Deploying an e-Learning environment in Zanzibar: A short guide
Agenda

1. Background and scope
2. Roles and responsibilities
3. Piloting and implementation
4. Budget and timelines
5. List of VLEs
1. Background and scope
In April 2020, the MoEVT and the World Bank approached the EdTech Hub to explore the feasibility of implementing a Virtual Learning Environment (VLE). The parties agreed on three deliverables to support this work.

1. **Feasibility assessment**
   - A practical and actionable report analysing key factors to be considered in deploying an e-learning platform in Zanzibar;

2. **Content curation**
   - A report documenting the process of sourcing appropriate digital content, aligning this content with the curriculum and populating the e-learning system accordingly;

3. **Implementation of a VLE**
   - An implementation plan to guide the deployment of an e-learning system in Zanzibar.

This presentation deck is the third deliverable.
Scope of the implementation guide for VLEs

This resource provides:

- A presentation deck
- An overview of the element that should be addressed in a plan to pilot and implement a VLE
- An outline of a proposed approach that can be used to pilot a VLE
- An overview of the expertise that will be required to support VLE piloting and implementation

Instead of:

- A full document
- A step-by-step framework
- Recommendation of a specific VLE
- All the expertise you need
2. Roles and responsibilities
Roles and responsibilities — principles

1. Curriculum developers take the lead
   Content developers are assisted by technology, but curriculum developers have the final word on how and when content is 'good'.

2. One coordinating body
   There should be one coordinating body, responsible for liaising with all players.

3. Clearly defined roles and responsibilities
   Each institution or body knows what is expected, what their role is, when they play it, and what they will be judged for.

4. No overlap between responsibilities
   Different bodies can contribute to a role, but only one body bears final responsibility.
Responsibilities should not overlap

- Responsibilities should be distinct and not overlap
- Diffuse responsibility may mean no-one takes responsibility
- For example: several bodies seem involved in monitoring

In Zanzibar’s MoEVT, some responsibilities seem to overlap.

For example, monitoring is performed by multiple departments

- DPPR Department of Policy, Planning and Research
  Developing monitoring tools
- Department of Secondary Education (DSE)
  Monitor needs
- Chief Inspectorate of Education (CIE)
  Monitoring usage in classroom
EdTech Hub’s technical assistance to Zanzibar

There is one coordinating body, responsible for liaising with all players.

There are clearly defined roles and responsibilities.

There is no overlap between responsibilities.

DPPR
Department of Policy, Planning and Research

Zanzibar Institute of Education (ZIE)
Content curation

Pres. Office Regions
Administration Local Governments

MoEvt Department
Secondary Education
Awareness/support

Chief Inspectorate of
Education (CIE)
Monitoring

MoEvt Dept Teacher
Education (DTE)
Teacher training

MoEvt ICT Department
Technical guidelines, content creation, Ensure connectivity

Zanzibar Information
Communication
Technology Infrastructure
Agency (ZICTIA)
Last mile connectivity

Teachers
Directly implementing and using content and VLE

Sate University of Zanzibar
(SUZA)
Provide e-content creation and expertise

ZANTEL
Providing broadband access

Zanzibar Broadcasting
Corporation
Broadcasting content

Zanzibar Broadcasting
Corporation
Broadcasting content
Experts must be allocated or hired

There are many **essential roles** in a VLE implementation team.

If experts cannot be found within the ministry, or their time cannot be allocated to this activity, they need to be engaged from outside or from abroad.

**Project lead**
Role: Ultimately responsible for project progress and project managers

**Instructional designer**
Role: Responsible for educational quality of curated and created digital content

**IT architect**
Role: Determines technical and infrastructural requirements

**VLE administrator**
Role: Manages users, content and usability of VLE

**Training designer**
Role: Develops training plans for all stakeholders

**Monitoring and evaluation expert**
Role: Tracks and reports on effectiveness of usage, learning outcomes and project process.
3. Piloting and implementation
Piloting approach and school sample selection

Pilot where you want to **scale**, not where it is **easy** to pilot

- Pilot in schools that represent other schools
- Start ‘down and out’, then move ‘up and in’ (Trucano, 2013)
- Schools with infrastructure usually are better funded, with better teachers, committed principals and more affluent students
- Results from ‘good schools’ do **not** generalise to all schools

![Graph showing number of computers per school by category](chart.png)
Implement through an iterative approach

