy and decision makers.
2. Planners, implementers, researchers, developers.
3. Health providers and practitioners.
4. Patients, people populations.

This is called "foundational framework". The hope is that this will help countries adapt or establish their own DHCF based on these core competencies to establish the standards for digital health capacity for their workforce.

The consortium has reviewed all eight domains: Ethics & Equity, Communications & Collaboration, Governance & Leadership, Health Systems & Digital Health Solutions, Data & Health Intelligence, Digital Health Literacy, Workforce Development & Training, and Research as depicted in a framework on the right.

Although the DHCF is a framework that is emerging, the framework was selected for use by the GIZ DIPC initiative because it is a comprehensive framework that can be used to help align capacity strengthening work across organisations and nations.
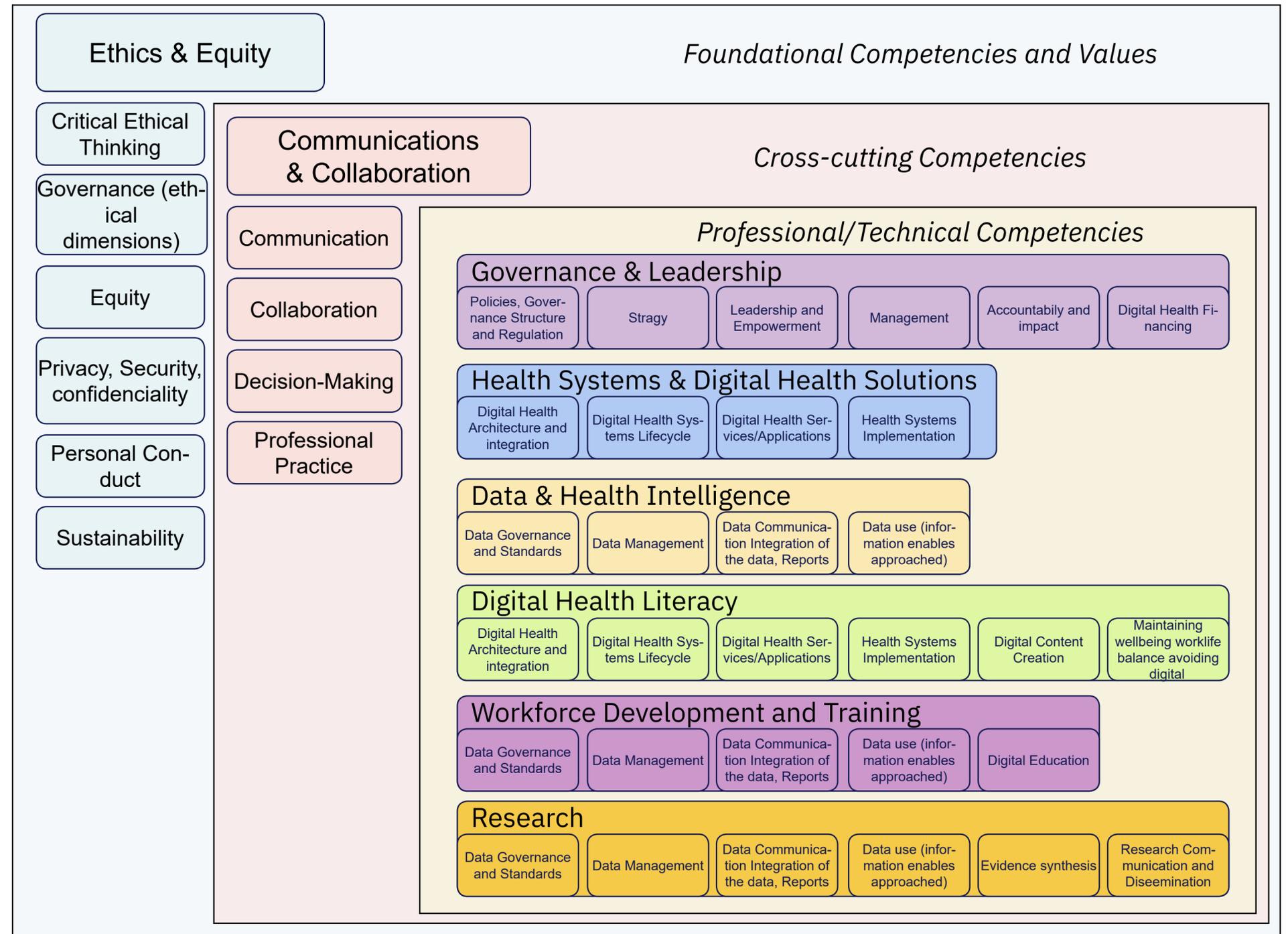

