

# KNOWLEDGE PACK

## Digital Teaching and Learning



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## DIGITAL TEACHING AND LEARNING

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## INDEX

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# Introduction

## What is a KP?

**Knowledge Packages (KPs) are short, pragmatic guides on individual topics within EdTech,** meant to provide sufficient knowledge and understanding so that non-technical stakeholders can make key planning, design, and procurement decisions for education.

They can be used as a starting point for the planning of technology deployment to improve education, especially with education ministries.

## About this KP

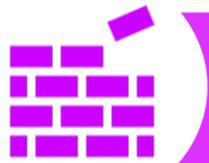
This knowledge pack is designed to support the target audience with how to procure, adapt and implement interventions with digital teaching and learning resources. The key objectives of this knowledge pack are to:

- Understand the existing evidence around the efficacy of using digital teaching and learning resources
- Gain some practical know-how around procuring digital teaching and learning resources, evaluating and adapting them, and training teachers to effectively use them to meet learning outcomes
- Identify potential challenges and gaps in preparation for an intervention

**After reading the main content of this KP, a question might pop\* :**

## WHO are the main stakeholders ?

### CREATORS AND USERS



#### CREATORS

- **Publishers-** Traditional publishers of print books in many cases also develop digital content in all format.
- **New digital content startups-** There are many startups focused on developing engaging and interactive digital content usually in both traditional media such as video as well as newer formats such as simulations, games and VR/AR content.
- **Ministries of Education-** Some Ministries have also developed their own digital content. This trend is getting rarer as publishers and startups now have large content catalogs.
- **Teachers-** Teachers frequently create digital content to use in their own courses, to share with other teachers and for commercial purposes.
- **Students-** Students can also create content usually to share with peers or wider audiences. As students spend more time on social media, they are increasingly creating and sharing content.



#### USERS

- **Students-** Students are usually the primary audience for digital content to support self-led, remedial, remote or facilitated/ guided learning.
- **Teachers-** Teachers are key consumers and users of digital content. Teachers can integrate digital content in their instruction, and they can also be consumers of digital content as part of professional development.
- **Parents-** Some digital content can be targeted at parents to help them support their children especially at early grades or prekindergarten.
- **Community-** Some digital content can also be available to the general community for lifelong learning.

## WHO are the main stakeholders ?

### CORE TEAM

Digital Content creation usually requires collaboration between a diverse set of experts working closely together. This multi-disciplinary team often includes:

**Curriculum experts-** work with SMEs to ensure alignment of content to the curriculum and learning objectives.

**Subject Matter Expert/ Teachers-** the person with the knowledge on the topic or subject.

**Learning/ Instructional designers-** these are like the “architects” of digital content. They often analyze the needs of learners, design learning paths, consider interactivity and other learning elements to ensure content is engaging and address learning objectives.

**Programmers-** some content will require coding and programmers work with instructional designers to create content containers or stitch elements of the content together, create interactive elements, etc.



**Multi-media designers-** often work on multimedia elements such as video, audio and animations.

**Assessment experts-** are responsible for creating and integrating assessments into the content.

The requirement for such a diverse team usually means good, engaging digital content can be expensive to create!

# WHO are the main stakeholders ?

## OTHER STAKEHOLDERS



### Legal experts

Digital content can come with a multitude of licensing, Intellectual property and legal use requirements. It is a good idea to have legal experts review the license and the terms of use of the content, what you can and can't do with the content.



### Procurement experts

Given the multitude of licensing and delivery options and growing range of providers, it is prudent to involve procurement experts early in the buying or acquisition process to ensure compliance or alignment with procurement rules.



### Finance experts

It is a good idea to involve finance experts early in the buying process as it can be complex to compare financial offerings of different providers and new content licensing models may require a change in financial rules (e.g. away from onetime licenses to recurring licenses).

## WHY is this KP designed ?

### BENEFITS

The primary content used in education is text and images in a printed book. While books are a critical element of education, digital content can replace, complement and extend the capabilities of a book. They can also replace or enhance other learning resources such as labs.

Digital Content is useful in education for several reasons:

- **Engage students-** Digital content with interactions can increase engagement for students.
- **Improve conceptual understanding-** digital content is useful in explaining abstract concepts by rendering them in a visual form or through simulations.

- **Reduce costs of learning materials-** the cost of reproducing and distributing digital content can be marginal.
- **To support remote and hybrid learning-** digital content is critical for learning in a remote and hybrid situation.
- **Substitute for expensive physical resources-** digital content such as simulations and virtual reality can substitute for expensive laboratories or field trips.
- **Support real-time assessment –** data linked to digital content use can provide clear learning metrics in real time.



