
Enrollment and Absence Monitoring Systems Options Paper

March 2021, v.1



Executive Summary

Due to the COVID-19 pandemic and corresponding school closures, there has been unprecedented disruption to children's learning. It is feared that many of these children might struggle to return to school as a result.

Aim

The aim of this options paper is to help Save the Children teams better understand and evaluate the applicability of tools already in use at Save the Children to track attendance and enrollment and to understand how to apply the framework to evaluate a number of options the organization could use in the near future.

The tools were selected by Save the Children with additional tools included based on their deployment, flexibility, and adaptability for the use cases, their ability to support multiple languages, and stakeholder interest in how these tools can be leveraged in response to reopening of schools. The intended audience for this paper is decision-makers in governments, schools, education clusters, and programs. Additionally, donors who are engaged in supporting these efforts would also benefit from the findings of this paper. The following tools were identified for this paper: Waliku, OMR, EduTrac/RapidPro, DHIS2 for education and OpenEMIS.

1. Primary use case

The use case illustrates the needs of a teacher managing a student data through the processes of enrolling, re-enrollment, attendance and absenteeism listing and notification,

and student follow-up and referral; for school administrators to view data in real-time as recorded by teachers, view attendance data by teacher, by class, by student; and for students parents, caregivers, to view when student marked as Present / Absent / Tardy. The following key indicators are monitored in the primary use case :

- Number of students / staff / institutions
- Number of qualified teaching staff in institutions absent
- Number of students identified as at risk of dropout (and those identified as vulnerable)
- Gross enrollment ratio
- Net enrollment rate
- Adjusted net enrollment rate
- Out-of-school rate for children of primary/secondary age
- Survival rate to the last grade of primary/secondary education
- Percentage of children in primary/secondary education who drop out before the last grade
- Percentage of new entrants to primary education without early childhood education

Contents of Attendance Register

The tool must allow for the taking of an attendance register at the start of the first session of each school day and once during the second session. On each occasion they must record whether every pupil is:

- Present;
- Attending an approved educational activity;
- Absent;
- Unable to attend due to exceptional circumstances; or,
- Not attending in circumstances relating to coronavirus (COVID-19)

The tool should allow the school to follow up on any absences to:

- Ascertain the reason;
- Ensure the proper safeguarding action is taken;
- Identify whether the absence is approved or not

Contents of Enrollment Register

The tools enrollment register must allow for the collection of the personal details of every pupil in the school, along with the date of admission or readmission to the school, information regarding parents and carers, and details of the school last attended.

2. Non-functional requirements

These address "quality attributes" of the platforms that can be used to judge the general operation of the system, such as system architecture, usability, security, extensibility, and scalability.

Summary

DHIS2, RapidPro, OMR, OpenEMIS, OpenSIS, and Waliku have the majority, but not all, of the functions identified for the primary use case. RapidPro is primarily optimized for remote communication through messages.



Scalability

Scaling digital solutions that are data-intensive require that the tool maintain consistent performance without crashing or stalling as the number of users and data grows over time. OpenEMIS, and DHIS2, have been deployed to thousands of users. RapidPro has had many installations supporting millions of users, including 4.4 million users in Nigeria. For

platforms that are hosted on local servers, their ability to scale would depend on the infrastructure in place. Waliku on the other hand has been deployed to around 30 sites at the time of this paper.



Devices and Operating Systems

Most mature global offerings cater to the dominant Android operating system and leverage a wide range of hand-held devices. In addition to this: DHIS2 and OpenMIS have a restricted set of functions available on basic phones as well. RapidPro's messaging function is optimized for the simplest mobile device



Usability

From a usability perspective, the platforms are comparable. The user- interface for platforms such as DHIS2, OpenEMIS, and RapidPro, are easily configurable with a multitude of options. Waliku is in Indonesian and English, and OpenEMIS is able to adapt to any language as long as there is a font-set to support that language.

If a tool is being developed for use in remote and disconnected settings, functionality that supports offline use should also be assessed in the selection of the platform. All the platforms considered here were built with offline access in mind. However, offline capabilities can be difficult to assess, as platforms may advertise the product for offline use without existing success in the field.



Administration, support, and documentation

All the tools apart from Waliku have standard user and technical documentation available online.



Standards, Interoperability, Compliance, and Data Accessibility

If enrollment and attendance data needs to be integrated with other education systems data, child protection systems, routine health information systems, or aggregate data sources for planning and resource allocation at district/national levels, decision-makers should consider methods of data integration that would work for their needs.