Diagram 1: Draft Health Competency Framework (DHCF)

DIPC Learning Pathways

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As expected, the work of DIPC is more granular than the DHCF, yet the initiative findings are aligned to support the direction of the draft framework. The following tables represent the professional and technical topics that arose from the research done on desired training needs for those implementing, supporting and managing health information applications. The tables below are organized using the coloring from the DHCF framework above. DIPC findings start with the Health System and Digital Health Solution and this section is more comprehensively defined as this is a key focus for DIPC.

As a part of DIPC, different types of learner personas emerged. The results below signify learning objectives that are key to specific aspects of the work. There is recognition that individuals may perform multiple

roles or different roles on different types of projects. An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.

Intended Use of the Pathways
The document is intended to be a living document that is updated and refined over time. This document is intended to be used in two different ways:

1. Use by those creating training materials to understand places where desired training is not yet available.
2. Ultimately, the vision would be that this document linked with con-

tent would enable use by learners in the digital health space to enable understanding of opportunities and needs for learning. Additional work is needed to link existing resources to this material in order to move toward a more comprehensive model that supports user needs.

To fully support use of this resource a next step is to align these learning needs with available materials. Additional usability will be gained by providing the information in a format that allows filtering and sorting by the type of work that is denoted.

DIPC Digital Health HIS eCourses Learning

Building on the Learning Pathways developed within the DIPC initiative, a set of targeted online courses has been created to translate identified training needs into concrete learning opportunities. Hosted on the atingi platform, these courses address gaps in available training resources and cover key topics that are relevant across different professional profiles in Digital Health. Designed to be practice-oriented, they enable learners to strengthen their skills and effectively support digital health systems in their roles. All courses are freely accessible and can be completed flexibly online.
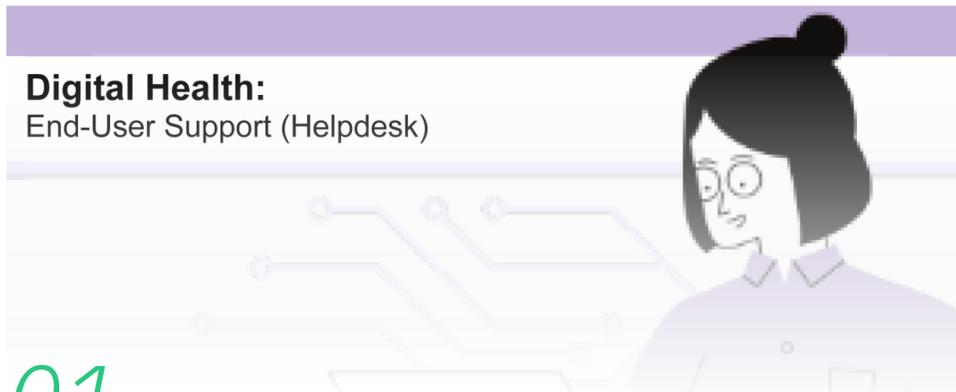
Digital Health:
End-User Support (Helpdesk)

01

Digital Health: End-User Support (Helpdesk)
Empower learners with the knowledge and skills needed to provide efficient and effective end-user support and training in a helpdesk environment. Ensuring that learners not only grasp theoretical concepts but also gain hands-on experience in applying them. Access the course clicking here.

02

Digital Health: Introduction to Systems Development
The Health Information Software Development Lifecycle (SDLC) course offers a comprehensive overview of the practices and methodologies involved in software system development. Learners will be introduced to fundamental concepts, models, and techniques used in each phase of the Software development life cycle. The objective is to empower learners to understand and effectively apply SDLC principles in software development projects. Access the course clicking here.

