The Design Document for the Instructional Component of

A Custom Data Reporting Software (CDRS)

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Introduction

The design of a custom data reporting software (CDRS) has been commissioned to support the electoral process within a developing community. This software is being designed to aid electoral officers in reporting the success or failure outcomes of the electoral process to a central data warehouse. It can primarily be accessed via the web although an alternative mobile based platform is provided in the case of an inadvertent access to the web based resource. The primary stakeholders are the national body responsible for conducting elections into public offices, the Independent National Electoral Commission (INEC) and external consultants providing advisory/support services, the International Foundation for Electoral Systems (IFES).

To ensure a hitch-free electoral run, supervising bodies have also asked for the training of their electoral staff to use the CDRS. This training will be conducted on a beta version of the software and is the focus of this instructional design document.

Instructional Design Considerations

Because the CDRS is going to be deployed nationally, there are certain ethical considerations that must be employed in the instructional design. It is important that learners are not taught to any great detail how to debug the software in a case where it crashes. Learners must also honor privacy concerns of the electoral public by keeping confidential whatever information is made accessible to them. Although these seem like concerns solely for the software developers, ethics will be a built in module in this training.

An envisioned constraint includes the typical bureaucracy that results from working with a national body which will require balancing sometimes conflicting stakeholder interests. Because the software the users are being trained for is currently in development, there is the likelihood, that this instructional document will be revised many times before the training is conducted. It also means that pace of the instructional design is dictated by the software development timeline.

Goals and Objectives

Due to the nature of this project, the instructional goals are multifaceted. The primary focus is of course the learners who need to demonstrate their ability to use the beta CDRS on a typical election day. However, the instructor is also implicitly compelled to deliver on performance (time, scope and budget). The supervising stakeholders are also interested in the quality of this demo training to enhance the final (non-beta version) of the CDRS and future trainings that will be rolled out en masse. Based on these, the goals are surmised below;

Goal 1.0 : Demonstrate prerequisite technological (hardware) proficiency

Objectives:

1.1. The learner should be able to set up the provided hardware

1.2. The learner should be able to troubleshoot the provided hardware

Goal 2.0: Demonstrate prerequisite technological (software) proficiency

Objectives:

2.1. The learner should be able to set up the provided software

2.2. The learner should be able to troubleshoot the provided software

Goal 3.0: Demonstrate contextual technological (hardware and software) proficiency

Objectives:

3.1. The learner should be able to use the beta CDRS to report the step-wise success/ failure outcome of the electoral process.

3.2. The learner should be able to use the beta CDRS to report the overall success or failure outcome of the electoral process.

3.3. The learner should show that they will ethically use the software, hardware and data encountered in this process.

Goal 4.0: Achieve performance proficiency

Objectives:

4.1. The instructor should be able to fit the training into the mandated 40 hours

4.2. The instructor should be able to cover all aspects of using the beta CDRS

4.3. The instructor should utilize only the available technology and resources provided

Goal 5.0: Achieve quality proficiency

Objectives:

3.1. The learner should be able to provide constructive feedback on the beta CDRS

3.2. The instructor should be able to provide constructive feedback on the beta CDRS

Scope

The referred to unit of instruction is for a training that will be given to the electoral officers who have never used the beta CDRS before. The mandated hours of instruction must not exceed 40 hours which is equivalent to a full-time work week. All of the technology and resources required for the training will be provided by the INEC and the IFES. The scope here is restricted to the initial training that will be rolled out to a group of 12 electoral officers in a laboratory setting. At the end of the training they should generally be able to demonstrate that they can use the beta CDRS software on the election day to monitor the electoral process

Learner Profile

There is a regional requirement for all students in the respective country to complete a year of civic duty training on the completion of a post-secondary degree before they can work for the government and most private institutions. This scheme is called the National Youth Service Corps (NYSC). Each year, three cycles of the scheme is conducted. Those currently active in the scheme are referred to as corpers and receive a certificate upon successful completion. The electoral officers are recruited from this active pool of corpers only. As such the learner demographic for this unit of instruction is expected to fall between 18 to 35 years of age. They represent varied academic, cultural and technical backgrounds. Though it is likely that some are technically proficient, especially those from private universities, majority will be lacking in the technical skills to use the CDRS. As a result, the instruction will target this latter majority as its audience.