Open-Access and Developer Community

Open-source tools publicly share their product roadmaps. Except for Waliku, all the platforms considered here have open-source code. Open-source code does not mean that deployment of the platform will be free of cost. For more details, please see the discussion on “ Total Cost of Ownership” Comparatively, DHIS2 , and RapidPro have very developed global communities with local expertise to customize and support the deployment of the tools without active involvement of the steward organization. DHIS2 and OpenEMIS have service-level agreements (SLAs) on a case-by-case basis based on client needs.



Technical specifications Reliability

Reliability is the ability of a tool to run consistently without failure over time. System and data backups should be implemented regularly for use in case of failure. Besides this, disaster recovery plans should be in place. All the tools tested performed reliably. Waliku was a bit glitchy and that may be because the test was on a demo site.

Messaging Capability

RapidPro has the most advanced capabilities for two-way communication, supporting interactive voice response (IVR) communications and several other channels like WhatsApp, Telegram and Messenger. DHIS2 can integrate with RapidPro for the purpose of focused communication. Waliku is building up its IVR channel although not yet deployed. Programs which engage stakeholders through SMS or phone calls may want to consider whether toll-free messaging or reversed-billed functionality may be available for purchase in-country. This may be achieved via two-way SMS APIs through Twilio or Africa's Talking. Use of toll-free lines may be critical to encourage system engagement by a population when airtime or data packages are expensive, and costs to the stakeholder need to be avoided.



Security

While all platforms have out-of-the-box authentication, authorization, and data encryption, RapidPro, DHIS2, and OpenEMIS, have been audited by external entities.



Analytics

OMR provides an interface to R for further statistical analysis. RapidPro offers offline visualizations and the ability to connect to third party analytics platforms and data warehouses. OpenEMIS and DHIS2 can be integrated with various analytics and tracking tools as needed based on the use case.



Time to Deployment

All the tools have parts of use case developed that are turn-key ready for deployment. For simple message-based workflows for communication, RapidPro can be promptly adapted and deployed. Waliku is currently testing its second version in Indonesia. DHIS2 and OpenEMIS are fully loaded EMIS with modules that can be activated as needed for attendance and enrollment.



Total Cost of Ownership

RapidPro, OpenEMIS and DHIS2 have open-source licensing. If needed, the steward organizations can provide end-to-end support in customization, hosting, and maintenance for a fee. Local expertise must be found for customization, hosting, and maintaining the platform. Rapidpro tiered subscription-based pricing model.

Figure 1 summarizes the detailed assessments discussed above.

Selection of Platforms and Process of Assessment

The digital tools chosen for this assessment were selected based on a high number of global deployments, flexibility in adapting the tool for different use cases, multi-lingual support, and interest from global stakeholders. While other open-source platforms as well as locally available proprietary products exist and might be valuable, this effort to rapidly develop guidance prioritized the following platforms: DHIS2 for Education, OMR, OpenEMIS, RapidPro, and Waliku

This assessment entailed the following activities, with the objective of developing recommendations for use in monitoring attendance and enrolment.

- Reviewed publicly available demo videos about the tool and its adaptation to the use case.
- Downloaded and used the tools or their attendance and enrollment module, where possible, to understand dependencies, usability, and possible barriers to use for each tool.
- Conducted a series of interviews with the tool developers and stewards to get clarity around functional and non-functional aspects that are of particular importance.
- Reviewed existing documentation and community engagement around the world on tools.

Figure 1 Assessment Summary (high level features)

	DHIS2 Education	OMR	OpenEMIS	RapidPro	Waliku
Usability	Fully developed	Somewhat exists	Fully developed	Fully developed	Somewhat exists
Reports and analytics	Fully developed	Not available	Fully developed	Fully developed	Fully developed
Standards, interoperability, compliance & data accessibility	Somewhat exists	Not available	Fully developed	Fully developed	
Privacy and data protection	Fully developed	Somewhat exists	Fully developed	Fully developed	Fully developed
Administration, documentation and support	Fully developed	Not available	Fully developed	Fully developed	Fully developed
Technical Specification	Somewhat exists				
Messaging support	Somewhat exists	Not available	Somewhat exists	Fully developed	Somewhat exists
Multilingual support	Fully developed	Not available	Somewhat exists	Fully developed	Somewhat exists

Overview of Prioritized Platforms

DHIS2 for Education

DHIS2 for Education uses the DHIS2 Tracker App. DHIS2 Tracker is an open-source, web-based application that supports data collection, and analysis of transactional or disaggregated data. The functionality of Tracker covers a wide spectrum of needs, from collecting student attendance in a classroom to monitoring the quality and availability of Wash in Schools, to capturing student data in a shared health record. The core DHIS2 Tracker software development is managed by the Health Information Systems Program (HISP) at the University of Oslo. DHIS2 Tracker is an extension of DHIS2 and should not be confused with DHIS2.