03

Global Goods and Community Engagement
This course is intended to provide and enhance abilities to contribute to software development projects in global digital health. It contains an overview of how global goods can contribute to digital health projects, and highlights the value proposition for working with applications that are supported by communities of practice. Students will learn how to evaluate a global good to determine fit for their context and learn how to effectively engage with global health information systems (HIS) communities. Access the course clicking here.

04

Business Analysis in Digital Health
This course provides learners with an introduction to Business Analysis in the Digital Health sector. The objective is to equip learners with foundational skills to understand the role of a Business Analyst. This involves methods and techniques employed during the analysis phase of the software development lifecycle. It also covers relevant frameworks, best practices, and their application in the development of software solutions for healthcare. Access the course clicking here.

Professional and Technical Competencies

Health Systems and Digital Health Solutions							
Digital Health Architecture and Integration		An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.					
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer /**	**System Admin**	**HIS Leaders**
1. HIS Architecture	1. Articulate the importance of using an architected and standards-based approach to HIS planning and implementation (Value proposition)	X	X	X	X	X	X
	2. Articulate the role that architecture plays in interoperability	X	X	X	X	X	X
	3. Articulate the pros and cons of different architecture approaches	X	X	X	X	X	X
	4. Identify the different layers (business, data, application, and technology) involved in an architected approach	X	X	X	X	X	X
	5. Articulate the role of standards in HIS Architecture	X	X	X	X	X	X
	6. List some of the common registries of health data	X	X	X	X	X	X
	7. Understand how an architected approach can be used to solve health challenges (how do components work together?)	X	X	X	X	X	X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
2. Data Exchange and Interoperability	1. Define the concepts of data exchange and interoperability	X	X	X	X	X	X
	2. Articulate the value proposition for the use of data exchange standards	X	X	X	X	X	X
	3. Recognize HIS standards (semantic and syntactic) and relevant standards organizations	X	X	X	X	X	X
	4. Read a diagram and understand the flow of data between systems	X	X	X	X	X	X
	5. Draw an interaction diagram		X		X	X	
	6. Identify FHIR Resources	X	X	X	X	X	

Topic	Learning Objective After the training, learners will be able to:	Support Analyst / Trainer	Business Analyst / Systems Analyst	Software Quality Analyst (testers)	Systems Engineer / Developer	System Admin	HIS Leaders
3. Working with a global good	1. Articulate the value proposition for using a global good	X	X	X	X	X	X
	2. Articulate a global goods approach to software development	X	X	X	X	X	X
	3. Demonstrate awareness of the types of global goods (sources and lists)		X		X		X
	4. Plan and conduct software selection		X	X	X		
	5. Understand impact of adapting a global good to fit your context		X	X	X	X	X
	6. Understand how to contribute to the development of a global good	X	X	X	X	X	
	7. Identify situations where global goods have been deployed have been deployed in your country or context	X	X	X	X	X	X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
4. Working with a community	1. Identify global good communities of practice relevant to country projects and goals	X	X	X	X	X	X
	2. Create a plan for engaging in a global goods community	X	X	X	X	X	
	3. Articulate considerations for building a local community	X	X	X	X	X	

Digital Health Application Development Lifecycle		An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.					
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer /**	**System Admin**	**HIS Leaders**
1. Business Analysis	1. Apply methods for identifying project stakeholders	X	X	X	X	X	
	2. Understand methods for aligning key stakeholders	X	X	X	X	X	X
	3. Apply methods for analyzing the project's context	X	X	X	X	X	
	4. Articulate key application development lifecycle points for engaging stakeholders in a development project	X	X	X	X	X	
	5. Establish a plan for engaging and aligning stakeholders	X	X	X	X		
	6. Understand and apply Business Process Notation Model diagramming methods	X	X	X	X		
	7. Apply methods for documenting testable user requirements	X	X	X	X		
	8. Evaluate requirements for testability	X	X	X	X		
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
Systems Development Lifecycle and Change Management	1. Articulate a basic systems development lifecycle	X	X	X	X	X	
	2. Describe how agile approaches align with and support the systems development lifecycle	X	X	X	X	X	
	3. Understand and apply good practices for change management	X	X	X	X	X	
	4. Identify key application development lifecycle points for stakeholder interaction and communication	X	X	X	X	X	
	5. Articulate key principles of design thinking and human-centered design and how those principles apply to the application development life cycle (includes empathy)	X	X	X	X	X	