- Start with a small set of **representative schools**
- Start with a **robust and simple VLE**
- Evaluate and **scale up or redesign**

<table>
<thead>
<tr>
<th>Focus</th>
<th>Discovery</th>
<th>Alpha</th>
<th>Beta</th>
<th>National trial</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding the challenge</td>
<td></td>
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<tr>
<td>Testing solutions</td>
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<tr>
<td>Refining the most promising solutions</td>
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<tr>
<td>Design for national scale</td>
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<tr>
<td>Scale</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of schools</th>
<th>1–5</th>
<th>15–20</th>
<th>150–300</th>
<th>500+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>4–6 weeks</td>
<td>1 term</td>
<td>1 term</td>
<td>1 year</td>
</tr>
</tbody>
</table>
Start with minimal viable VLE and expand

- An agile approach produces viable products immediately
- Iterative, flexible and adaptable
- Creates a series of minimal viable products
- Lets us assess and evaluate if we are moving in the right direction
- Complexity is brought in over new iterations
- For details, see Adam, McBurnie & Haßler (2020)
There are different pathways to a complex VLE

Move to a more complex step only when all conditions in a previous step have been met.

Different pathways can be taken towards a more complex VLE implementation as your needs evolve.

<table>
<thead>
<tr>
<th>Teacher-led</th>
<th>Offline</th>
<th>Online</th>
<th>Asynchronous (occasionally online)</th>
<th>Synchronous (online)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Least complex</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Group-based</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personalised</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most complex
Starting with a complex VLE carries risk

- Implementing a VLE has **many prerequisites**. A more complex VLE has more prerequisites.

- **All prerequisites** must be met for the implementation to be effective.

- If most but not all prerequisites are met, the implementation will **not** be a success.

- In this example, there are many prerequisites and most are met. However, because there is an insufficient data package, the implementation **will not be a success**.

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>Procure hardware</th>
<th>Clear roles within schools</th>
<th>Clear roles within schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage mechanism in schools</td>
<td>Training for supporting staff</td>
<td>Reliable internet</td>
<td></td>
</tr>
<tr>
<td>Charging mechanism in schools</td>
<td>Training for teaching staff</td>
<td>Sufficient bandwidth</td>
<td></td>
</tr>
<tr>
<td>Maintenance contract</td>
<td>ICT support</td>
<td></td>
<td>Sufficient data package</td>
</tr>
</tbody>
</table>

**Procure hardware**

**Clear roles within schools**

**Clear roles within schools**

**Storage mechanism in schools**

**Training for supporting staff**

**Reliable internet**

**Charging mechanism in schools**

**Training for teaching staff**

**Sufficient bandwidth**

**Maintenance contract**

**ICT support**

**Sufficient data package**
A VLE requires a continuous development plan

Deploying a virtual learning environment requires all actors to know their role and be adequately trained to execute it. Developing human capacity to execute these roles is a precursor to successful VLE implementation.

Without well-trained teachers the VLE will not be used. Ministry staff must be equipped to lead the roll-out and support schools to use the platform. Students need to be gradually supported to build the VLE into their daily learning activities. Parents must have a functional knowledge of the VLE to be able to support their children.

There is a chain of dependencies from teachers to supporting staff and school management. All need training in the VLE as part of their continuous professional development plan.
4. Budget and timelines
Developing even a broad budget for a VLE is difficult due to the many variables and ongoing costs, which often vary wildly depending on the level of customisation, users, etc.

It is important to note that even free VLEs are not free: the installation, maintenance, updates, etc., are done by government and institutions instead of the service provider.

The cost of a VLE per student typically goes down as the number of students increases.
Budget

There are many different implementation models. The examples provided range from lowest to highest cost.

These implementation models are examples; there are many others.

We have created two budget examples: one budget example for usage case 1 (the lowest budget) and a budget example for usage case 4 (a high budget).

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
</table>
| 01 | One device per school | - Teachers use the device
- Devices support professional development
- Students do not use the device |
| 02 | One screen per school | - One screen per school in a lab
- Classes rotate through the lab |
| 03 | Shared devices in a lab | - Limited number of devices in a lab
- Devices are shared by around 4 students
- Classes rotate through the lab |
| 04 | One device per student (lab) | - One device per student in a lab
- Students have their individual learning paths
- Classes rotate through the lab |
| 05 | One device per student | - Each student has their own device
- Students have their individual learning paths
- Students bear responsibility for the devices |
**Low budget example — one device per school**

This first example is one of the simpler options. This budget is for an implementation that provides **one device per school; teachers use the device for professional development**. Students do not use the device in this scenario.

