



Empowering Women through Digital Markets

Pedagogical Strategy

Prepared by
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www.ayitic.net

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Executive Summary

Haiti's susceptibility to natural disasters and current dependence on natural resources has created levels of fragility within the island-state's economy that have proven difficult to overcome. With a 41% unemployment rate and more than 59% of Haitians living below the national poverty line, the situation in Haiti is described as dire. Women, however, are particularly disadvantaged as they suffer from higher levels of unemployment, lower average educational levels, poorer overall living conditions and greater vulnerability to exploitation.

In accordance with Okun's Law, the solution for Haiti's economic growth, lies in the meaningful employment of its people; and the key to reversing the growing unemployment rate lies in education and the creation of a qualified pool of human resources. Now in its fourth iteration, the International Development Research Centre (IDRC) and the Latin America and Caribbean Network (LACNIC)'s Ayitic program remains committed to its stance that the focus on employment defined by a tangible product or bound by geography should be reconsidered, and instead, active efforts to develop employment based on intangible knowledge products and supported by technology should be embraced. Tasked with addressing: the creation of independent female learners equipped to manage and actively engaged in work within the ever-changing technoscape, Ayitic has, at its core two new objectives:

- Primarily the project will encourage women's involvement in technology; and
- Secondly, the project will promote the development of employment opportunities in digital markets

It is within this context of high unemployment and gender inequality that the International Development Research Centre (IDRC) and the Latin America and Caribbean Network (LACNIC), have engaged consultants to develop a program to promote remote employment and the development of digital skills and data-related service market. In response to these objectives the team at SlashRoots engaged in a multi-methods research activity. Desk research was used to form the foundation upon which key informant interviews were executed. Interviews were conducted with persons of authority within institutions demonstrating the execution of similar programs were chosen for investigation.

Resulting from these exercises, the proposed pedagogical framework covers considerations across three clearly delineated touchpoints: **(a) Program Responsibility** - covering active strategies to identify, attract, capture and retain students with the greatest potential for success; structures for the learning experience to be cohesive and extensive, from initial engagement through continued learning post placement; and the focus on generating content and learning objectives that are competency and skill-based rather than solely knowledge-oriented; **(b) Instructor Responsibility** - prescribing flexibility and empathy; pragmatism and practicality and; experience and exposure as key characteristics to ensure success; and **(c) Learner Responsibility** - as emerging from facilitating autonomous learning; topic-based exploration; peer collaboration; and continued learning. These will facilitate the development of self-evolving learners who are able to adapt and capture current and future jobs.

More specifically, the insights gained and recommendations made are articulated as:

1. Student acquisition and engagement
 - a. Programme branding
 - b. Student initiation
 - c. Attrition vs continued independent learning
2. The skills building approach
 - a. Competency based curriculum design
 - b. Capacity building
3. Language and comprehension
 - a. Context based vocabularies and literacy
 - b. English as lingua franca
4. Technology usage and online learning
 - a. Student/Instructor interaction
 - b. Adult learners in an online space
 - c. Student collaboration and reflection

Project Overview

- Background
- Research Scope

Project Background

As a small island developing state with a history of social upheaval and other forms of instability, Haiti remains vulnerable to shocks internally and externally. Haiti's vulnerability has crippled the state's ability to actively grow and provide sustainable macro and micro environments for its people. Haitian culture is often described as eclectic and remains in a tumultuous struggle based on socioeconomic class amongst other things; the state's economic growth has slowed to 1%; and the political environment was described as paralyzed following the departure of Michel Martelly in 2016, but has since begun to stabilize with the swearing in of their new President in February, followed by the refreshing of the Prime Minister and the Cabinet in March of 2017.

The island-state's susceptibility to natural disasters and current dependence on natural resources (nearly 70% of the country's population depends on agriculture and is engaged in small scale farming - Compete Caribbean) for GDP is only one explanation of why Haiti, considered the least developed country in Latin America and the Caribbean, is still recovering today from the 2010 earthquake. According to 2014 World Bank estimates, there are 4.59 million Haitians in the labor force; beyond the 41% unemployment rate, underemployment is widespread, there is a marked shortage of skilled labor ("CIA World Factbook" 2017) and more than two thirds of the population do not have a formal job. Overall social and economic conditions are dire for both men and women, with more than 59% of Haitians living below the national poverty line ("The World Bank In Haiti" 2017). Women are particularly disadvantaged as they suffer from higher levels of unemployment, lower educational levels, poorer overall living conditions and greater vulnerability to exploitation (Caribbean Development Bank).

In accordance with Okun's Law, the solution for Haiti's economic growth, lies in the meaningful employment of its people; and the key to reversing the growing unemployment rate lies in education and the creation of a qualified pool of human resources. Considering the state's susceptibility to natural disasters it is reasonable to suggest that the focus on employment defined by a tangible product or bound by geography should be reconsidered, and instead, active effort to develop employment based on intangible knowledge products and supported by technology should be embraced. It is within this context of high unemployment and gender inequality that the International Development Research Centre (IDRC) and the Latin America and Caribbean Network (LACNIC), have engaged consultants to develop a program to promote remote employment and the development of digital skills and data-related service market. By doing so, the project actively moves Haiti towards resilience and ultimately positions the state for growth and development.

To ensure the effectiveness of this direction, a collection of rules and guidelines regarding: (a) the content that is developed; (b) the mechanisms used to develop that content and; (c) the techniques for delivering the content - is required. As such, the Pedagogical Strategy Framework designed by SlashRoots will detail the pedagogical principles; curriculum design and; instructional design required to engage the targeted cohort of women and maximize their input into the Haitian economy and society.

Research Scope

SlashRoots set out to explore best practices in teaching and learning, and ultimately define a set of recommendations and frameworks for creating the optimal learning space for participants within the LACNIC's Ayitic programme. By focusing on the needs of the learner SlashRoots was able to focus the research effort around three focal areas:

1. Appropriate strategies for teaching Digital Skills and building Digital Literacy and Data Literacy
2. Lessons from models on both Competency Based Training (CBT) as well as Technical and Vocational Education and Training (TVET)
3. Optimal learning modalities for purposed employment

Appropriate strategies for teaching digital literacy and data-literacy: From defining digital literacy to understanding the need for language literacy in a skills-based program, the team's research focused on identifying, understanding and most importantly culturally contextualizing the pedagogical principles at the very foundation of learning strategies for digital and data literacy. This crucial step allowed the team to determine the most effective models of training and key touch points for the structure of the programme to ensure its success. Though focused on the theory of learning and instruction, this research area also informed the final recommendations regarding the profile of the learner and therefore the most effective strategies in delivering content.

Emerging from this focus area the following learning milestones were generated:

- Understand and articulate digital literacy
- Understand and articulate data literacy
- Understand the context and importance of language and literacy to effective instruction and learning
- Synthesize the Haitian context and considerations therein with respect to contemporary strategies for instruction, especially towards digital and data literacy

As noted in the Methodology, these milestones were achieved through desk research and key informant interviews. The team acknowledges the implicit risks associated with these strategies (chiefly data validity and reliability) and mitigated the same via rigorous corroboration and triangulation.

Lessons from models on both Competency Based Training (CBT) as well as Technical and Vocational Education and Training (TVET): Training towards employment within a specific role and sector was shown as best achieved through CBT and TVET models. This aspect of the research focused on examining key areas within existing institutions that have adopted these models. These investigations were then compiled into case-studies, from which key learning could be garnered and disseminated easily. The approach also allows for the longitudinal study of the entities, encouraging flexibility and agility within the program design.

From this line of questioning, the following learning milestones were agreed upon:

- Document and illustrate CBT
- Document and illustrate TVET
- Articulate technologies used to support CBT and TVET models
- Articulate considerations surrounding language, literacy and content comprehension
- Identify and articulate key considerations in deploying CBT-based programs - especially within varying cultural and economic spaces
- Identify and articulate key considerations in deploying TVET-based programs - especially within varying cultural and economic spaces
- Document strategies employed for student acquisition and engagement
- Synthesize findings to create a framework for instructional design within the Ayitic programme

By employing the use of expert case studies built on multiple instances of key informant interviews, site visits and user experience maps - the team was able to gather rich primary data and mitigate risks of data accuracy, relevance and obsolescence.

Strategies for effective online course delivery: The final aspect of the research exercise was focused on how best to deploy an effective course using an online learning modality within the unique context of this project. Considered were issues of low connectivity, varying levels of digital literacy starting capacities, access and exposure to technology and the digital nature of proposed employment opportunities.

This guided the research towards achieving the below milestones:

- Identify and detail instructional design models
- Articulate key considerations for technology reliant learning spaces
- Illustrate learner-centered approaches and models

This final aspect of the research served to identify and validate the key components instructional design framework recommended.

Methodology

- Multimethods Design
- Desk Research
- In-Depth Interviews
- Case-study Framework

Research Design

A Multi-method Approach

The task of designing a pedagogical framework requires a clear understanding of the project scope, industry area and the economic, social and political contexts of the geographical space within which the framework will be deployed. Within this purview it was decided that a multi-methods research design be adopted.

An extensive desk research phase was used uncover the theoretical underpinnings of the program while case studies (enabled by in-depth interviews) of existing institutions provided real world data and guided insight into hits and misses around the execution of competency based, technology-driven programs.

Desk Research

Desk research comprised the review of internet articles, academic literature, periodicals and documentation for similar projects. The process followed a rigorous march through the definition of terms; to the historical context of this and similar interventions; to the theory of instruction and various learning theories; to the documented approaches to online learning, the adult learner and virtual learning spaces.

The Desk Research phase of the study provided an understanding of not only the mechanisms and points of view in play, but also the contexts within which these were most successful - creating lasting impact and irreversible change.

Case Study Framework

To better understand the data, and to allow for comparison and insight generation - it was decided to thoroughly examine real-world applications of the knowledge gained from the desk research. The case study approach focused on exploring four key thematic areas of inquiry: (i) the approach to building skills; (ii) the institution's use of technology and how the program leveraged online learning; (iii) the impact of language, literacy and content comprehension on the learning experience, and the methods of mitigation used by the programs; and finally (iv) techniques and mechanisms for and around student acquisition and engagement across the full term of each program.

In-Depth Interviews

To garner the data necessary to fill out the case study framework, regional institutions with digital skills building programs that catered to a similar demographic as the one proposed were identified. The sample group was further thinned by selecting programs that utilized online platforms in the delivery of their programs, either supporting face-to-face delivery or courses

offered entirely online. Once the sample was finalized, key informants within the institutions were identified and interview protocols designed to engage these individuals. Interviews were chiefly conducted using digital technologies, and during each interview the interviewer was supported by an associate who took field notes for later study.

Together, the recorded interviews and field notes provided the material to fill out the case study framework for each institution.

Research Context

- Language and Literacy
- Digital Literacy
- Skills Training
- Online Learning

Language and Literacy

The Mother Tongue-Based Multilingual Education approach ("Mother Tongue-Based Multilingual Education" 2013), states that "starting in the language they know best allows children to build a strong foundation, which then enables them to make an effective transition into other national or international languages in due course." According to UNESCO (Hanemann and Scarpino 2016) this holds true for adult learners as the use of the mother tongue in teaching has powerful and far reaching cognitive and pedagogical advantages; - "it makes the home culture of learners visible, allows them to talk about their prior knowledge and experience and link them to new information, brings the home and the school closer together, opens up communication and participation in the classroom, and helps learners increase self-esteem and a stronger sense of identity."