Topic	Learning Objective After the training, learners will be able to:	Support Analyst / Trainer	Business Analyst / Systems Analyst	Software Quality Analyst (testers)	Systems Engineer / Developer	System Admin	HIS Leaders
HIT Security	1. Articulate key cyber security concerns and strategies for addressing them.	X	X	X	X	X	X
	2. Understand practices for incident management and ensuring alignment with contextual laws and regulations for managing incidents.	X	X	X	X	X	X
	3. Articulate practices and identify tools for assessing and mitigating security risks.		X	X	X	X	X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
FHIR	1. Understand an overview of FHIR and it's use in healthcare settings		X	X	X	X	
	2. Recognize key FHIR resources		X	X	X	X	
	3. Describe the importance of a FHIR IG		X	X	X	X	
	4. Create and use FHIR APIs				X		
	5. Understand and apply CQL				X		
	6. Identify and apply key FHIR tooling				X		
	7. Identify keys for troubleshooting FHIR connections				X		
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
Systems Engineering	1. Demonstrate proficiency in one or more languages (JavaScript, Python, Shell, Pearl and scripting languages, SQL Server)				X		
	2. Develop mobile apps				X		
	3. Demonstrate proficiency in use of developer tools like Postman and API tools				X		
	4. Understand strategies and methods for containerization				X	X	
	5. Have an awareness of AI tooling and block chain				X		
	6. Understand the value development practices such as the creation of micro services and web services				X		
	7. Understand the basic concepts for design and development of data warehouses				X		

Topic	Learning Objective After the training, learners will be able to:	Support Analyst / Trainer	Business Analyst / Systems Analyst	Software Quality Analyst (testers)	Systems Engineer / Developer	System Admin	HIS Leaders
IT Infrastructure and Operations	1. Apply basic practices for server hosting, configuration and management					X	
	2. Understand and apply the basis of networking					X	
	3. Understand the basics of LINUX					X	
	4. Understand and apply the basics of containerization					X	
	5. Apply the basics of system monitoring and patching					X	
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
End-user Support and Training	1. Use methods for understanding the context of the users	X	X	X	X	X	
	2. Demonstrate best practices for issue tracking	X	X	X	X	X	
	3. Identify typical tools used for tracking issue status and resolution	X	X	X	X	X	
	4. Apply key troubleshooting techniques	X	X	X	X	X	
	5. Identify ways to enhance or create help desk documentation	X	X				
	6. Identify key points in the support process for user engagement	X	X				
	7. Apply strategies for framing end-user training to help users accomplish their goals	X	X				
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
Quality Assurance and Testing	1. Articulate the goals of software quality assurance processes	X	X	X	X	X	X
	2. Identify and follow good quality assurance practices	X	X	X	X	X	
	3. Articulate and define different types of application testing relevant to the digital health space	X	X	X	X	X	
	4. Articulating the importance of validating the implementation of a software application	X	X	X	X	X	X
	5. Understand manual vs automated testing and the pros and cons of each method		X	X	X	X	

6. Articulate key tools and basic practices for automated and manual application testing		X	X	X	X	
7. Understand and apply software testing methodologies		X	X	X	X	
8. Partner with key users to create plans for acceptance testing		X	X			
9. Understand the basics of usability testing		X	X	X	X	

Digital Health Services and Applications		An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.					
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer /**	**System Admin**	**HIS Leaders**
1. Global Goods	1. Articulate the different classifications and understand the landscape of global goods	X	X	X	X	X	X
	2. Describe the value proposition for using a global good	X	X	X	X	X	X
	3. Understand which global goods are implemented in your context and identify key documentation sources for those applications	X	X	X	X	X	X
	4. Awareness of how to configure the application and document the configuration		X	X	X	X	
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
2. Understanding the Clinical Context	1. Articulate basic LMIC data collection practices	X	X	X	X	X	X
	2. Articulate a basic understanding of the regulatory environment and local legislation	X	X	X	X	X	X
	3. Have a basic understanding of the Health sector and its structures	X	X	X	X	X	X