This budget example is rough and contains assumptions such as the amortisation of four years for devices.

This budget estimate for only technology and the VLE comes to around $340 per school over four years. Across approximately 1,000 schools in Zanzibar, this is equivalent to approximately **$340,000 every four years**.

<table>
<thead>
<tr>
<th>Item per school</th>
<th>Number</th>
<th>Cost</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>Total (4 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android tablets per school</td>
<td>1</td>
<td>$150</td>
<td>$150</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$150</td>
</tr>
<tr>
<td>Maintenance contract for devices</td>
<td>1</td>
<td>$10</td>
<td>$10</td>
<td>$10</td>
<td>$10</td>
<td>$10</td>
<td>$40</td>
</tr>
<tr>
<td><strong>Total per school</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$340</strong></td>
</tr>
</tbody>
</table>
High budget example — one device per student

The second budget example is a more complex option and represents a situation with **one device per student in a lab; classes rotate through the lab.**

This budget example is rough and contains the following assumptions:

- amortisation of four years for devices
- one lab with 15 devices per school
- a loss of 5% of devices per year
- licensing cost for an VLE of $5 per student per year

This budget contains an estimate for only technology and the VLE.

The budget amounts to around $20,600 per school over four years. Across approximately 1,000 schools in Zanzibar, this is equivalent to approximately **$20 million every four years.**
# High budget example — one device per student

<table>
<thead>
<tr>
<th>Item per school</th>
<th>Number</th>
<th>Cost</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>Total (4 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android tablets per school</td>
<td>40</td>
<td>$150</td>
<td>$6,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$6,000</td>
</tr>
<tr>
<td>Loss of devices of 5%</td>
<td>2</td>
<td>$150</td>
<td>$300</td>
<td>$300</td>
<td>$300</td>
<td>$300</td>
<td>$1,200</td>
</tr>
<tr>
<td>Maintenance contract for devices</td>
<td>40</td>
<td>$10</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
</tr>
<tr>
<td>Storage/charging cart per school</td>
<td>1</td>
<td>$500</td>
<td>$500</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$500</td>
</tr>
<tr>
<td>Local server</td>
<td>1</td>
<td>$500</td>
<td>$500</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$500</td>
</tr>
<tr>
<td>Local UPS</td>
<td>1</td>
<td>$800</td>
<td>$800</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$800</td>
</tr>
<tr>
<td>VLE license/student/year</td>
<td>500</td>
<td>$5</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$10,000</td>
</tr>
<tr>
<td>Total per school</td>
<td></td>
<td></td>
<td>$11,000</td>
<td>$3,200</td>
<td>$3,200</td>
<td>$3,200</td>
<td>$20,600</td>
</tr>
</tbody>
</table>
Budget — human resources per school

The table below provides a rough estimate for the human resource costs per school. The budget below applies to a situation with one lab. Teacher training costs are the additional training costs necessary for working with a VLE and include teacher salary, transport, trainer, lunch, accommodation, etc. Central costs for piloting, content curation, content upload, training material, monitoring protocols, etc., have not been included.

With approximately 1,000 schools, the annual additional **HR cost comes to $12,150,000**.

<table>
<thead>
<tr>
<th>Human resources per school</th>
<th>Number</th>
<th>Cost/person/day</th>
<th>Annual cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher training (20 teachers)</td>
<td>20 days / year / teacher</td>
<td>$25</td>
<td>$10,000</td>
</tr>
<tr>
<td>School management training (3 managers)</td>
<td>5 days / year / school manager</td>
<td>$30</td>
<td>$450</td>
</tr>
<tr>
<td>School technician training (1 technician)</td>
<td>20 days / year / technician</td>
<td>$25</td>
<td>$500</td>
</tr>
<tr>
<td>School technician time allocation</td>
<td>2 days / week (40 weeks / year)</td>
<td>$15</td>
<td>$1,200</td>
</tr>
<tr>
<td><strong>Total (human resources)</strong></td>
<td></td>
<td></td>
<td><strong>$12,150</strong></td>
</tr>
</tbody>
</table>
A good project team is essential, but the relevant expertise may not be present within the ministry or region. Allocating or attracting experts requires budget allocation. For the rough budget below, we have assumed that resources are available in the region. If international expertise is necessary, these costs will rise considerably. Note that external experts are a temporary solution and that the ministry must build its own capacity with their help.