The Bernard Reform of 1982, sought to address the discriminatory use of French in the classroom through the introduction of Haitian Creole as the medium of instruction (Prou 2009, 29). The pilot programme involved 1,000 students learning solely in Creole for the first four years and then slowly transition to French teaching. Although the programme had some success it was met by opposition from the Haitian elite, who feared greater access to education would infringe on the privileges speaking French had afforded them (Salien and Marlow-Ferguson 2002, 552). Conflated by the lengthy implementation delays of the new curriculum and appropriate resources the programme would ultimately fail (Luzincourt and Gulbrandson 2010, 5). As all Haitians speak Creole and only the privileged understand French, the removal of Creole as the language of instruction only perpetuates neo-colonial mentality and exaggerates the socioeconomic disparity of access to education and economic mobility (Spears 2010, 1). Despite being recognized as an official language in 1987, Creole is still excluded from the media, the government, official documents and the law, and is still regarded as "mere local vernacular" and "a dialect" (Perry, 2000). While some critics may argue that teaching in Creole will isolate the population, Hebblethwaite counters the position by using the examples of Denmark, Iceland and Estonia where the native tongues dominate their respective classrooms and then makes the point that the exclusion of Creole in favour of French leaves Haitians "isolated inside their own country" (Hebblethwaite 2012, 272).

The reality in Haiti is that students are expected to learn and understand new course material in what is to them, essentially a foreign language. Lessons from the Juba Language-in-Education Conference (McIlwraith 2013) illustrate that the main challenge faced by linguistic minorities is the exclusion of their language in formal settings such as education. Language considerations are important in curriculum design, as it involves the verbal interactions between instructor and students and therefore determines learning outcomes and predicates the effectiveness of instruction. The argument, is that students are better equipped to learn, understand and master complex concepts when they are taught in the language they know best first. Other languages should then be either taught as a second language and then gradually introduced within the context of the subject matter.

Digital Literacy

While the literature on digital literacy lacks a universal definition of the concept, the general consensus among many scholars is that digital literacy mandates the ability to critically think, solve problems and work collaboratively while interacting with technology in a manner that is adaptable to a rapidly evolving digital economy.

The OECD in 2016 reported that digital skills comprises of both technical and professional skills within ICT (Rimini and Spiezia 2016). The market demand for ICT skills fall under specialist (for example programming), generic (the skills for using technology professionally) and complementary soft skills (these include communication skills, planning abilities and problem solving) and are predicated by market demands and technological trends. It is therefore imperative that a labourer is digitally literate as Ng (2012) posits that it signifies the ability to adapt to emerging technologies and changes in digital trends.

Marc Prensky (2012), describes 'Digital Wisdom' as going beyond simply knowing how "to use a particular digital technology but rather as the capacity to critically evaluate technology and the context surrounding its appropriate use". Prensky proposes that it is this deeper critical thinking around the use of technology that will become the new distinction in talking about digital literacy and education.

Coined by the National Telecommunications and Information Administration in 1995, the digital divide describes the disparity in digital and technical skills as well as access to technological resources and tools (Hilbert 2011, 4). Curtis Kularski illustrates the issue surrounding the digital divide as a paradox: "Without access to technology, it is difficult to develop technical skills and it is redundant to have access to technology without first having the skill to utilize it." (Antonio and Tuffley 2014). It is important to note that access has evolved to not only simply identify those who could connect to the internet but to include those who have access and are able to use it. Access to technology does not translate into digital literacy.

The conceptualization of a digital literacy framework across various academic works reveals key competencies associated with digital literacy; information and branching literacy, communication and collaboration, digital content creation and problem solving and critical thinking skills. In developing these competencies users are then able to act autonomously, construct knowledge individually or as a collective and assign appropriate communication methods to specific audiences. The European Commission provides a useful framework, DigComp 2.1 (Carretero, Vuorikari and Punie 2017). for assessing competence by assigning eight proficiency levels for each competence. The framework associates complexity of tasks, autonomy and cognitive domain to each level and provides a rubric that can inform teaching and training materials. At level one, participants can complete simple tasks with guidance and are developing memory skills while on the other end of the spectrum participants are able to solve complex problems, create content, guide and collaborate with others. With each successive level, participants are

able to complete more complex tasks with a higher degree of autonomy. An important insight from the wealth of digital literacy frameworks is the need for students to constantly self reflect which translates into self development . The individual is adept to adapt. Consequently, if digital literacy is defined as a composite of the required digital skills then it is to be expected that an individual can readily identify learning gaps, has the capacity to adapt to the constant and rapid changes in the digital economy and is more responsive to emerging technology.

Skills Training

UNESCO posits that technical and vocational education training (TVET) has the potential to develop a skilled workforce and alleviate poverty as the focus on the development of competency-based skills gives an individual greater access to more opportunities for employment. TVET is “used as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupants in various sectors of economic social life.” (Wahba 2013)

The Bernard Reform was an effort to modernize education in Haiti and introduce technical and vocational training in schools. Haitian children are exposed to vocational training in the second cycle of primary education and at the end of this stage the student may chose a general, academic or vocational track. Vocational training in the third cycle leads to a technical baccalaureate at the secondary level. It is important to note that in Haiti "there is no formal framework for training teachers and supervisors in this sector. They are chosen on the basis of their professional experience" (UNESCO 2000). The National Institute of Vocational Training (INFP) was created as the governing body assigned to Vocational Training in Haiti, responsible for designing, developing and governing policies and projects in vocational training and is responsible for ensuring that training schools such as CETEMOH adhere to their education standards. Similarly, Trinidad and Tobago have National Training Agency and Jamaica has The Human Employment and Resource Training Trust, National Training Agency (HEART) as regulatory bodies for vocational training. These agencies provide accredited qualifications, most notably the Caribbean Vocational Qualification (CVQ). As part of the CARICOM's commitment to strengthening the free movement of skilled labour, the CVQ was developed as to ensure “a common system and understanding of quality assurance issues” at “all levels of education and training, including TVET” (Gregory 2014). This certification is awarded by the Caribbean Examination Council (CXC). As the Council's criteria for assessment looks at the proficiency and competence of students in the specific field, affiliate programmes are expected to use Competency Based Education Training and Assessment methodologies (CBETA)

Under the VET umbrella of skills training, CBETA or Competency Based Training and Assessment (CBTA) is described as "training which is performance - and standards-based and related to realistic workplace practices...It is focused on what learners can do rather than on the courses they have done" (Deißinger, Thomas, and Hellwig 2005, 6). By utilizing training needs assessment and/or task analysis as a specific measure of competence CBET teaches and assesses the knowledge and skills required to complete a specific job function. This design of

CBET programs "requires experts in relevant occupational fields who are able to depict essential work activities, tasks and function with respect to a specific competence profile." The methods applied can either be DACUM or functional analysis" (Deißinger, Thomas, and Hellwig 2005, 9).

Online Learning

Using Internet-based technologies for education and the implications for the same has been the topic of much research by educators from every region of the world within the last decade. The ability to leverage multimedia assets in the delivery of content has allowed engagement in the classroom to be redefined, and the advent of the Internet-based classroom removed the barriers that physical space and time placed on the learning environment. In general, these points form the core of every pitch for the delivery of a course in an online environment.

By engaging the option of online learning, facilitators open up the ability to deliver content in a "live", shared-time setting (Synchronous) or in a delayed, more self-paced setting (Asynchronous). Asynchronous delivery allows for the learner to better personalize and customize the learning experience, often contributing to a more satisfying course experience. It is this ability to customize the learning experience that appeals to some learners, and that is argued by proponents of online learning as facilitating the exploration and passion necessary for deep learning.

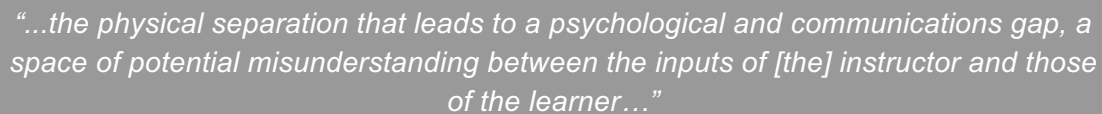
Despite the boons of online learning, Van Buren and Sloman (2003) assert that up to 62% of all initiatives surrounding learning technology fail to meet the expectations of stakeholders. The most accepted reason for this is articulated as a part of Driscoll and Carliner's 2005 arguments - designing e-learning is a much different activity from designing learning in the classroom. The two must be approached differently and each given careful consideration, especially so far as learner-centered instruction goes. Within this purview and the reality of Haiti's social, political and economic context, strategies to mitigate a series of considerations around the deployment of an online learning initiative must be put in place. The most glaring considerations are:

Availability of the necessary hardware and software: That is, is the computer hardware and software necessary to facilitate an online learning environment available to both the teacher and the student? This consideration is necessary to ascertain whether or not an online learning environment is even possible. Without the availability of the hardware or software to both the student as well as the teacher, an online learning environment is impossible.

Access and ownership: If the necessary hardware and software is available, how are these accessed and used? What is the environment of use? This consideration determines the feasibility of the online learning environment. In the case where the learner is only able to access the hardware and software in a shared environment with his other learners, then the online learning environment is less than feasible, as it would only serve to create the classroom environment in a location other than the institution of training.

Internet infrastructure: Finally, beyond the software and hardware, is the Internet infrastructure able to reliably sustain the online learning environment - or are the recurring problems with accessing and/or uploading multimedia because of restrictive bandwidths; or is the teacher unable to host a live class using video conferencing; or is the student unable to maintain a reliable connection to the learning space? This consideration speaks to the quality of the learning experience, a key element in any learning environment and a proven direct predictor of learning outcomes (Neumann and Neumann 1993) (Goh et al 2017).

Even where these tangible hurdles are overcome and the ability to communicate and transfer knowledge online is realized, there are further considerations for the practice of teaching as well as the practice of learning. Primary among these is the space between stakeholders that brilliantly articulated by Moore's theory of Transactional Distance:



"...the physical separation that leads to a psychological and communications gap, a space of potential misunderstanding between the inputs of [the] instructor and those of the learner..."

It is this Transactional Distance that is the underlying thought of Huang's (2002) barriers to constructivist online learning. (i) the isolation from classmates - speaking to the idea that learning is not just from teacher to student, but student to student as well, and how the online classroom must seek to overcome the loss of this facet over the transactional distance; (ii) the instructor's understanding of learner's individual characteristics and situations; (iii) the extensive time required to evaluate online learning activities; (v) the expectations of adult learners; and (vi) the creation and evaluation of collaborative learning opportunities for adult learners. These are all considerations that must be accounted for in the design of any online learning environment.