In practice, DHIS2 Tracker is used for tracking individual data and can be used in a community or facility setting; DHIS2 is used to track aggregate data, typically at a district-level. The DHIS2 Tracker has been built to work seamlessly with DHIS2. DHIS2 Capture is the mobile component of the DHIS2 platform.

Notable Features

- Easily configurable with multitude of features
- Large active global community of implementers with local expertise in customization
- Several turn-key use cases for attendance and enrollment monitoring
- Interface with R for data analyses and presentation

Attendance and monitoring Use cases

- Attendance/ Absenteeism tracking
- Enrollment /Re-Enrollments

Deployments

- DHIS2 Tracker has been deployed in 52 countries, 2 are used for attendance and enrollment



OMR

OMR use 'absence register' templates. Teachers shade a circle in the register next to any child who is absent. Field staff visit the schools every two weeks and collect the absence sheets, which are scanned and uploaded onto new software for analysis of attendance. The registers contain information on the child's name, sex and grade.

Notable Features

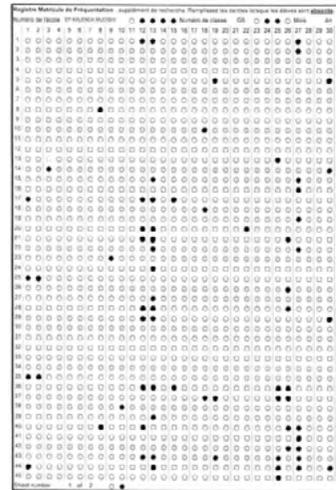
- Very easy and quick to deploy as all that is required is the OMR software

Attendance and monitoring Use cases

- Very low tech Attendance and Enrollment use cases

Deployments

- One major deployment in Democratic Republic of Congo, (DRC) in about 50 schools



OpenEMIS

OpenEMIS School is an Open Source School Management Information System (SMIS) that facilitates the collection, processing, and management of information at the school level. OpenEMIS School is a customizable web application that supports the day-to-day activities involved in managing an individual school. One of its core modules is Attendance and Enrollment tracking.

Notable Features

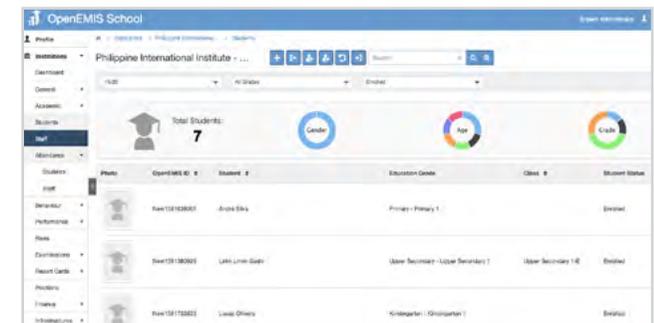
- Easily customizable
- Easily manage data transactions at the school level including attendance, assessments and behavior
- Several turn-key use cases for attendance and enrollment monitoring

Attendance and monitoring Use cases

- Attendance/ Absenteeism tracking
- Enrollment /Re-Enrollments

Deployments

- 17965 deployments in 15 countries



Overview of Prioritized Platforms *cont.*

RapidPro/Text-it

TextIt provides instant turn-key hosting of RapidPro by the original creators of the platform. TextIt runs the very latest version of RapidPro and provides hosting and support for hundreds of organizations across the world. One can visually build multi platform messaging and voice bots to engage internationally. At the core of TextIt lies the Flow engine. With Flow, anybody can create engaging two-way SMS /WhatsApp, Messenger, line ,etc and voice applications without the need of a programmer or expensive consulting company.