<table>
<thead>
<tr>
<th>Expert</th>
<th>Role</th>
<th>Cost/month (local)</th>
<th>Annual cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project lead</td>
<td>Ultimately responsible for project progress and managers</td>
<td>$4,000</td>
<td>$48,000</td>
</tr>
<tr>
<td>Instructional designer</td>
<td>Responsible for educational quality of digital content</td>
<td>$3,000</td>
<td>$36,000</td>
</tr>
<tr>
<td>IT architect</td>
<td>Determines technical and infrastructural requirements</td>
<td>$3,000</td>
<td>$36,000</td>
</tr>
<tr>
<td>Training designer</td>
<td>Develops training plans for all stakeholders</td>
<td>$2,500</td>
<td>$30,000</td>
</tr>
<tr>
<td>M&amp;E expert</td>
<td>Tracks and reports on usage, learning outcomes and process</td>
<td>$3,000</td>
<td>$36,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$15,500</strong></td>
<td><strong>$186,000</strong></td>
</tr>
</tbody>
</table>
Implementation timelines — steps

1. Select implementation
   - Select specific VLE based on needs (offline, online, at home, etc.)
2. Create budget
   - Is a scale-up feasible for the entire region
3. Check prerequisites
   - What is needed in terms of hardware, capacity, connectivity?
4. Prepare implementation
   - Adjust interface, upload content, design teacher training activities
5. Identify set of schools
   - Pick representative sample; not schools already equipped
6. Identify control group
   - Pick representative sample without intervention to compare
7. Implement
   - Execute the actual implementation
8. Monitor, track and evaluate
   - Vigorous monitoring identifies bottlenecks and assesses success
9. Decide on steps forward
   - Adjust budget, calculate return on investment, decide to scale up, adjust and repeat, or drop
## Implementation timelines

<table>
<thead>
<tr>
<th>Task</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
<th>Month 4</th>
<th>Month 5</th>
<th>Month 6</th>
<th>Month 7</th>
<th>Month 8</th>
<th>Month 9</th>
<th>Month 10</th>
<th>Month 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select implementation</td>
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<td></td>
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<tr>
<td>Create budget</td>
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<tr>
<td>Check prerequisites</td>
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<td></td>
<td></td>
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<tr>
<td>Prepare implementation</td>
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<tr>
<td>Identify set of schools</td>
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<tr>
<td>Identify control group</td>
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<tr>
<td>Implement for 6 months</td>
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<tr>
<td>Monitor, track and evaluate</td>
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<tr>
<td>Decide on steps forward</td>
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<tr>
<td>Scale up, adjust and repeat, or drop</td>
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</tbody>
</table>
5. List of VLEs
Examples of VLEs

We have gathered a list of potential VLEs. This is not a complete list.

Selection criteria for these VLEs were:

- They offer **offline capabilities**; in some cases, this requires a local router with the VLE installed
- They allow **content** to be **uploaded**; in some cases, they may contain their own content as well
- The **links** at the end of this deck refer to **more resources**

Licensing costs are only a fraction of the Total Cost of Ownership (TCO) for any implementation.
Examples of VLEs

<table>
<thead>
<tr>
<th>VLE</th>
<th>License</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolibri</td>
<td>Free</td>
<td>Low-cost solution designed for and tested in LMICs (e.g., Tanzania, DRC). Large content library; offers full offline VLE (including student assessment).</td>
</tr>
<tr>
<td>Rachel Plus</td>
<td>Free</td>
<td>Low-cost solution around a local, offline server (the ‘Rachel’). Focus on content provision rather than VLE features.</td>
</tr>
<tr>
<td>Moodle</td>
<td>Free</td>
<td>Widely used open source LMS in higher education. Mixed outcomes for schools and LMICs. Limited offline functionality. No content provided. Highly customisable.</td>
</tr>
<tr>
<td>ProFuturo</td>
<td>Free</td>
<td>Proprietary but free in emerging markets; does have some content as well.</td>
</tr>
</tbody>
</table>
Links to resources and further reading