Instructional Design Process

The instructional design methodology for designing the entire unit of instruction is based on the ADDIE model which covers analysis, design, development, implementation and evaluation of the instructional design document(s). Specifically for the purpose of this unit, the modified PADDIE+M model is applied to include the Planning and Maintenance stages. This is because the instructional component is for a software that is still in development. It is adequate to have a separate planning stage to accommodate correspondence with team stakeholders as to how to effectively and efficiently conduct both the software development and instructional design process concurrently. The maintenance is required for future iterations of the instructional training that will be conducted to reflect the most up to date software version at the end of beta testing.

Instructional Approach

The training will be conducted in a face-to-face, instructor to learner laboratory type setting. The instructor has a stationary central setup, with a laptop and powerpoint project displaying the instructor's screen. Each learner has a personal mobile work station with all of the technology required for the training. The instructional approach used will employ a combination of direct instruction, demonstration, learning center and role play.

Direct Instruction

Each lesson will be introduced by means of direct instruction. The instructor discusses the theoretical aspects of the lesson, explaining some of the foundational knowledge required.

Demonstration

This usually follows or supplements the direct instruction if there is a hands-on skill that the learners need to acquire. It could be demonstrated virtually or physically. The step-by-step process is demonstrated on the screen as the instructor completes the task to the viewing of the learners. For the physical exercise, the learners gather round the instructor's station to watch the demonstration and interact or ask questions.

Learning Centers

Each demonstration by the instructor requires a replication by the learners. The learning centers are the mobile work stations where learners work independently on the demonstrated task. The instructor moves away from his/her stationary central station at this point and transitions between learning centers to supervise the completion of the tasks. The idea is for the learner to first watch how the task is conducted by the instructor and then perform it on their own. The demonstration-replication process is piecemeal, as the lesson moves from one task to another.

Role Play

This is a key conclusion to each lesson as the students work in random pairs. The instructor issues a problem scenario that covers concepts learned in the current lesson. This scenario is one that is likely to occur on an election day. The pair works on a plan to address the scenario. Each learner takes a turn at the workstation with the team mate playing a supporting role, as they unveil their act to the critique of the instructor.

Instructional Approach Rationale

The instructional rationale employed is based on the principle of constructivism through the Knowledge as Tools and Situated Cognition theories. Because the of the learner profile and kind of training this instruction targets, the most suitable approach is learning by doing; doing being a direct implication of *knowing* how, what, when and how to do or undo. This comes from knowledge as tools theory which proposes that the functions of a tool are best understood within the context of its use. Additionally, this learning by doing must occur in an environment that is as authentic as possible as advocated by theory of situated cognition. Therefore, this unit of instruction employs Goal Based Scenario model which is traditionally associated with the aforementioned theories.

[*Task] go*als are integral to every aspect of human behavior (Schank, 1993). The use of word 'goals' here might cause some ambiguity but it it is important to note that "the *instructional* goals are distinct from the *task* goals (called the *mission*) which are set within some activity (called the *context*)" (Naidu et al., 2000). The learning by doing approach identifies tasks, goals for each task, and the activity or context in which that goal can be met. Within the scope of this project, this favors the adoption of a Goal Based Scenario (GBS) Model. "The intent of a GBS is to provide motivation, a sense of accomplishment, a support system and a focus on skills…" (p. 453, Schank, 1993)

The idea of goal based scenarios is that learners are able to do research, role-play and collaborate in order to achieve the learning outcomes (Naidu, Ip, & Linser, 2000). The design architecture is therefore made up of setting goals, role-playing, online web-based communication/collaboration and lectures/tutorials. Goals are recognized to be both intrinsically

and extrinsically motivating for the learners. Role-playing allows the learners to act on predefined responsibilities mimicking what they would encounter in the real world. It doesn't matter if it is simulated in situ or virtually. The web acts as a support framework to make other additional resources available to both the students and lecturer. This will be supported by leveraging the traditional face to face lectures and tutorials. GBS necessitates the need for an instructor to be physically present, which in this project's environment is critical, at least initially, because the learner demographic are assumed to be lacking in technological skills, access to technology and have no experience in particular with this software being deployed. The instructors presence will provide a real time communication framework favored by cognitive apprenticeship.