Notable Features

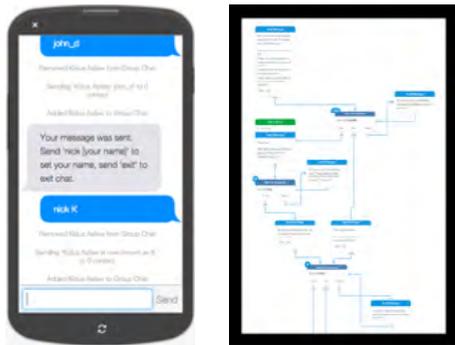
- Advanced capabilities of communication not limited to SMS and Voice allows for quick deployment.
- Large active global community of developers.
- Very easy to customize and deploy with minimal expertise.

Attendance and monitoring Use cases

- Only works at an aggregate level.
- Use cases can be quickly built fit-for-purpose and deployed.

Deployments

- Since 2011 RapidPro has been deployed in several countries
- Apps are continually being deployed since the solution is easy to access, adapt and deploy without involvement of the steward organization.



Waliku

Waliku, Indonesian for “my guardian,” seeks to address education and well-being disparities among school-aged children by digitizing student attendance and facilitating triage and follow-up of high-risk absentees. Once enrolled in Waliku, students’ daily attendance and absence recording happens digitally and allows the dynamic management of absent students. Every day, after teachers take attendance on the Waliku mobile app, an absence task-list is generated for teachers to follow up on a prioritized list of absent students. Teachers call or meet their parents/guardians to know the reason for absence and advise them so children are encouraged to return to school. For children who are very absent, teachers use tools to further assess and counsel, as well as triage those who need interventions from a local education, health or child-welfare authority.

Notable Features

- Waliku was designed with Indonesia context in mind, as such it has been built ground up with local context.

Attendance and monitoring Use cases

- Attendance and absenteeism monitoring use case is well developed. Enrollment use case is still at a nascent stage

Deployments

- Waliku has only been deployed in Indonesia to about 30 schools



OpenSIS

OpenSIS is an open source Student information system. OpenSIS offers main products OpenSIS- CE (Community Edition) and OPenSIS-Pro, the later being having additional features like teachers lessons plans and financial management. With built-in alerts for teachers and school administrators . OpenSIS is one of the more comprehensive SIS that is user centric. It available both downloadable for local hosting and cloud hosted.

Notable Features

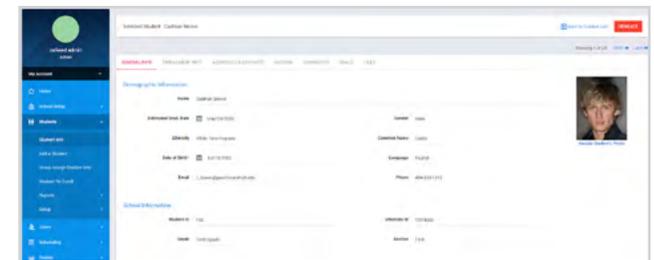
- Advanced in-built messaging
- Parents por
- Bi-directional integration with Moodle
- Google class integration.
- Ability to track students medical records.
- Large active global community of developers
- Very easy and highly customizable and deploy with minimal expertise

Attendance and monitoring Use cases

- Use cases pre-built with extensive additional features.

Deployments

- Since has been deployed in several countries,
- Trade schools, Health Education and K-12
- Apps are continually being deployed since the solution is easy to access, adapt and



	 Functionality does not exist 1	 Functionality somewhat exists 2	 Functionality is well developed 3	DHS2	OMR	OpenEMIS	RapidPro/EduTrac	Waliku	OpenSIS	CGA*
Category 1 : Functionality and scalability										
Offline mode										
The application can not run offline.		Some features can function offline	The application can run offline. Data are stored locally on mobile devices until the device has a connection to WiFi or cellular data.	3	2	3	3	2	3	3
Realtime Data Validation										
No real-time data entry validation and feedback is available.		Real-time data entry and validation is not available, but is provided when the data is synchronized to the server.	Yes, real-time data entry and validation is available during data entry.	3	1	3	3	2	3	3
Auto-sync										
Auto-sync not available			Auto-Synch available	3	1	2	3	2	2	3
Bandwidth frugal										
Not optimized for minimal bandwidth and high-latency environments.		Some operations are No real-time data entry validation and feedback is available.	Optimized for minimal bandwidth and high-latency environments.	3	3	3	3	2	3	3
Remote reporting										
No ability for remote-location reporting where there is no internet data or no smart device.		Some ability for remote-location reporting where there is no internet data or no smart device.	Ability for remote-location reporting where there is no internet data or no smart device.	3	1	2	3	1	3	3
Auto-triggers and reminders										
No ability to set auto-triggers and reminders		Some auto-triggers and reminders can be set	Auto-triggers and reminders can be set up with the tool	3	1	2	3	2	3	2
Multiple access										
Can only be accessed through only one channel			Accessed through multiple channels	3	1	3	3	1	3	3
Devices and operating systems										
Support for Smartphones										
smartphones are not supported			Yes, smartphones are supported	3	1	3	3	3	3	3
Support for Basic Phones										
No, basic phones are not supported.			Yes, basic phones are supported.	3	1	1	3	3	3	3