Research Results:

Crafting a Pedagogical Strategy

- Crafting a Pedagogical Strategy
- Curriculum Design
- Instructional Design

Crafting a Pedagogical Strategy

In order to gain a more nuanced understanding of the practical and theoretical aspects of teaching and learning the SlashRoots team first undertook an extensive desktop review of research reports, white papers and scholarly articles. This research was centered around key lines of inquiry which include; Online Learning and Digital Pedagogy, Skills Training and Assessment, as well as Language and Literacy. The first goal of this literature review was to define in a concise and actionable way the various aspects of pedagogical strategy.

Pedagogical Strategy can be seen as having three different levels:

- Firstly at a wholistic or high level, where Pedagogical Strategies are informed by the principles of teaching and learning as well as theoretical concepts such as Behaviourism, Cognitivism and Constructivism. As well as specific teaching and learning paradigms such as vocational training.
- Secondly at a programmatic or curriculum level, the use of general instructional strategy covering the various aspects of the sequencing and organising of content, specifying learning activities and deciding how to deliver this course content and associated activities.
- Finally, Pedagogical Strategy can be looked at through the lens of how instructional design impacts the delivery of an individual lesson or module. This focuses on which specific instructional methods are best suited for the course content, modality and learner.

Curriculum Design

During the inception phase of project Technical and Vocational Education and Training (TVET) and Competency Based Assessment were identified as key components of the “Skills Training and Assessment” line of inquiry. Key Informant interviews were held with TVET lecturers, scholars and administrators to gain a deeper understanding of TVET specific curriculum design, course delivery and competency assessment. Through these interviews and a TVET focused case study, the DACUM/SCID curriculum development framework was chosen as the process by which industry needs and employment opportunities are translated into course design and delivery.

DACUM Framework

Developed by Ohio State University, the DACUM (Developing a Curriculum) and SCID (Systematic Curriculum and Instructional Development) frameworks are frequently used in the development of Technical and Vocational Education (TVET) programmes and curricula. They are used to develop skills training focused curricula while incorporating insights and needs of relevant industry stakeholders.

The DACUM framework, which is a subset of SCID, is an efficient method for the analysis of jobs and occupations. Typically beginning with an in-person workshop or focus group with

incumbent skilled workers, the DACUM process captures the major duties and related tasks associated with a given job or occupation. Drilling down even further, the framework helps to identify the necessary knowledge, skills and behaviour needed in the execution of a given task. This Job/Duty/Task/Skill Structure was used by 3x3 Design in the execution and modeling of their demand-side research. Ultimately this will allow for the creation of a competency profile which then guides the curriculum development process (Norton 2009).

Activities & Process

Demand-Side Research: Beginning with a demand-side analysis or needs assessment the DACUM/SCID process identifies occupational areas which possess an attractive amount of employment opportunities so as to justify the development and offering of an instructional program. The 3x3 Design led demand-side research analysis takes into account multiple factors such as contract structure, employment volatility as well as skills transferability.

Job/Occupational Analysis: The next stage within the overall process is the Job/Occupational analysis which typically takes the form of a DACUM workshop or focus group. Centred around a group of industry stakeholders and skilled workers identified through the needs assessment process. While a formal workshop was not held, through interviews with industry respondents the 3x3 Design team was able to deconstruct the identified employment opportunities into areas of responsibility or duties, and then breaking down individual duties even further into areas of competency or tasks. Where possible, each task was then analysed to and supportive enablers, such as skills, knowledge, behaviours and tools were identified. The information provided through this breakdown should serve as the foundation for the creation of course curricula and material.

Task Verification: The third stage of the DACUM/SCID process is aimed at verifying the tasks identified during the Job/Occupational Analysis. Typically taking the form of a web or paper based survey, the process requires the input of expert works as well as their immediate supervisors. This task verification survey asks a series of questions such as:

- Is this task actually a part of the associated occupation?
- How important is this task?
- How frequently is this task done?
- How difficult is this task?

Data from this process is analysed and used to guide the process of selecting which tasks should become learning objectives within the curriculum. The Task Verification process also provides the opportunity to develop more buy in within industry, reaching a larger group of stakeholders and expert works than initially involved with the DACUM workshop.

Task Selection: Utilizing the data gathered during Task Verification, the Task Selection process identifies the specific tasks that will become learning objectives in the course curricula. Without a compelling reason, tasks of low importance, low difficulty or task performed by only a few workers would not typically be considered for inclusion in the curriculum. Decisions surrounding task selection should be done by a panel of various stakeholders, including industry representatives, educators, and the programme coordinator.

Task Analysis: More information is needed on the selected tasks such as the steps required to execute the tasks, the tools and equipment needed, the knowledge and skills required, relevant behaviour and attitudes, as well as competency assessment and certification criteria. Ideally all tasks should be analysed, however tasks of higher importance identified during the verification process take priority.

Competency/Skills Profile: An instructional Competency/Skills Profile is created using the results of the Task Analysis, where tasks which require similar knowledge, skills and behaviours are identified. Tasks within a specific job/occupation often require the same foundation of knowledge, though the application of that knowledge for each task may be different. These skills are grouped into clusters, which during the curriculum development process may become modules\units, this clustering will reduce the repetition of foundational material. It is important to note that some tasks are so complex that they may require a dedicated competency profile.

Level 3	Specialization	Specialization	Specialization	Specialization
Level 2	Internet Practitioner		Data Practitioner	
Level 1	Digital Learner			

Level 1	Digital Learner				
	Info/Data Literacy	Comm. & Collab	Content Creation	Safety	Problem Solving
	Learning Objective	Learning Objective	Learning Objective	Learning Objective	Learning Objective
	Learning Objective		Learning Objective	Learning Objective	
	Learning Objective	Learning Objective		Learning Objective	

Curriculum Material Development: Using the outputs of the task analysis process Curriculum Materials such as learning guides and aids, handbooks and handouts, as well as lesson plans can be developed. Curriculum Material should be developed within the context of the instructional programme being offered. This includes the modality of the course, the specific technical attributes of the subject matter, as well as the learning and competency profile of the student.

Learning Objective/Task			
Competency Domain	Info/Data Literacy	Safety	
Objective/Task Statement	Verb	Object	Qualifier
Performance Criteria	Form	Amount	Quantity
Knowledge and Skills	Knowledge	Skill	Behaviour
Range Statement	Step	Step	Step
Assessment Guide	Evidence	Evidence	Evidence

The structure of the learning guide centers around specific learning/competency objectives which are supported by two or more enabling objectives. These enabling objectives are supported by a learning experience which consists of specifically designed activities, support material and self-assessment instruments. Upon completion of practice assignments and other activities within the learning experiences the student must demonstrate their competency within the associated skill area. Included in the learning guide are performance evaluation criteria as well as a performance test used to assess the learner's level of competency. This ongoing assessment structure will allow the instructor to better guide the student through any challenges they might have in developing competency through additional practice or other activities.

Begin Training: With competency based learning and assessment materials designed the course can then be delivered to the appropriately selected learners. The role of instructor within the DACUM/SCID framework is defined as having 3 main components, the advising of students, assisting students and assessing student progress. The advantage of having course material designed as part of the overall curriculum development process as opposed to lecturer led course material development is that the teacher is free to take on the overall role of a learning facilitator. The use of learning guides allow for the student to learn at their own pace, practice skills and demonstrate their competency. This in turn allows the instructor to give more individual attention to students and small groups.

Competency and Program Assessment: The last component of the DACUM/SCID framework is focused on the assessment of both learner competency as well as the achievement of overall programmatic objectives. While the performance test included in the learning guide assess the specific skill covered in that learning guide, an overall competency assessment explores the learner's skill level across multiple competencies. This assessment plays a vital role in not only course grading but also certification.

In addition to student competency assessment, program evaluation data should also be collected throughout the delivery of the program. This data will provide program coordinators the ability to monitor the effectiveness of course delivery and to make in-course modifications as needed. Once a cohort cycle has completed an overall quality assurance evaluation should be undertaken so as to identify entry and exit competency levels, dropout rates, learner satisfaction and other KPI's that can inform program improvements.

Instructional Design

"Instructional Models are guidelines or sets of strategies on which the approaches to teaching by instructors are based" (Stephanidis and Antona 2007). These guidelines fit within a larger pedagogical strategy or approach, and are based on learning theories. Instructional design models can be used at varying levels of granularity, at a curriculum level they can guide the creation of workshops, courses or training sessions. They can also guide how individual lessons or structures and sequenced, specifying the types of activities instructors and learners are involved in.

Instructional Design Framework & Considerations

While the DACUM/SCID curriculum design model facilitates identifying what skills, knowledge, tools and attitudes should be contained within the course content, a better understanding of how to deliver that content is needed. Through key informant interviews and cases studies SlashRoots explored a range of instructional models currently being used by specific skills training institutions/programs. These cases studies focused on institutions and training programs that offered skills/competency based courses in ICT, Application Development and Data Literacy. Additionally, preference was given to training programs which targeted learner

demographics similar to that of this project as well as those who used an online or blended modality of delivery.

While the institutions included in the case studies utilize various approaches in the development of their instructional strategy and material, two models were chosen for further exploration:

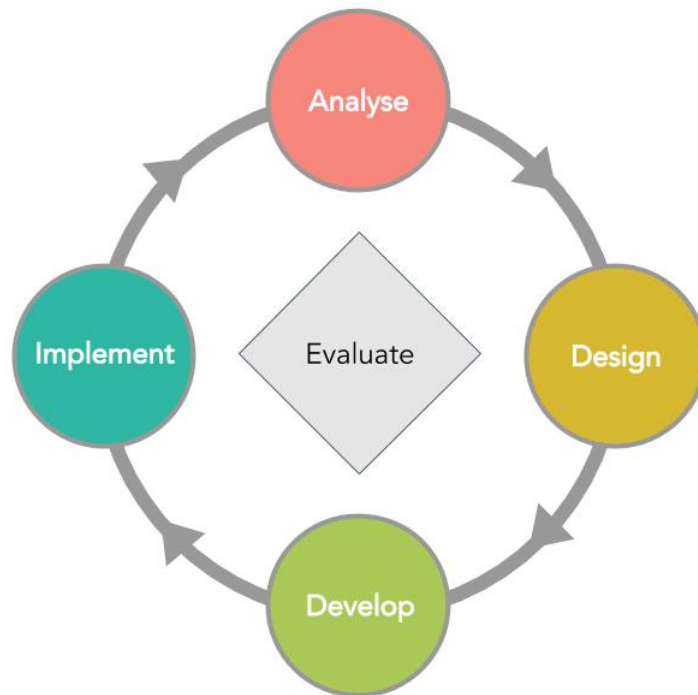
- ASSURE Model
- ADDIE Model

ASSURE Model

ASSURE is an Instructional Systems Design (ISD) model, it provides instructors and course designers with a systematic way to design lessons, training sessions and workshops Utilizing a step by step process instructors are able to plan lessons and integrate multimedia and technology that ultimately enhances the learning experience. It is especially useful in courses that utilize a blended modality of delivery and incorporates Robert Gagne's (2007) nine events of instruction to assure effective use of media in instruction.