According to Schank (1993), a fear of failure in learning begins to precipitate at about age 6, which is when the natural goals associated with learning (which is learning for learning sake or learning to know) are then replaced by superficial goals like getting good grades or pleasing instructors. This is why it is important to incorporate the GBS principle of creating an environment that allows the learner to fail safely (Naidu et al., 2000). This means that the learners will experience more freedom in learning which is especially important for the novice technology learners in this project.

Learning-by-doing can be dangerous, expensive and fail to provide relevant cases (Schank,1993). This danger can be in form of physical harm to themselves or the environment. In this project, precautions will be taken to simulate as much of the learning as possible before the election day. If required, a retraining will be conducted periodically until a satisfactory outcome is met. The otherwise adverse effect of this is causing critical errors or reports to be

issued during a real election, which is unacceptable. The time and cost expenses of the GBS however cannot be averted without compromising on the quality of the training. Finally, it is plausible that no relevant information will be obtained from demo settings that can be used as cases in future iterations of the instruction. The following then surmises the justification for this training; “The goal of effective training must be to simulate as well as possible the total experience an employee needs in as intense, danger-free, inexpensive, and timely fashion as possible” (p. 436, Schank, 1993)

Learning Resources and Activities

The following shows the resources that will be provided for and after the training.

Learning Resources

The learning resources that will be available to the learners during the training are;

- A Laptop
- A Wi-fi modem with internet connection
- A mobile phone
- All hardware manuals
- Instructional material from the instructor
- Charging Outlets

Some learning resources that will be available to the learners outside the live training are;

- The CDRS user guide from the software development team
- A recorded instructional video of the instructor going through the training
- A help menu integrated into the CDRS that describes how to perform basic functions

Learning Activities

Based on the background information presented about this training, the table 1.0 below shows a mapping of the learning objectives to the learning activities for the learner. It addresses Goals 1. 0 to 3.0, Objectives 1.1 to 3.1 from the Goals and Objectives Section.

Learning Objectives	Learning Activities
1.1. The learner should be able to set up the provided hardware	a) Ensuring the devices are charged and/or plugged to suitable power outlet b) Starting up the devices c) Connecting to the devices to the internet d) Connecting multiple devices together e) Shutting down the devices appropriately
1.2. The learner should be able to troubleshoot the provided hardware	a) Resetting the modem b) Resetting the mobile phone c) Resetting the laptop
2.1. The learner should be able to set up the provided software	a) Updating the modem, mobile and laptop operating system versions to the most recent b) Installing the beta CDRS from various sources(CD ROM, USB drive, internet) c) Running the CDRS program
2.2. The learner should be able to troubleshoot the provided software	a) Backing up data on the CDRS b) Repairing or resetting the CDRS c) Reporting a software error d) Using the CDRS help menu
3.1 The learner should be able to use the beta CDRS to report the step-wise success or failure outcome of the electoral process.	a) Identifying each step in a typical electoral process b) Entering success outcome in the CDRS if criteria for each step has been met c) Entering failure outcome in CDRS with justification
3.2. The learner should be able to use the beta CDRS to report the overall success or failure outcome of the electoral process.	a) Submitting a form addressing the overall outcome at the end of the electoral process
3.3. The learner should show that they will ethically use the software, hardware and data encountered in this process.	a) Reading and consenting to an Ethical License Software Agreement b) Submitting personal login information to indicate consent

Table 1.0: Learning Objective to Activity Mapping

Objectives 4.2 and 4.3 of Goal 4.0 are indirectly addressed by the creation of table 1.0 which ensures that learning activities make use of only learning resources provided by the INEC and the IFES. There is no requirement for the learners to acquire supplementary material. The learning activities column also addresses all the functionalities available in the beta CDRS. Objective 4.1 (Goal 4.0) which covers instructional hours has been elaborated upon in table 2.0.