	 Functionality does not exist 1	 Functionality somewhat exists 2	 Functionality is well developed 3	DHS2	OMR	OpenEMIS	RapidPro/EduTrac	Waliku	OpenSIS	CGA*
Support for Android										
No, Android not supported			Yes , Android is supported	3	1	3	3	3	3	3
Support for iOS										
No , IOS is not supported			Yes, IOS is supported	1	1	1	3	1	3	3
<i>Note: For Yes or No questions, we assess as 0 and 2.</i>										
A. Scalability and Expandability										
Multilingual support										
No multi-lingual support		Some local languages supported	All official languages supported	3	3	3	3	2	3	1
Multiple level supported (Schools , regions, countries)										
Only on level supported			Multiple level are supported	3	1	3	3	3	3	3
Multiple user profiles										
Only one user profile		some user profiles	Multiple and customizable user profiles	3	1	3	3	2	3	2
Category 2: Usability										
Ease of Use and User- Friendliness										
The system is complicated, hard to use, and requires substantial training.		The system is somewhat easy to use, and would require some training.	The system is easy to use, and would require minimal training.	2	3	2	2	2	3	3
Graphical User Interface										
There is no graphical user interface available with the system.		Some components have a graphical user interface while others do not.	A full-featured graphical user interface is available.	3	2	3	3	3	3	3
Forms Available on Mobile and/or Computer										
The forms are built for mobile only and will require substantial effort to be made available on the computer for editing.		The forms can readily be used on mobile, but can also be made available on the computer for editing in a short period of time.	The forms are available for use on both mobile and computer.	3	1	3	2	2	3	2
Search Interface										
There is no search interface available.		Basic search functionality is available.	Advanced search functionality is available.	3	2	2	3	2	3	3

 Functionality does not exist 1	 Functionality somewhat exists 2	 Functionality is well developed 3	DHS2	OMR	OpenEMIS	RapidPro/EduTrac	Waliku	OpenSIS	CGA*
Notification of Changes Made									
No, users are not kept informed of completed actions, changes made to the records	Users are kept informed of some completed actions, changes made to the records, or errors.	Yes. Users are kept informed of completed actions, changes made to the records, or errors	3	1	3	3	1	1	1
Font Size									
No, the size of the font cannot be configured by the user	Zoom functionality can be used to view information.	The size of the font can be changed from the device.	3	1	3	3	2	3	1
Icons and Colors									
No, these cannot be changed easily.	Either icons or colors can be changed, but not both.	Yes, these can be changed easily.	3	1	1	1	1	1	1
Dropdowns, Radio Buttons, and Checkboxes									
No use of dropdowns, radio buttons, or checkboxes.		Yes, dropdowns, radio buttons, and checkboxes have been used to make data entry easier.	3	1	3	3	3	3	3
Tooltips									
No tooltips are used	Tooltips are not used Attendance and Enrollment but are available in the platform.	Yes, tooltips are used.	3	1	3	3	3	1	3
<i>Note: For Yes or No questions, we assess as 0 and 2.</i>									
Category 3: Reporting and analytics									
Analytics									
Data Export to CSV Files									
The users have no access to data from the system	The users have to request access to data from the company.	Users can automatically download the data they want through an easy to use interface.	3	1	3	3	1	3	3
Usage Metrics									
The system does not provide any usage metrics.	The system tracks usage metrics but does not provide a graphical user interface to view them.	The system has an easy to use interface to allow analysis of usage metrics.	3	1	2	2	1	1	2
Analytics and Reporting Capabilities Built into the Platform									
There are no analytics and reporting capabilities built into the platform.	There are basic analytic and reporting capabilities.	There is extensive reporting and analytics capabilities available in the platform.	3	1	3	3	2	2	2