Each of the six letters in the ASSURE acronym map to a step in the process, the following is a breakdown of each step:

- A — Analyze learners
- S — State standards & objectives
- S — Select strategies, technology, media & materials
- U — Utilize technology, media & materials
- R — Require learner participation
- E — Evaluate & revise



A – Analyze Learners: The ASSURE model first calls for the analysis of the learner, identifying learning characteristics, specifically, characteristics associated with course learning outcomes. This deeper understanding of the learner will influence instructional design decisions later on in the ASSURE process. The selection of appropriate teaching and learning strategies are guided by this understanding of student learning characteristics. The learner characteristics explored in this analysis should include:

- General demographic information (Age, gender, grade level, academic abilities, socioeconomic status as well as attitudes and interests)
- Entry level competencies (prior knowledge)
- Learning styles (Visual, auditory, tactile and/or experiential)

S – State Standards and Objectives: The second stage of this process involves describing the desired student competency outcomes of the learning process in the form of very specific learning objective statements. This is a statement of what knowledge the student will know and what skills they will be able to use as a result of the learning process. These statements are not meant to describe how the student will be taught. These learning objectives will form the basis of student learning expectations and should therefore be written in way that are measurable and observable. In this way the objective statements influence how student competency is assessed and graded.

The standards/objectives statements should be well structured, utilizing verbs that indicate the level understanding and competency of the intended skill the learner is to explore. The use of Bloom's Taxonomy may be helpful in categorizing the appropriate domain of learning and the

associated verb. A useful model for the structuring of learning objectives is the *ABCDs of well-stated learning objectives*:

- Audience – For whom is the objective intended?
- Behavior – What is the behavior or performance to be demonstrated?
- Conditions – Under what conditions are behavior and performance observed?
- Degree – To what degree will the knowledge or skill be mastered?

S – Select Strategies, Technology, Media, and Materials: This next step within the ASSURE process calls for the selection of instructional strategies, technologies and media appropriate for the types of learners identified as well as the stated standards and learning objectives. Firstly the method of course delivery and instruction should be decided, will the instruction be student centred or instructor centered. Student centered instructional strategies include group discussions or collaborative group work, while instructor centered instructional strategies include lectures, demonstrations or instructional videos. While most lessons involve a mixture of instructor-centered and student-centered strategies, student focused strategies and activities are essential in the development of skills mastery. Once instructional strategies have been decided on, technology, media and materials that support and enhance the learning experience, ultimately helping students achieve the stated learning objectives.

U – Utilize Technology, Media, and Materials: This step involves the planning of how technology, media and materials will be utilized in lessons and support the achievement of the stated learning objectives. It is recommended that this planning utilize the “five P’s” process:

- Preview the Technology, Media, and Materials
Review all the material thoroughly and plan ahead on how the material is going to be used but stepping through the entire lesson.
- Prepare the Technology, Media, and Materials
Gather all technology, media and materials needed to deliver the lesson, ensure that everything needed for the lesson is present. Verify that technology and materials function as planned.
- Prepare the Environment
Ensure that the learning environment is set-up and has what is needed,
- Prepare the Learners
Inform the learners of the learning objectives and how they will be assessed so that they know what to expect. Additionally, assignments and support material should also be shared with learners.
- Provide the Learning Experience
Utilizing the material and strategies chosen deliver the lesson.

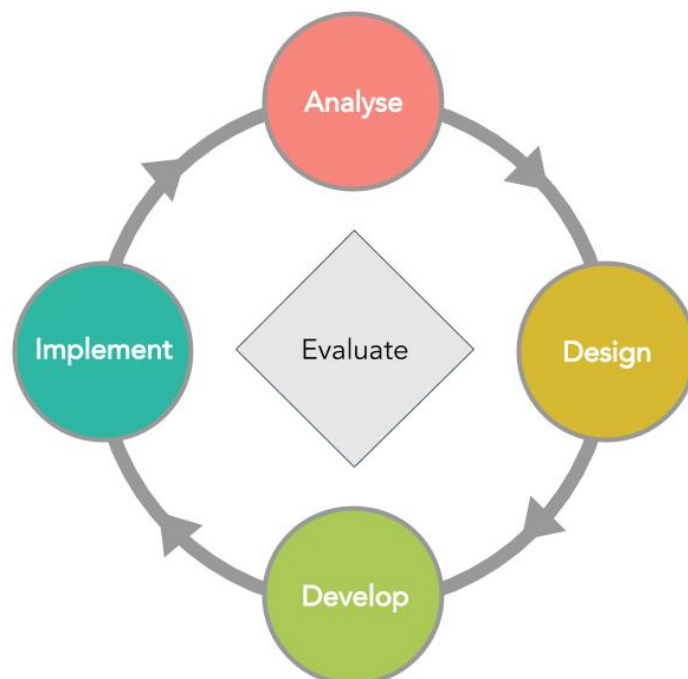
R – Require Learner Participation: The lesson plan will specify how students will comprehend, apply, analyse, synthesize and evaluate the content covered in a given lesson. However it should also specify how the instructor plans to actively and individually engage learners in the learning process. This step in the ASSURE process can be integrated with earlier steps, planning learner engagement throughout the development of instructional strategies. Planned activities should provide opportunities for the learner to practice and develop skills.

E – Evaluate and Revise: The final step in this process focuses on evaluating the impact of course instruction on learner competency. This evaluation process also included the review of media, technology, media, and materials used in course delivery. The following questions can be used in evaluations:

- Did your lesson meet the learning objectives that you planned? How will you determine whether the students reach the objectives? Is your way of assessing the students in line with your learning objectives?
- Can this lesson be improved? How? How are you going to assess the weaknesses in your presentation?
- Was your choice of media and materials a good one? How will you assess the effectiveness of these tools?
- Is it possible that other technologies, media, and materials would have done a better job?

ADDIE Model

Popular amongst instructional designers in the creation online and e-learning course material, ADDIE is an instructional systems design model. Developed in the 1970's at Florida State University, ADDIE is one of the first instructional models and still widely used due to its flexible design. The model isn't without its drawbacks, with the linear content creation structure contributing to increased content development costs and timelines. However, multiple variations of the ADDIE model have been developed to address these shortcomings and to adapt to various learning contexts and environments (Treser 2015). Designed to be a cyclical process, ADDIE consists of five streamlined phases: Analysis, Design, Development, Implementation, and Evaluation (Molenda 2003).



A – Analysis: The first phase of the ADDIE process can be thought of as the “goal setting” phase. It is centered around identifying the instructional problem, environment and target audience, as well as defining instructional goals and objectives. Activities in this phase can include a needs analysis, audience analysis and task analysis (Legault 2015).

This phase also aims identify the learner's existing level of skill and knowledge so as to align the program content and learning pathways, ensuring students enter at the appropriate level.

A series of questions is used to guide the instructional designer through this phase (Treser 2015):

- Who is the audience and their characteristics?
- Identify the new behavioral outcome?
- What types of learning constraints exist?
- What are the delivery options?
- What are the online pedagogical considerations?
- What is the timeline for project completion?

D – Design: The second phase of this process focuses on the development of learning objectives, course content structure, teaching strategy and the relevant assessment tools to measure performance (Forest 2015). Building on the analysis outputs, the approach of the design phase is structured and systematic to ensure that course content and assessment fall within an overarching instructional strategy. Possible activities included this phase may include learner personas and analysis, drafting of learning objective, selection teaching modalities and sequencing of course content.

These are steps used for the design phase :

- Documentation of the project's instructional, visual and technical design strategy
- Apply instructional strategies according to the intended behavioral outcomes by domain (cognitive, affective, psychomotor).
- Create storyboards
- Design the user interface and user experience
- Prototype creation
- Apply visual design (graphic design)

D – Development: With the first two phases focus on identifying learners, learning objectives and strategies, the Development phase focuses on the creation and assembly of course content that were designed in the previous phase. This included lesson plans, course materials and media, as well as other supporting documentation. Graphics, media, lesson content, activities, quizzes and interactions are developed utilizing an appropriate authoring tool. Additionally, the configuration of appropriate hardware, software and online learning platform for the delivery of course content. Prototypes of course material during early stages of this phase allow for quality assurance and testing activities, which ensure that course content design meets the required standards

I – Implementation: In the implementation phase focuses on the actual delivery of instruction, whether via face-to-face or online modalities. In order to accomplish this, procedures for the training of training facilitators and learners are developed. The training of trainers should include an overview of the course curriculum, learning objectives, teaching modality and assessment procedures. While the orientation of incoming learners should be centered around training them on the use the learning platform and other tools required for course participation (McGriff 2000).

E – Evaluation: Consisting of two parts, formative and summative, the Evaluation phase measures the effectiveness and efficiency of course delivery. A key aspect of ADDIE's design is that evaluation occurs throughout the entire instructional design process, both within each of the other four phases as well as after implementation (McGriff 2000).

ASSURE vs ADDIE

The ASSURE and ADDIE models have a great deal of similarities, with both having cyclic structures that begin with the analysis of the learner which acts as the foundation for all subsequent phases. ASSURE is specifically designed to account for the use of multimedia and technology as part of the instructional process. While ADDIE does call for the selection of teaching modality it does not at its core account for the selection of media or technology. However, variations of the ADDIE model address some of its shortcomings and adapt to different instructional contexts including online learning.

While the ADDIE model does include an Implementation phase within which instruction takes place, there isn't a discrete phase for student focused interaction and participation. However, the "Require Learner Participation" included in the ASSURE model places focus on the role of the learner in the instructional design. Both models also include evaluation phases, the ASSURE model saves evaluation for the end of the process. In contrast, the ADDIE model integrates evaluation and quality assurance throughout the model in addition to a summative evaluation at the end of the cycle.

ASSURE's focus on the identification of suitable technology and media as well as its learner participation focus, this model is well suited for a programmes that utilize a blended delivery. While ADDIE's flexibility and many variations make it a strong option for the development of online courses. Both models provide a strong framework for the development of courses that utilize some form of technology in delivery of course content.

Research Results: Case Studies

- Case Study Framework and Rationale
- Laboratoria
- ESIH
- CETEMOH
- LACNIC Campus
- HEART - VTDI
- School of Data

Case Study Framework

Core to the Pedagogical Strategy research was the creation of case studies that explore key thematic areas of inquiry:

- **Skills Building Approach:** Core not only to the case study framework but also the overall research inquiry is the exploration of appropriate skills building approaches. The curriculum and course structure of the various programs included in our case studies were mapped and the specific approaches to the development and assessment of skills competency assessed.
- **Technology Usage & Online Learning:** Online course delivery was identified early on as the preferred teaching modality. Given the demographic of learner and the requirements of online work issues of digital pedagogy (the use of technology in teaching and learning) and digital literacy were also explored. While not every institution interviewed as part of the case study process offered courses with a predominantly online modality, they all utilized technology to support the learning process. Where possible, challenges and strategies pertaining to online course delivery and technology usage were investigated. These challenges included internet infrastructure, student access and exposure to technology, lecturer/tutor involvement, platform design, among others.
- **Language, Literacy and Content Comprehension:** Given the local context of this project, issues pertaining to language and comprehension were explored in case study interviews and research. Core to this line of inquiry was the pedagogical relationship between the language of instruction and the language of dialog, and the instructional challenges posed. Through key informant and case study interviews, challenges and strategies related to the development of and assessment of language competency within the skills building context were investigated.
- **Student Acquisition and Engagement:** Lastly, the case study process explored how institutions recruited and retained applicants. This inquiry included learning more about how the target institutions evaluated applicants, whether through the submission of educational qualifications, or through more thorough testing. These entry requirements were also probed to gain a deeper understanding of what makes an ideal candidate for a programme of this nature.