Lesson Day	Lesson Time	Learning Objectives	Instructional Hours	
Monday	8.30am - 9.30am	1.1	Direct Instruction	1 Hour(s)
	9.30am - 10.30am		Demonstration	1 Hour(s)
	10.30am - 11.30am		Learning Center	1 Hour(s)
	11.30am - 12.30pm		Role Play	1 Hour(s)
	1.30pm - 2.30pm	1.2	Direct Instruction	1 Hour(s)
	2.30pm - 3.30pm		Demonstration	1 Hour(s)
	3.30pm - 4.30pm		Learning Center	1 Hour(s)
	4.30pm - 5.30pm		Role Play	1 Hour(s)
Tuesday	8.30am - 12.30pm	2.1	Direct Instruction	1 Hour(s)
	9.30am - 10.30am		Demonstration	1 Hour(s)
	10.30am - 11.30am		Learning Center	1 Hour(s)
	11.30am - 12.30pm		Role Play	1 Hour(s)
	1.30pm - 5.30pm	2.2	Direct Instruction	1 Hour(s)
	2.30pm - 3.30pm		Demonstration	1 Hour(s)
	3.30pm - 4.30pm		Learning Center	1 Hour(s)
	4.30pm - 5.30pm		Role Play	1 Hour(s)
Wednesday	8.30am - 10.30am	3.1	Direct Instruction	2 Hour(s)
	10.30am - 12.30pm		Demonstration	2 Hour(s)
	1.30pm - 3.30pm		Learning Center	2 Hour(s)
	3.30pm - 5.30pm		Role Play	2 Hour(s)

Lesson Day	Lesson Time	Learning Objectives	Instructional Hours	
Thursday	8.30am - 10.30am	3.2	Direct Instruction	2 Hour(s)
	10.30am - 12.30pm		Demonstration	2 Hour(s)
	1.30pm - 3.30pm		Learning Center	2 Hour(s)
	3.30pm - 5.30pm		Role Play	2 Hour(s)
Friday	8.30am - 10.30am	3.3	Direct Instruction	2 Hour(s)
	10.30am - 12.30pm		Demonstration	2 Hour(s)
	1.30pm - 3.30pm		Learning Center	2 Hour(s)
	3.30pm - 5.30pm		Role Play	2 Hour(s)
Total				40 Hours

Table 2.0 Learning Objectives to Instructional Hours Mapping

Assessment and Evaluation

Formative Assessment

Formative assessments will be based on the learning center and role play tasks issued by the instructor. Each learning center task is directly mapped to a learning activity from table 1.0. A learning center task is assessed by completing the associated learning activity and receiving a direct verbal feedback from the instructor. Each role play task is directly mapped to a learning objective. A pair of students complete a scenario issued by the instructor. A role play task will require the learner to be an actor (working directly with the software or hardware technology) and a supporting actor. A grade of a Pass (P) or Do-Over-Until-Pass(DP) is assigned to the learner's role as an actor. To receive a P grade for a role play task, the actor role must be completed successfully on the first or second trial of the task. A DP is awarded otherwise. To qualify for the final examination (summative assessment) at the end of the instruction, the learner

needs to have a P grade in at least 50% of the formative assessments. Otherwise a retraining is recommended.

Summative Assessment

Summative assessment will be by the means of a final demonstration project in a one-one setting with the instructor. In this project, an entire simulation of an election day electoral process will be carried out between the learner and someone else acting as a voter. The voter will act according to a script provided by the instructor but unknown to the learner. The learner will be graded on their ability to complete each task successfully and within the set time frame. Their summative performance will dictate whether they need to be retrained or selected for the real elections. Their selection for the real elections is score based, priority is given to those with the higher percentages.

The grading scale is as thus;

- 0 - 33% : Learner requires retraining and does not demonstrate a real grasp of the CDRS
- 34 - 67% : Learner is somewhat comfortable with the CDRS but is advised to retake the summative assessment at a later date for a better score.
- 68 - 100% : Learner is a good choice for election day use of the CDRS.

Evaluation

The evaluation addresses Goal 5.0 (Objectives 5.1 and 5.2). At the end of the training, the instructor and the learner complete respective surveys on the quality of the beta CDRS based on questions prepared by the software development team.

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