	 Functionality does not exist 1	 Functionality somewhat exists 2	 Functionality is well developed 3	DHS2	OMR	OpenEMIS	RapidPro/EduTrac	Waliku	OpenSIS	CGA*
MoE suggested reports										
Can not generate MoE reports	Some MoE reports can be generated	All MoE reports can be generated		3	2	3	3	2	3	3
Reports according to audience (DoE, PTA, supervisory, students etc.)										
Can not generate reports according to audience	Some reports can be tailored to the audience	Reports can be tailored to the audience		3	1	3	3	2	3	3
Category 4: Standards, Interoperability , Compliance and Data Accessibility										
Compliance with Industry Standards										
The tool does not support ISB standards for Education, skills and children’s services , and it would take substantial effort to add.	The toolkit does not support ISB standards for Education, skills and children’s services , but this can be added with minimal effort.	The tool supports ISB standards for Education, skills and children’s services		3	3	3	3	2	3	
Integration with Standard Back-End Systems										
No integrations exist.	Integration is either being planned or in development.	Integration has been established with at least one system.		3	1	3	3	1	3	
Support for Education Coding Standards (CBDS, DCSF, 2009f)										
No Education coding standards are supported.	Support for coding standards can be added with some	At least one of the standards are supported.		3	3	3	3	2	2	
<i>H RapidPro/TextIt: There are some domain specific questions which are not applicable to TextIt and RapidPro/TextIt.</i>										
Category 5: Security, Data protection and Privacy.										
Different levels of user access with functions reserved for specific user levels (integrated into the user interface										
Supports different user views based on user permissions and types										
				3	1	3	3	3	3	

	 Functionality does not exist 1	 Functionality somewhat exists 2	 Functionality is well developed 3	DHS2	OMR	OpenEMIS	RapidPro/EduTrac	Waliku	OpenSIS	CGA*
user passwords implemented										
No user authentication		some authentication	user authentication fully implemented	3	1	3	3	3	3	
Security Controls and Implementation Guidance is Comprehensive										
No security controls or implementation guidance are in place.		Role-based authorization and authentication exists, if appropriate. Guidance on encrypting all remote access (e.g. web interface or APIs) is available to implementers.	Role-based authorization and authentication exists, if appropriate. All remote access (e.g. web interface or APIs) are encrypted by default using current best practices. An independent security audit of the software has taken place within the last twelve months.	3	1	3	3	3	3	
Inherent security of the database and system architecture, protecting the system from both direct attacks and back door entry, the isolation of the database, and proper firewalling										
No built-in security for the database and systems architecture		Some security for database and systems architecture	Comprehensive security for database and systems architecture	3	1	3	3	3	3	
Encryption of the database and passwords										
No encryption			Full encryption	3	1	3	3	3	3	
Notification of file violations										
No notification on file violations			Notification on file violations	3	1	3	3	3	1	
Audit trail on transaction that identifies user										
No Audit trail that identified user			Audit trail that identifies users	3	1	3	3	3	1	
System violation log										
No system violation log			Yes, systems violation log present	3	1	3	3	1	3	
Self-auditing program										
No self-auditing program			Yes, there is a self-auditing program	3	1	3	1	1	1	
Compliance to country (and GDPR) data privacy and protection laws										
No compliance to country (GDPR) data privacy and protection laws and no independent audit			Yes, there is compliance to country (GDPR) data privacy and protection laws and Independent audit	3	1	3	3	1	3	

	 Functionality does not exist 1	 Functionality somewhat exists 2	 Functionality is well developed 3	DHS2	OMR	OpenEMIS	RapidPro/EduTrac	Waliku	OpenSIS	CGA*
Category 6: Administration and support										
Back up and Storage										
no backup			comprehensive back up and recovery in place	3	1	3	3	3	3	
Fault Tolerance and Robustness										
For a networked system, the system remains on-line if the network goes down										
Networked systems does not remain online when the network goes down			Yes, Networked systems remain online when the network goes down	3		3	3	3	3	
Notification to user of processes not completed										
No, Notification when of process not completed			Yes, Notification to user when process is not complete	3	3	3	3	3	3	
System continues to function properly despite database or operating system errors										
Systems doesn't function when there are database or OS errors		Limited functionality when there is database or OS errors	Yes, System functions properly despite database or OS errors	3		3	3	3	2	
System handles major errors gracefully by providing users adequate time and information to react correctly										
Systems doesn't handle major errors gracefully			Yes, System handles major errors gracefully	3		3	3	3	3	
End-of-Period Processing & Triggers										
There is no Automatic End-of-period processing and trigger		Some triggers and end-of-period processing is automated	Automated end-of-period processing	3	1	3	3	2	3	
User defined triggers										
No user defined triggers		Triggers present but not user-defineable	Yes, user definable triggers functionality	3	2	3	3	1	1	
Support Infrastructure and Maintenance										
Availability and proximity of nearest support office (Most can have local partners)										
No support office nearby		Support office available but far and different timezone	Support office available locally	3	3	3	3	3	3	