	4. Understand the healthcare context and best practices
	    a. Clinical care, logic, imaging, and records
	    b. Surveillance / population health / public health / case reporting and health emergencies
	    c. Community health
	    d. Laboratory workflows
	    e. Understand the basic flows of health care financing and insurance
	    f. Understand the basics of logistics and inventory control, fraud control and cold chain management
		X	X	X	X	X	X

	5. Recognize global goods that support the health services use cases	X	X	X	X	X	X

Data and Health Intelligence		An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.					
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer /**	**System Admin**	**HIS Leaders**
1. Analytics, data science and biostatistics	1. Understand data analytics and statistics practices and processes						
	2. Understand basic data transformation processes						
	3. Awareness of data analytics tools (Power BI, My SQL Workbench, Tableau, advanced excel)						
	4. Understand practices for working with large data sets						
	5. Define data mining						
	6. Plan and create a dashboard						
	7. Understand and appropriately apply the different types of visuals such as graphs and heat maps						
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
2. Data Governance and Standards / Data Management	1. Understand and apply practices for data modeling and definition						
	2. Articulate practices eliciting and aligning stakeholders on data needs and intended use		X		X		
	3. Articulate the key aspects of database design						
	4. Apply best practices of data management						
	5. Understand techniques for data warehousing				X		
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
3. Artificial Intelligence	1. Articulate the value and risks of AI for use in health data	X	X	X	X	X	X
	2. Identify AI tools currently being used in HIS	X	X	X	X	X	X
	3. Identify current application of AI in HIS	X	X	X	X	X	X

Topic	Learning Objective After the training, learners will be able to:	Support Analyst / Trainer	Business Analyst / Systems Analyst	Software Quality Analyst (testers)	Systems Engineer / Developer	System Admin	HIS Leaders
4. Data Use	1. Interpret data to make informed decisions						X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
5. Data Management	1. Understand data collection practices	X	X	X	X	X	X
	2. Understand data quality and review practices	X	X	X	X	X	X

Digital Health Literacy		An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.					
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer /**	**System Admin**	**HIS Leaders**
1.Digital Technical Proficiency	1. Understand the basics of the internet and IP addresses	X	X	X	X	X	X
	2. Understand and apply the MS Office basics	X	X	X	X	X	X
	3. Understand and apply the basics of social media	X	X	X	X	X	X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
2.Privacy Safety and Security	1. Understand the legal context of your environment	X	X	X	X	X	X
	2. Establish and manage appropriate passwords	X	X	X	X	X	X
	3. Follow practices that promote confidentiality	X	X	X	X	X	X

Governance and Leadership		An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.					
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer /**	**System Admin**	**HIS Leaders**
1. Policies, Governance Structure and Regulation	1. Understand practices for digital health policy creation						X
	2. Establish a plan for program and project governance						X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
2. Strategy	1. Establish a digital health strategic plan						X
	2. Create a plan for cultivating strategic champions for the program and key projects						X
	3. Establish a strategy for data use		X				X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
3. Management	1. Establish tools and implement practices for alignment and management of stakeholders						X
	2. Establish processes for risk assessment and management						X
	3. Establish and implement practices for operations and management of systems						X
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
4. Digital Health Financing	1. Have tools and processes for establishing and managing resources and budgets						X

Cross-cutting Competencies

Communication and Collaboration		An "X" is denoted in specific columns to indicate learning objectives that directly support the type of work of the noted individuals. Any of the other objectives may be deemed important to an individual learner.					
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer /**	**System Admin**	**HIS Leaders**
Communication	1. Apply strategies for active listening						
	2. Apply strategies and tools for presenting and facilitating						
	3. Demonstrate strategies for collaborating with multidisciplinary teams						
Topic	**Learning Objective** After the training, learners will be able to:	**Support Analyst / Trainer**	**Business Analyst / Systems Analyst**	**Software Quality Analyst (testers)**	**Systems Engineer / Developer**	**System Admin**	**HIS Leaders**
Professional Practice	1. Apply strategies for leading and managing people						
	2. Establish plans for mentoring and coaching						
	3. Engage in critical thinking						