To this end six educational programmes were selected, with certain case studies focusing specific thematic areas, the table below outlines the selected institutions and their thematic alignment.

Skills Building Approach	Language & Literacy	Technology & Online Learning
Laboratoria	CETEMOH	
School of Data	ESIH	
HEART - VTDI		LACNIC Campus

Also explored were strategies to reduce the rate of attrition/dropout. Strategies explored included profiles that avoid applicants with attributes that would lead to dropout, as well as in course support mechanisms.

Laboratoria

Overview

Founded in 2014, Laboratoria ([ref](#)), is a highly competitive institution that identifies young women from Peru, Mexico and Chile, who have both the potential and the drive to learn front end web development and Java. Over the course of two years, the school aims to develop the technological and life skills necessary for a viable career in the tech industry. Students are provided with extensive resources aimed at securing employment as the programme connects them with companies, assists with interview preparation and provides employment recommendations. 75% of their graduates have been able to secure a job through the programme

Upon completion of the bootcamp Laboratoria is committed to securing their graduates employment. They have a process to assess market needs for the structure of the course; research is done through their job placement programme and remaining cognizant of market needs and trends. Talent Fest is hosted by Laboratoria to pair graduates with companies. There is also a talent pool available to employers online. It provides a comprehensive profile of the student and overview of their technical, life and english skills. The school has contracted with companies like IBM, BELCORP, Interbank and CULQI, providing them with UX Designer, prototypers and frontend developers.

Course Timeline

Training involves a 6 month boot camp followed by a 18 month continuous education programme, where students are given the opportunity to specialize.



Bootcamp: Laboratoria's 6 month boot camp consists of 2-4 weeks courses where students meet 5 days a week, 9 hours a day 9am-6pm. As of 2017, Laboratoria students in Peru will have 35 hours of study each week with 25 hours dedicated to in classroom sessions and the remaining 2 hours will be done remotely. Courses in the Bootcamp phase of the programme are designed to build competency in App and Web development by introducing students to core software development concepts and techniques.

Continued Education: After completion of the bootcamp Laboratoria assists students with job placement. During the next 18 months students are given the opportunity to choose from various 4 week specialized courses delivered both online and in classroom. These courses focus on diving deeper into specialized areas of study, giving students the opportunity to gain

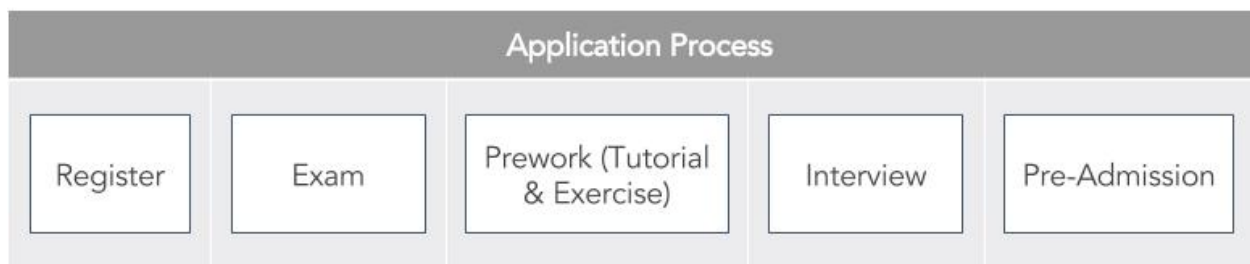
proficiency in skills that will assist them in their individual career paths. The bulk of these courses are offered online but students are still required to attend face-to-face classes for 3 hours each week. Students also have the option to retake courses from Bootcamp to improve existing competency

Student Profile

Laboratoria's programme focuses on young women, and while there is no age limit the majority of students are 20-27 years old. The programme's selection process is designed to identify women who have a genuine interest in technology, from low income families and have limited educational and occupational opportunities. With prior digital skills not being a prerequisite for entry students at Laboratoria have diverse backgrounds and skill sets. Laboratoria seeks out students who haven't completed university or have low quality secondary level schooling.

Working with a team of psychologists and volunteers, Laboratoria is able to make strides in the personal development of their students in self awareness & self-esteem, emotional intelligence, leadership, creativity and professional skills. These are the core soft skills that Laboratoria has identified as crucial to survival in the workplace. .

Application Process: Laboratoria has an extended application process that takes into account the applicant's current proficiency level in math, reading comprehension, as well as personality attributes and critical thinking.

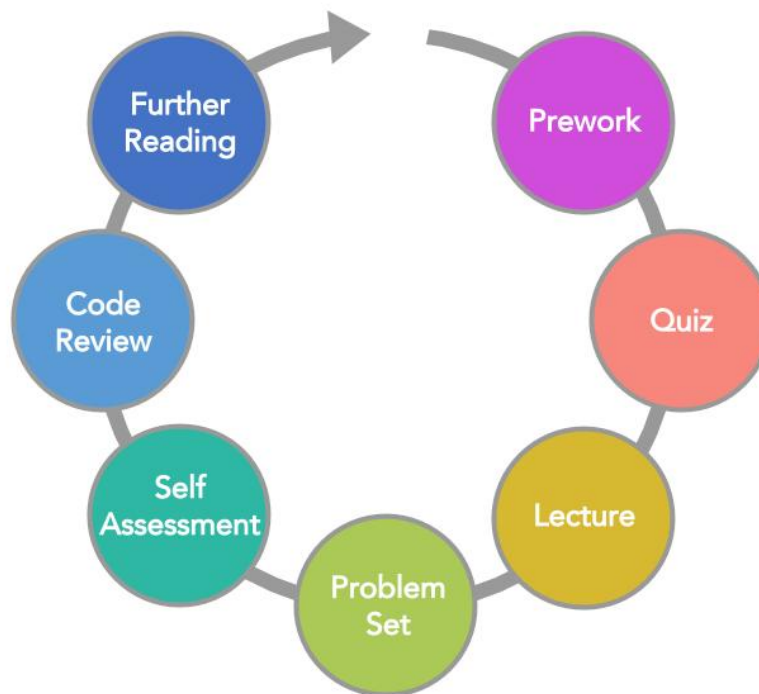


A core aspect of the application is the “Pre-Work” process which requires applicants to first complete an online tutorial after which they are presented with a basic coding exercise. This Pre-Work process was devised by Laboratoria to both teach and assess, for many applicants this exercise is their first exposure to code. The Pre-Work exercise identifies applicants who show genuine interest in the subject area and are comfortable with independent learning. However, many applicants fail to complete the exercise, some as a result of internet access and technical challenges. In instances of technology or internet access assistance is given to the applicant in order for the exam and exercise to be completed. Applicants who complete the Pre-Work exercise move on to in-person interviews, after which top applicants participate in a four day pre-admission workshop which involves a focused group assignment.

Pedagogical Approach

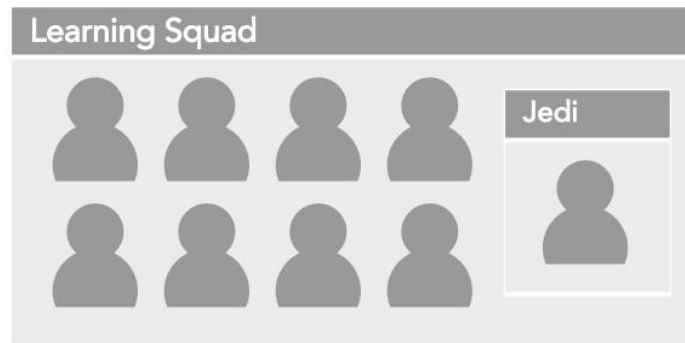
Agile Classroom Model: Laboratoria utilizes what they call the Agile Classroom ([ref](#)); based on the principles of the Agile software development principles ([ref](#)), Laboratoria organises their classes into teams (Learning Squads) that cover lessons in form of short sprints with frequent retrospectives. Rather than marathons, working in sprints allows for shorter feedback loops and makes it easier for students to adapt and respond to change.

Each learning outcome is achieved through a sprint. These sprints are cyclical and begin with pre work which encourages students to do work on their own and develop self learning skills. Upon completion of the Pre-Work, students are given an 'on-the-spot' graded quiz to assess their understanding of the material and receive instant feedback. The Pre-Work, quiz and subsequent lecture are designed to prepare students for the completion of an assigned problem set. At the end of each assignment students are required to reflect on their work and then receive an individual grade as well as sharing a team grade.



It is then expected that students will take the initiative to independently read further to either supplement their learning or fill any identified learning gaps. Subsequent learning objectives are designed to build on previous learning outcomes.

Learning Squads: Each cohort consists of a total of 150 students with approximately 70 students per class, however Laboratoria's Peru programme is expected to expand to 310 students. Classes are divided into groups of 6 to students referred to as "Learning Squads", these groups self-organise and students within each group, working together to complete each assignment. At the end of each assignment the learning squad is disbanded and new groups are formed, allowing students to rotate through different group configurations.



In addition to the lecturer, each squad is assigned a tutor or “Jedi” who is able to provide individual learner attention. Each day students are required to participate in “Stand Ups” which are part of Laboratoria’s larger Agile approach. These daily standups require students to reflect on the work they did in the previous day, share their plan for the current day’s goals and identify any obstacles that may prevent them from achieving their goals. Stand Ups help students and instructors take inventory on daily achievements and the opportunity to identify what is left to do. Learning in ‘Squads’ builds communication and collaboration competencies by encouraging students to use their own channels for collaborative work.

Assessment and Grading: With a ‘point-and-reward’ system Laboratoria’s assessment structure utilizes Gamification instead of traditional assessment systems. Students are awarded points for effort, performance and behavior to encourage good learning practices and collaboration. Still a work in progress, Laboratoria continues to identify shortcomings of this point system, one such shortcoming involves students becoming points obsessed and as a result lose focus on the learning objectives.

Core to Laboratoria’s assessment approach is the process of reflection and self/peer assessment. This key lesson sprint component is designed to facilitate continuous improvement and is conducted on three levels; the individual, squad and classroom. Code review is done at the end of every sprint: problem sets are graded and students are assessed both individually and in the group.

Key Insights

Application Process & Student Retention: Applicants interested in ICT education are often unaware of the level of effort required to successfully complete an intense program. By having a thorough application process that requires applicants to learn and complete a task independently, program coordinators can get a better sense of which students will be able to complete the program.

Communication and Collaboration: By having assessment tied to smaller working groups within larger classes students keep each other accountable and learn through collaboration. This also improves communication and other soft skills. Allowing these groups to self-organize empowers students to take responsibility for their own education pathway.

Agile Process Reflects Work Environment: Through the Agile Classroom methodology Laboratoria seeks to replicate both the technical and non-technical requirements of the work environment. Inter-personal training seminars are intended to prepare the women for the challenges that women face in the workplace and thrive male-dominated environments

ESIH

Overview

Ecole Supérieure d'Infotronique d'Haïti, or ESIH, is a private educational institution founded in 1995 by a group of Haitian professionals to develop and train Haitian professionals for the local ICT sector. ESIH boasts a student population of 500 individuals. Nationally and internationally recognized, ESIH training programs are designed in accordance with the European Research Data Alliance (RDA) standard.