			DHS2	OMR	OpenEMIS	RapidPro/EduTrac	Mailku	OpenSIS	CGA*
 Functionality does not exist 1	 Functionality somewhat exists 2	 Functionality is well developed 3							
Version Control and Upgrade Strategy									
No version control and upgrade strategy	Some upgrade strategy available	Comprehensive and well documented version control and upgrade strategy	3	2	3	3	3	3	
Category 7: Technical Specifications.									
Technology and Architecture									
Technology and architecture not well defined	Aspects of the Technology and architecture documented	Technology and architecture well documented	3	2	3	3	3	2	
Hosting									
local hosting	Cloud hosting	both local and cloud	3	1	3	3	3	3	
Storage									
there is a size limit to the database		No size limit to the database	3	3	3	3	3	3	
Storage (empty system)									
Empty systems requires a lot of space	medium space	Empty system doesn't require a lot of space	2	3	2	2	2	3	
Speed									
User interface, report generation and general operation takes long	User interface report generation and general systems operation performs moderately fast	User interface report generation and general systems operation performs fast	3		3	3	2	3	
Category 8: Time to deploy.									
Availability of Public Documentation of Issues or Bugs									
No documentation available in public	Some documentation available	all the documentation is publicly available	3	2	3	3	2	3	
Pre-Built Modules									
No pre-built in core modules	Some core modules are pre-built in	Core modules are pre-built	3	1	3	3	2	3	
Interfaces for Importing Data into the Platform									
There is no interface to import data		There is an interface to import data	3	3	3	3	3	3	
Multilingual Support									
Support available in local language	Some language are supported	Multi-lingual support including local languages	3	3	3	3	3	3	

Category 9: Total Cost of ownership						
DHIS2	OMR	OpenEMIS	RapidPro	Waliku	OpenSIS	CGA
<p>The software is open-source and there are no licensing fees. University of Oslo provides open technical assistance through the Community of Practice. Customization, configuration, and operational support has to be sourced at the country level. This is provided by either an in-country health information system staff or external technical assistance.</p>	<p>OMR typically requires a scanner and the OMR software. While OMR can be labour intensive , it has a very low CapEx</p>	<p>OpenEMIS is an opensource application that is free to download, configure and install. Free knowledge base and product documentation. OpenEMIS also has paid Installation and Configuration at clients site and cloud hosting. They also offer paid support all OpenEMIS users.</p>	<p>RapidPro/TextIt is an open-source and free software. TextIt offers free hosting for all COVID-19 related projects. All costs are encompassed in “credits”. One credit is equal to one message sent or received via the TextIt platform (e-mails from a flow do not use credits). Accounts come with 1,000 free credits. If connected to a channel like a social media platform, (e.g. Facebook, Twitter, Telegram), there is no additional charge for messages. If an SMS aggregator, gateway, or carrier is chosen, there are additional charges per message from the service chosen.”</p>	<p>Being a “homegrown” system, Waliku is still undergoing improvements and they’re in the process of streamlining deployment. Walku is hosted in Azure. The core costs are the development costs (this will reduce with every iteration and deployment), and hosting. OpEx should be calculated in view with the fact that most changes in Waliku require hard-coding.</p>	<p>OpenSIS production customers are hosted in a secured (SAS 70 certified) data center in a private “cloud”. A Software as a Service (SaaS) deployment typically means sharing a hosted instance and database with other customers. This significantly reduces CapEX and allows for scalability. The only OpEX is the “hosting” and “ala-carte” support costs.</p>	<p>Being a bespoke development the main CapEx is the development cost. The initial risk of development is transferred the CGA. Main OpEx is hosting fees (cloud or local) constinued support and any updates and modifications</p>