ESIH's course offerings include mathematics, science and technology (computer science for L-Pro and Databases or telecommunications for M1-Pro), economics, management and accounting sciences. Additionally, ESIH also provides its students with resources to start their own business.

Course Timeline

ESIH's undergraduate programmes utilise a traditional semester structure with each academic year consisting of two semesters. ESIH programmes are designed within the Licence Master Doctorat (LMD) system to facilitate easier transfer of course credits between tertiary institutions. Building on the high-school baccalaureate, each academic year is expressed in terms of years in addition to the baccalaureate. After 2 years the student is awarded a Diplôme d'études universitaires générales (Diploma), but can continue for an additional year to receive a License (Degree).

Year 1 (BAC+1)		Year 2 (BAC+2)		Year 3 (BAC+3)	
Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6

Student Profile

With an entry requirement of a high-school baccalaureate, ESIH's programmes focus primarily on high school graduates who wish to pursue a career in ICT. As with many other tertiary educational institutions ESIH has encountered challenges in attracting women to their ICT programmes stemming perceptions surrounding STEM as a career pathway for Haitian women.

"Women are raised to believe that science is for men not women." - Patrick Attié

Pedagogical Approach

Platforms & Online Learning

THESS is an online/distance learning platform developed by ESIH with the goal of increasing access to educational content for urban and rural populations in the Haitian context. The development of the THESS platform is managed by a ten-person ESIH team in collaboration with Dorayla, a Haitian software development company.

Upon starting their programme, students receive a “THESS Student Kit”, the cost of which is included in their tuition. This kit includes a mobile data enabled tablet computer with a one year mobile internet plan and a preloaded library containing a semester’s worth of digital content. Course content available on the tablet primarily take the form of PDF files. So as to conserve on bandwidth and storage space audio and video are typically not used. Students are able to interact with each-other as well as tutors through forums and chat features integrated into the THESS platform.



ESIH utilizes a mixed modality of in-person and online/distance learning interactions for THESS integrated courses. While course content delivery and learning takes place predominantly within the THESS platform, portions of the course are delivered in-person. Courses begin with an “Integration Week” where students are taught how to use the tablet, interact with content through the THESS software, and review ESIH's policies and expectations. ESIH is currently considering extending this week long onboarding and extending the curriculum to include courses on “autonomy” and “critical thinking” to better prepare students to take courses online.

Additionally, while multiple-choice quizzes are given via THESS at the end of each week, final exams are administered in-person. ESIH works with partners to create in-person spaces for students to interact once a week. Tutors play an essential role in the administration of the online forums, facilitation of in-person sessions and the troubleshooting of the tablets. THESS classes maintain a student to tutor ratio of 30:1.

Scaling The THESS Platform

ESIH currently offer THESS enabled courses to students in Port-au-Prince and in Cap-Haïtien through a partnership with Alliance Française. Alliance Française provides administration support to the courses delivered and physical space for the students to meet, get Internet access, and troubleshoot their tablets.

In 2018, ESIH will begin a partnership with other Haitian Universities to extend usage of the THESS platform by other universities.

Key Insights

Continued Learning Pathways: Aligning Program Design with multiple continued learning pathways can incentivize and lower barriers to continued learning. ESIH's LMD compatible course design approach provides credit transferability that encourages students to "level up" their educational qualifications through the university, and its partners.

Student Onboarding for Online Course Delivery: Student success in online learning environments requires deliberate preparation and mentoring. Despite digital literacy and competency levels of student, online courses require an initial in person onboarding session to introduce students to the online learning environment.

Student Autonomy: Student Autonomy of greater importance in online learning environments. High school-aged students are more likely to lack the maturity required to act autonomously and reflect on personal learning gaps necessary to succeed in online learning environments. Students receive less oversight and support. ESIH has attempted to address this through the usage of tutors and in-person sessions, but a full online LACNIC course is unlikely to be successful

HEART VTDI

Overview

Vocational Training Development Institute (VTDI) was established in 1970 as part of a collaborative effort involving United Nations Development Plan, International Labour Organisation and the Government of Jamaica to tackle unemployment and the unskilled workforce in Jamaica. The institution was transferred to the Human Employment and Resources Trust National Training Agency (HEART NTA) in 1992. VTDI offers diploma, degree and post graduate diploma programmes aimed at developing technical and managerial skills and strengthening learning and teaching capabilities.

The school operates in Kingston, Jamaica and has extension sites in Montego Bay and Mandeville. Accredited by the University Council of Jamaica and the National Council on Technical Vocational Education and Training, VTDI has also conducted training interventions within other countries in the Caribbean. VTDI has partnerships with Microsoft, CompTia, Cisco, Fiscal Services, Carlong Publishers and Jamaica Producers Ltd.

While VTDI offers a wide range of courses and programmes, this case study focuses on their Information and Communication Technology programme. Offered by the School of Applied Technology at the VTDI, the ICT Diploma/Degree programme focuses on teaching students industry relevant IT skills in programming, website development and networking skills.

Course Timeline

Students can achieve a diploma in ICT after 2 years of full-time study or 3 years part-time. Students who have completed the diploma programme and wish to further their study, have the option of applying for entry in the Bachelor degree programme. After review successful applicants enter year three and complete two more years, with specialization, for the Bachelor Degree in ICT.

Year 1		Year 2 (Diploma)		Year 3		Year 4 (Degree)	
Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6	Semester 7	Semester 8

Pedagogical Approach

Skills Building Approach / Assessment

HEART VDTI utilizes a Competency Based Training and Assessment approach to their TVET programmes. Each course is split into modules which last a few weeks and cover a few learning objectives. Students are assessed at the end of each module and are given multiple opportunities to be reassessed. Lecturers closely monitor each student's competency development, and where a student is struggling individual attention is given so that students do not fall behind between modules.

Week 1	Week 2		Week 3	
Learning Outcome	Learning Outcome	Learning Outcome	Learning Outcome	Competency Assessment

While the VTDI develops its curricula internally through a process involving committees, course coordinators and content experts, their curricula are also influenced by qualification standards developed by the National Council on Technical and Vocational Education and Training (NCTVET). Also falling under the umbrella of the HEART Trust, NCTVET engages industry stakeholders to form a “Lead Group” in order to gain deeper understanding into the occupational tasks and competency requirements. Following a process similar to that of DACUM, learning objectives and competency assessment criteria are identified through occupational and task analysis. These competency based curricula are used by the various institutions under the HEART Trust to deliver a wide range of curricula and are aligned with industry requirements, with objective of producing graduates who are able to meet the needs of workplace.

Summer Community Learning Intervention

In addition to their degree programs in IT, the School of Applied Technology at VDTI also offers a Community Learning Intervention each summer that targets surrounding communities. The aim of this summer programme is build basic digital literacy competency, and accepts a wide array of participants, spanning multiple ages and educational backgrounds. Lasting for approximately 6 weeks lessons are centered predominantly around lecturer led demonstrations supported by a team of tutors to ensure individual student attention. Computer labs are open outside of class-time to accommodate students who needed more practice time to complete assignments. Outside of serving the larger communities surrounding the VDTI campus, the summer programme is used feeder programme of the full-time programme, providing an alternative pathway for weaker degree programme applicants.

Key Insights

Competency-based Learning Outcomes through Industry Stakeholder Engagement

Competency-based curriculum development emphasizes the specific learning and demonstration of competencies (knowledge, skills and attitudes) central to a given career, job, or task. Including industry stakeholders during the curriculum development process ensures that learning outcomes and competency goals are in line with workplace expectations. HEART utilizes a “Lead Group” of industry stakeholders that operate as an advisory board, assisting to guide curriculum design.

Community Engagement and Multiple Pathways to Programme Entry

By offering a summer community digital literacy workshop HEART VDTI is able to influence perceptions around careers in ICT and STEM amongst a wide cross-section of potential beneficiaries and actors. It also provides unsuccessful applicants with an opportunity an alternative pathway of entry into the main program.

CETEMOH

Overview

Centre de Technologie Moderne d'Haïti, or CETEMOH, is a private training institute launched in May 2001 to train and promote the practice of various trades in Haiti. One of the largest technical schools in Haiti, CETEMOH is the only school where graduates have the ability to transfer to a four year university. The school's initial focus was providing training courses and seminars in mechanics, and has since expanded offering students professional certifications and training in disciplines ranging from data processing to construction and management.

CETEMOH provides learning pathways for Haitians of varying literary competencies through specially designed curriculums. Students are able to transfer high school towards program requirements. While a high school degree is not a requirement for entering CETEMOH, students are required to have completed grade 10. The institution offers four types of training programmes:

- Regular Programme: 3-year programme leading to a senior degree in the chosen field.
- Long-Cycle Programme: 2-year programme leading to a junior diploma for technicians and middle managers. This programme can be used a qualifying certification for matriculation into the Regular Program.
- Continuing Education programme: 9-10 months leading to certificates of competence.
- Course Auditor: Individuals are allowed to attend and participate in classes, but are not eligible to receive credits.

Pedagogical Approach

Student Acquisition & Engagement

Failure to complete high school does not preclude admission to CETMOH as the minimum requirement is having completed 10th grade. Entry assessment is required for all prospective students and covers math, logic, language and reading in a basic level test. Logic questions are used to test how students think, the institution is less concerned with the final answer as the questions are a means to assess candidate's approach to problem-solving. Prospective students can take the entry test in either French or Creole as the school looks to evaluate how well the applicant is able to communicate their thoughts more than grading the grammar. "What we teach is very applicable to the local reality that we face." CETEMOH liaisons with specific industries to decipher market demands and involves the government to collaborate on areas for testing: learning objectives can be translated into real world work environments. Courses are designed based on current market trends and needs and are amenable. Additionally, CETEMOH has staff dedicated to providing guidance to students as a means to ensure they have chosen a career path that would make the most sense.

Language, Literacy & Comprehension

“Teach and test in the language in which the students are most comfortable” Despite identifying communication skills as critical to a student’s development, mastering of the language while important, does not take precedence over technical and critical thinking skills. Teaching in Creole is advantageous in achieving learning outcomes but it still circumvents the dominant language used in the formal Haitian economy; French. However, the mandatory communications courses are strictly in French in an effort to enforce the French aspect of the work environment. Additionally, language learning is largely dependent on the specific trade that the student has chosen.

Although Haitian state exams and textbooks are in French, course delivery and internal assessments are in both Creole and French. Students are required to enroll in a communication course where they are mostly taught professional soft skills and how to function in a work environment. It is important to note that Haitian students are required to learn English in high school and most Haitians have a basic understanding of the language and the grammatical nuances found in language. The school reports that written English has not posed a problem but the phonetics of the language have proved to be a challenge.

Digital Skills Training

CETEMOH’s supply of skilled graduates far exceeded labour market demand as the school reported that approximately 25% of its students were unable to secure employment after completing their studies. In response CETEMOH created an incubator for its graduates in 2013. The incubator involved digital work for roughly 100 international clients; 70 people are currently employed doing mainly back office jobs such as data mining, keyword search and online research. The school notes that serve clients in the U.K, U.S and Canada but none from Francophone countries.

CETEMOH believes that because all prospective students have some exposure to technology, they already have some form of digital skills and most are able to interact with technology in some way, however all show need for a course centred around the basic use of specific office software such as Excel and Word. The school lists computer training as one of its milestone courses and every student is required to take at least one computer course. Students first master the basic technical computer skills and then build up from there. There is greater focus on the technical aspect of digital training and teaching computer skills based on the specified trade.

Key Insights

Prior Exposure to ICT Useful but Typically Inadequate

CETEMOH believes that because all prospective students have some exposure to technology, they already have some form of digital skills and most are able to interact with technology in some way, however all show need for a course centred around the basic use of specific office software such as Excel and Word.

Context Based Language Development

CETEMOH's position of logic over language has translated into a state exam pass rate of approximately 90%. The school gives students the freedom to learn in a language they are most comfortable with and focuses on building language within a skills context so they are better able to communicate within their chosen field.

LACNIC Campus

Overview

Established in Uruguay in 2002, the Latin American and Caribbean Internet Addresses Registry (LACNIC) is an international non-government organization responsible for the assignment and administration of key Internet infrastructure services within the Latin America and the Caribbean (LAC) region. LACNIC provides numbering resources (IPv4, IPv6), Autonomous System Numbers, Reverse Resolution and other resources. The organization is one of the five Regional Internet Registries that exist worldwide and is managed by a board of seven elected directors. The organization serves a network of more than 7000 members in 33 LAC territories with a defined mission to “manage Internet number resources for Latin America and the Caribbean through the participatory development of policies, based on a culture of excellence, transparency and continuous improvement, adding value to our community”.

LACNIC Campus

Core to LACNIC’s mission is expanding the capacity of the region’s technical community through various training initiatives. To this end, LACNIC has launched multiple training and capacity building initiatives which include partner supported in-person workshops, broader programmes such as the cybersecurity-focused AMAPRO Project as well as the institution's virtual training initiative, LACNIC Campus.

LACNIC Campus is a learning platform offering various online courses developed for the technical community, such as developers, network operators, educators and administrators, to build the capacity necessary to support the region’s Internet infrastructure and services. Established in 2015 using a Moodle-based learning management platform, the LACNIC Campus supports the consistent delivery of two types of courses: (i) tutor-supported learning; and (ii) student-driven learning. This virtual campus allows LACNIC to serve its widely dispersed membership throughout the year. Currently, however, courses are only offered in Spanish, with plans to expand courses to include English offerings.

Pedagogical Approach

Course Content

There are three short-form courses currently offered by the LACNIC: a basic and advanced IPv6 as well as Border Gateway Protocol (BGP) and Resource Public Key Infrastructure (RPKI). The courses on BGP/RPKI and advanced IPv6 serve the most advanced technicians within the community, while the basic course on Internet Protocol Version 6 (IPv6) equip the wider body with the knowledge necessary to support the modernization of systems transitioning from IPv4 to IPv6.

While course topics such as IPv6 are designed to support the organization's broader goals of internet infrastructure expansion and modernization, LACNIC has implemented a strategy to ensure better alignment with the current needs and preferences of the technical community. First used in the design of the BGP/RPKI course, LACNIC has adopted a decision-making process where (i) topics are first generated based on the organization's missions and goals; then (ii) courses are developed and offered in accordance with how the membership prioritizes those topics based on feedback via an electronic survey.

The courses are offered throughout the year to allow for easy access and continuous improvement throughout the membership. The Basic IPv6 course is hosted six (6) times per year, the Advanced IPv6 classes are hosted four (4) times per year, and the BGP/RPKI courses are hosted twice per year.

Platform & Course Structure

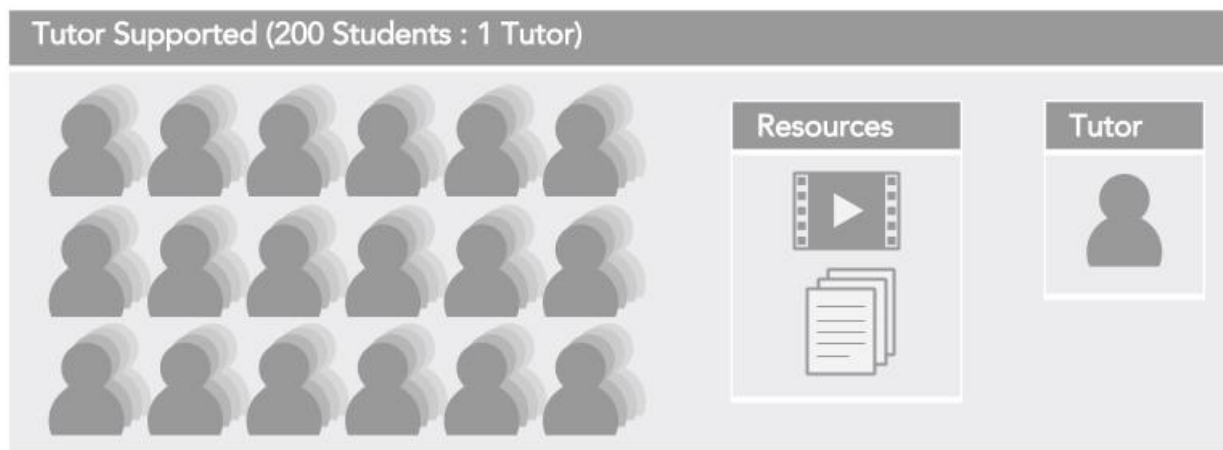
All courses offered by LACNIC employ asynchronous teaching modalities, leveraging multimedia assets as courseware and making use of platform features that enable both independent learning as well as class interaction and collaboration in class activities. Lessons take the form of short videos produced by LACNIC, and are supported by powerpoint presentations containing video transcripts as well as other reading material. The Moodle learning platform allows students to communicate with the tutor and each other through a class forum and direct messages.



Each course employs module-based learning targets which are assessed through multiple choice quizzes at the end of each module. This step-based, modular learning allows the participant (and the organization) to identify and address knowledge gaps prior to the final examination. The final examination for each course is used as the primary form of assessment and is required for the awarding of certification in the subject area.

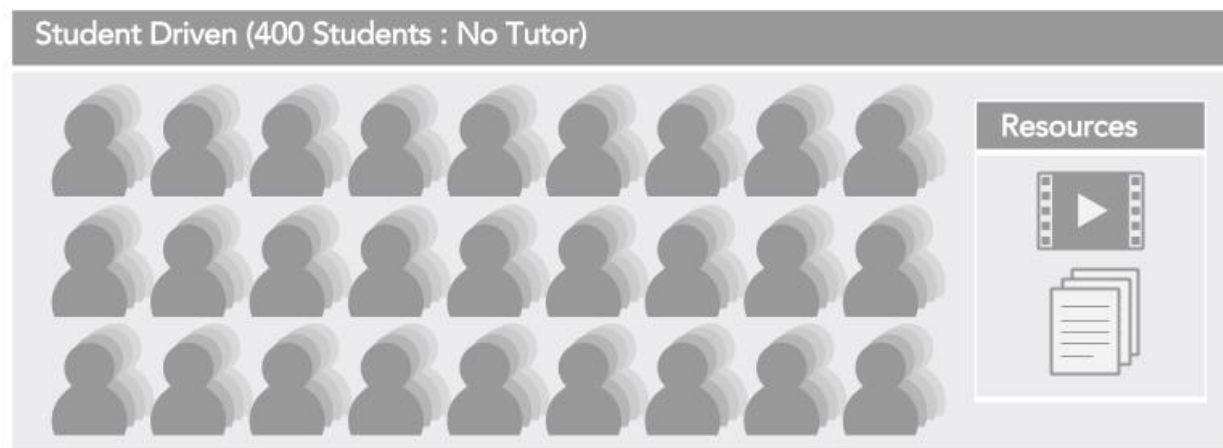
Tutor-Supported courses

For topics deemed to require more practical interaction, a tutor is assigned to assist learners in meeting weekly objectives across 8 weeks of instruction. Tutor facilitation is conducted through forum interaction and email dialogue. These courses are highly structured and comprise discrete week-long modules. Students are therefore expected to dedicate at least 10 hours per week to complete the course and are encouraged not to fall behind on the weekly modules.



Student-Driven Courses

Student-driven courses are generally 6 weeks long, and while quizzes are still present at the end of each module, there is no requirement that the modules must be completed on a week-by-week basis. The only requirement is that students take the final exam before the scheduled end of the course. These courses are designed with the expectation that students will commit a minimum of 20 hours in order to achieve success.



For all courses, LACNIC adopts a first-come-first-serve approach to enrolment. LACNIC Campus aims to achieve enrollment targets of 400 students per cohort for Student-Driven Courses and 200 students for Tutor-Supported Courses. Student-Driven Courses are generally offered to the membership for free while Tutor-Supported Courses are offered at a cost and

participants are enrolled based solely on their ability to meet the financial requirements of the same. Of note, all courses usually meet their enrolment targets and are usually oversubscribed.

While there are no specific entry requirements for LACNIC's courses, students typically already have some technical training and are engaged within the ICT industry. This technical background and previous exposure to other technical courses are seen as a contributing factor for higher completion among more advanced courses. However, the Basic IPv6 course has a much lower completion rate of roughly 25%. This higher attrition rate can be seen as a result of multiple factors, such as the lack of familiarity and experience with the subject matter and online learning modalities, the absence of tutor support, or reduced student buy-in and motivation due to the course not having a fee.

Key Insights

Diverse Multimedia-Based Courseware

Pre-recorded instructional videos give students the ability to control the pace of their learning, however, it plays to the strengths of visual learners while excluding students with other learning preferences. More forms of learning content are needed in order to cater to the many different types of learners that will ultimately make up the virtual classroom.

Structured Course Pacing and Tutor Support

While student autonomy and self-paced learning are important aspects online learning, the lack direct support and structure can lead to high dropout rates among students who are not yet independent learners. Though the issue of attrition is a complex issue with multiple contributing factors, structured learning milestones, combined with tutor monitoring and intervention can positively impact student engagement and ultimately lead to increased student retention rates.

School of Data

Overview

Made up of a global network of individuals and organizations, School of Data is committed to advancing data literacy in civil society. School of Data grew out of a collaboration between Rufus Pollock from Open Knowledge International and Phillip Schmidt from Peer-to-Peer University during their Shuttleworth Fellowships. School of Data was founded "to empower civil society organizations, journalists and citizens by giving them the skills they needed to use data effectively in their work."

Initially created as an entirely online resource, School of Data was both an online classroom for learning data skills and a resource for digital tools. These online resources quickly gained popularity internationally, however, the school's target groups did not believe the content was relevant to their language and experiences. Therefore in an effort to allow for greater customization of course content and delivery, School of Data began to transition from being a solely online resource to utilizing a more human-centric capacity building approach, focusing more on face-to-face course delivery supported by online resources.

Fellowship Programme

In responses to this rapidly increasing demand for localized face-to-face training interventions, School of Data's global fellowship programme was created. Lacking the internal training capacity School of Data sought to expand their training network with data experts who possessed local knowledge, the necessary languages and most importantly were willing to train people within their local context. A selection committee selects potential fellows based on experience, availability, local partnerships and their references.

The focus was on building to develop resources for fellows/instructors on how to delivery the school's data literacy, how to develop their own curriculum and how to cater for specific demographics. By 'training to train' School of Data is able to ensure both the viability and sustainability of data literacy projects.

The programme last nine months and is delivered both online and offline. School of Data holds a summer camp for fellows to meet and train with other data advocates and orients them into the programme.



The fellowship class of no more than ten persons will commence online training in a specific topic of their choosing: some of the offerings include Extractives Data, Gender Inequality, Digital Privacy and the Responsible Use of Data, Tax Justice and Government Budget Data. As part of their training fellows are paired with a local partner organisation and are expected to online and offline training events for the selected organisation and/or community. At the end of the programme, not only do they receive a fellow certification and letters of recommendations, graduates are added to the School of Data networks as accredited trainers

School of Data Member Network

School of Data has two kinds of members: Organisations and Individuals. Currently there are 13 member organizations and 100 individual members. In 2013 School of Data brought on their first “member organization”; SocialTIC; a Mexico based non-profit who were already interested in utilizing School of Data’s resources, to localize their content. Members are required stay active in the network by running events, organise training sessions as well as creating and localizing course material.

The member network expands School of Data’s reach, allowing for the mounting of more courses and training events worldwide. The school is often invited by organizations to conduct data intervention initiatives, wherever possible the wider network is used to assist in the delivery of these training initiatives. These training initiatives typically begin with a crash course or bootcamp, which is an intensive programme where trainers are able to showcase material and build student confidence in using data. This crash course is followed by longer training periods, often supported by local network members, where concepts and techniques are repeated to encourage integration of these new skills into their work and everyday life.

Pedagogical Approach

Data Pipeline

Data literacy courses are designed around the data pipeline and learning outcome are then expand within the pipeline. The pipeline was created to teach that data is more than functions and that there are processes that can be cyclical. It follows the school’s philosophy of “learning by doing” and “working with real data.” If time allows School of Data will repeat the pipeline cycle.



Define

The first stage of the pipeline involves “defining the problem that you are trying to solve”. This involves going from a high level, all encompassing theme and then posing a series of specific questions. This specificity assists in identifying what types of data will be needed and in turn assists in defining the scope of the project.

Find

The next phase is aimed at finding the data, which is crucial due to the fact that without identifying data sources the next steps in the phase are not possible. A wide range of tools and techniques can be used to identify sources of the data required, such as the use of social networks and search engines, open data portals and freedom of information requests.

Get

Once data sources have been identified retrieving this data can either be simple and efficient or it can be quite a challenging process. There are many ways to acquiring the data needed, such as using involved web scraping tools or simply downloading datasets from government open data portals.

Verify

Once the required data has been acquired it then needs to be verified to ensure its validity, this included checking the metadata, as well as the method by which it was collected and also ensuring that the data was collected and compiled by a reputable source.

Clean

Quite often, acquired data may contain duplicate rows, incorrect column names, values non-standard characters, and other attributes that will make using the data difficult. This phase of the data pipeline involves using tools and techniques that will help format the data into a more machine-readable format so that it can be used easily.

Analyse

With the data verified and cleaned, analysis of the data can take place, revealing insights about the defined problem. Data analysis utilizes a wide range of skills and tools such as data visualization, programming languages such as R or Python, statistical suites such as PSPP or simply using spreadsheet processing software.



Present

The final stage of the data pipeline involves preparing the data for presentation. Factors to be considered are the audience the data will be presented to, the questions around the defined problem, as well as the medium by which it will be presented.

Key Insights

Relevance through Localized Context

School of Data has found the most success when course content has been relevant to experiences and local context of the participants. Going beyond simply presenting in the language of audience, creating relevant course content involves incorporating examples and problems from the local context that the audience can understand.

Structured Approach to Data Literacy

School of Data's data pipeline provides a well structured approach to the task of developing data literacy. Breaking down the process of using data into discrete steps allows the process to be customized to various teaching contexts.

Conclusions & Recommendations

- Student Acquisition & Engagement
- Skills Building Approach
- Language & Comprehension
- Technology Usage & Online Learning

The literature surveyed early in the research process provided an excellent foundation for the in-depth interviews carried out with key informants within established institutions and programs. These contextualized conversations have allowed the SlashRoots team to gain keen insight into the requirements for Ayitic's pedagogical strategy as well as its placement within Haitian contemporary culture in consideration of the country's economic, social and technological environments.

In summary, the proposed Ayitic programme must be grounded within a results-based context and developed with careful consideration of best practices in instructional design for the contemporary adult learner. The pedagogical strategy that emerges from these considerations establishes milestones across three clearly delineated touchpoints: (a) program responsibility; (b) instructor responsibility and (c) learner responsibility.

In as far as program responsibility is concerned, the strategic implications for learning include: (i) active strategies to identify, attract, capture and retain students with the greatest potential for success; (ii) structure the learning experience to be cohesive and extensive, from initial engagement through continued learning post placement; and (iii) the focus on generating content and learning objectives that are competency and skill-based rather than solely knowledge-oriented.

When instructor responsibility is examined, the research points to the requirement for: (i) flexibility and empathy so as to remain agile in content delivery and responsive to unique student needs; (ii) pragmatism and practicality in an effort to reposition the learning experience to one that is universally and unequivocally directed at employment and empowerment; and (iii) experience and exposure so as to create intrigue, fuel respect and catalyze engagement - thereby elevating the learning experience and sparking passion within the adult learner.

Finally, for Ayitic to become and remain successful it must encourage learner responsibility around: (i) autonomous learning; (ii) topic-based exploration; (iii) peer collaboration; and (iv) continued learning. These will facilitate the development of self-evolving learners who are able to adapt and capture current and future jobs.

Together, these facets create a deeply integrated response to the issue Ayitic is tasked with addressing: the creation of independent female learners equipped to manage and actively engaged in work within the ever-changing techno-scape.

In detail, the insights gained and recommendations made, may be classified across four (4) considerations for action:

1. Student acquisition and engagement: This segment provides guidance on how we recommend Ayitic attract, enrol and retain students
2. The skills building approach: Guidance regarding techniques for instruction and measurement of success
3. Language and comprehension: Key considerations for the learner and the cultural context of the learner
4. Technology usage and online learning: Instruction of how to ensure that the program is not only future-proofed but is relevant to the student's experience and programmatically sustainable

As suggested earlier, these considerations for action follow the life and learning experience of the student from recruitment through graduation and even beyond, into job placement and career advancement.

Student Acquisition & Engagement

Programme Branding

- To capture the attention of its target audience, Ayitic must be branded and marketed as a modern and innovative initiative focused on women and the creation of new opportunities within the ICT sector.
- The programme must clearly differentiate itself from existing offerings by highlighting its unique approach to digital literacy, content delivery, employment placement and continued learning.
- Additionally, Ayitic should consider a communications campaign that addresses the current misconceptions about the field. Key messages may include stories of successful women within the field as well as highlights of graduates from the programme.

Student Initiation

- A robust application evaluation process should be developed to separate applicants with a general interest from strong candidates who are likely to succeed.
- The application process should also serve as an expectation-setting opportunity. This will better ground the applicants and may further refine the cohort. It is recommended that as a part of the overall application evaluation process candidates should be required to engage in an exercise as well as an in-person interview. The goal of these activities is reveal whether or not the applicant has the basic capability to enter the program and the requisite expressed commitment to complete the same.
- Attention should be given to the fact that the levels of digital literacy in applicants will differ for varying reasons. The current competency level of the applicant should be compared to the various skills profile levels to better identify course starting points.

- The evaluation of applicants should incorporate an assessment of their ability to learn independently and the rate at which they synthesize new knowledge. This is to ascertain the candidate's ability to keep pace with semi-autonomous course timeline targets.
- In-Person onboarding sessions ensure efficacy of online course delivery by equipping students with the necessary level of digital literacy required to navigate the online learning platform.

Student Attrition vs. Continued Independent Learning

- Learning pathways must have in-built responses to attrition and should treat the same as a student's choice to remove themselves from the pace of the program rather than from the learning experience.
- Post job placement Ayitic should allow for continued deep engagement and independent learning by facilitating student collaboration and community involvement
- Ayitic should consider the creation of a purely online community of practice where graduates are allowed to continue the learning experience by learning from each other outside of the framework of formal instruction

Skills Building Approach

Competency Based Curriculum Design

- Industry stakeholders should be involved early in the curriculum development process, so that learning objectives can be designed with competency and employability in mind. Industry stakeholders should be involved in the job/occupational analysis process, where employment opportunities are translated into learning objectives.
- Each learning objective should have clearly defined competency standards, specifying the type of evidence required to verify skills mastery. This becomes the foundation for the creation of assessment materials used in the delivery of the course.

Capacity Building

- Replicating Technical & Non-Technical Requirements in the Learning environment is crucial to a successful skill-building programme
- Aligning program design with multiple continued learning pathways can encourage students to maintain skill development.
- Continued learning can be utilized after initial programme bootcamp while students have been placed in employment opportunities. This creates additional pathways to career development, making job prospectives more robust through specialization.

Language & Comprehension

Context-based Vocabularies and Literacy

- While language literacy remains a critical factor in professional success and growth, insight from the case studies pointed to consistent challenges in completing full French/English literacy training within the context of a short course. This challenge may be addressed through the removal of pass/fail criteria based on literacy and instead placing focus on mastery of skills context-based vocabularies, treating language literacy as a further achievement rather than as a current hurdle.

English as Lingua Franca

- Haitian students are taught English as a second language in schools. This method of teaching formally exposes them to the language's syntax, grammar and sentence structure in a way that they do not experience a first language. This kind of training allows them to have a better foundation for bridging literacy gaps in both the classroom and professional environment. By using English as the lingua franca for the project, Ayitic will not only address challenges in communication and directly improve the learning experience, but also purposefully improve the mastery of participants in English as a second language.

Technology Usage & Online Learning

Student/Instructor Interaction

- Course delivery should be designed to facilitate in-person interactions at key points in the learning pathway so as to sustain high student engagement.
- Student/Instructor instruction within the online learning space should employ asynchronous techniques (e.g. video and/or voice recordings of key learnings) as well as synchronous techniques (video chat and/or real-time forums) to ensure the most effective learning experience
- The Instructor should always remain a tangible facet of the course, accessible to the student.

The Adult Learner in an Online Space

- Course design and delivery should always maximize on the characteristics of an adult learner: allowing autonomy; being goal-oriented; heavily practical content and; structured for a community experience

- Online courses should take care to provide content that emphasises exploration and develops passion for the topic area. Thereby increasing engagement through deep learning and allowing student agency and autonomy.
- Professional / work experience can provide a proxy indicator for access to and capability with technology

Student Collaboration and Reflection

- Course content should encourage student collaboration through dynamic activities including group work and team sprints
- In order to achieve the goal of the “self-evolving student” the program must incorporate technology-driven, regularized self assessment sessions. Additionally, peer assessment via the online learning space should also be encouraged and regularized. These two feedback systems will serve to equip the student with the necessary resilience and objectivity to adapt within the professional world.

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