## WHY is this KP designed ?

### DIGITAL VS PRINTED BOOKS

Evidence has shown for decades that the availability of textbooks is one of the most important predictors of academic achievement and educational opportunities for children in low and middle-income countries, yet many countries struggle with the costs and other associated challenges (Heyneman, 1990). Digital learning and teaching resources are not an all-encompassing solution, but there are a number of challenges they can help address:

<b>Textbook cost and procurement</b>	Procuring, transporting and tracking textbooks and other learning materials has been a huge cost and challenge.
<b>Content flexibility and accessibility</b>	Textbooks, workbooks and other traditional materials are costly and difficult to update. They can contain outdated content, and do not meet the needs of learners with disabilities.
<b>Support for teachers</b>	A central task of teachers' work is to design, research, select, modify, and recombine the learning resources they have available to design their lessons and engage with students. Digital content and resources offer the possibility of teachers, either individually or collectively, to curate, adapt and design their content drawing from more options than only paper-based materials. Digital resources can also facilitate problem-based and project-based approaches and foster collaborative learning ( <a href="#">UNESCO, 2019</a> ).

## WHY is this KP designed ?

### INCLUSION

The flexibility of digital content allows for low cost adaptation to support inclusive education. This flexibility supports the concept of personalized learning and teaching at the right level. Three target groups – women, rural students and students with disabilities are key audiences for personalized digital content.



#### Women and girls

Evidence has shown that the implementation of mobile literacy interventions at the beginning of primary education can prevent gender disparities driven by pedagogical practice (Pitchford, 2019). Digital content developed for women and girls can help to ameliorate gender divides and content with gender bias.



#### Rural communities

In least developed countries (LDCs), 17 percent of the rural population live in areas with no mobile coverage at all, and 19 per cent of the rural population is covered by only a 2G network, whereas almost all urban areas of the world are covered by a mobile-broadband network (ITU, 2020). Digital content that can be produced as text, audio or video and distributed across multiple platforms – radio, TV, mobile and Internet as well as off line Internet content provide cost-effective means to reuse and repurpose content for rural students.



#### Disabilities

For learners with disabilities, access to assistive technologies, accessible content and pedagogical approaches which follow universal designing for learning standards are critical to ensure quality education. Accessible content is a particular roadblock for learners with disabilities, as most materials are in print and not designed for screen readers, do not have sign language videos, limited or culturally inappropriate symbol sets, etc.



Assistive Tech KP

## WHAT are the potential solutions?

### CORE CONCEPT

Digital Content refers to teaching and learning resources that are published and distributed in a digital and/or electronic format.

Digital content includes text, e-books, audio video, games, e-workbooks and worksheets, photographs, simulations and animations. These resources can be used across various media such as radio, television, mobile phones and the web.

Digital content can cover a curriculum or be standalone covering a fact, theory, concept, activity, lesson plan, unit, a subject in a grade or an entire course

Digital content is also closely associated with the data that it produces and how

that data is used for assessment and adaptive learning (see more in these two knowledge packs)

Digital Content comes in two primary forms:

- **Commercial Content:** paid content, usually aligned to standards and can be highly customized.
- **OER (Open Educational Resources):** free content or content with relatively low-license fees, can be modular and edited, adapted and customized.



Picture credit: World Bank

While a lot of focus is usually on the electronic devices, it should be noted that devices are just “containers” and that the real value is in the Digital Content.

## WHAT are the potential solutions?

### TYPES OF DIGITAL CONTENT

#### MOST COMMON AND GROWING TRENDS IN DIGITAL CONTENT

##### Some of the most common digital content includes:

- **E-Books-** electronic version of print books or a digital only book that contains text and images and is read on a computer or other electronic device like a tablet screen.
- **Video-** Video is a powerful teaching and learning resource that can engage learners more than text alone. Video can also be recorded from live face-to-face classes or videoconferences/ webinars.
- **Audio-** Audio files (e.g. MP3, MP4, WAV), Podcasts and Audiobooks are versatile digital formats that can be used on their own or to complement other teaching and learning resources.
- **Presentation Slides based content-** Presentation Slides are frequently used to rapidly develop digital content. They are very popular in training and higher education.
- **Multi-media interactive content-** This content combines text, images, audio, animations and video. It is also usually interactive prompting and engaging users.
- **Quizzes-** digital quizzes can be used to determine prior knowledge, assess understanding, identify gaps in learning and many other situations.
- **Animations-** can engage learners and can be used to easily convey complete abstract concepts.

##### And growing trends in digital content format in education includes:

- **Simulations-** usually simulates real-world situations and can be a great learning tool. Some good examples of simulations are Virtual Labs.
- **Games-** Gamification is a hot topic in education as games can engage learners and make learning fun.
- **Adaptive Learning-** combines data and analytics to provide appropriate content to support teaching at the right level and personalized learning.
- **Virtual Reality/ Augmented Reality-** is growing in education and training.

## WHAT are the potential solutions?

### TYPES OF DIGITAL CONTENT

#### CORE DIFFERENCES BETWEEN COMMERCIAL AND OPEN

Commercial content and open educational resources differ in a few key ways.

COMMERCIAL CONTENT	OPEN EDUCATION RESOURCES (OER)
They are <b>accessible</b> only through special permissions or they are completely proprietary. They are not open to adjust, adapt or reuse without the express permission of the content publishers.	Most are open or abide by a <a href="#">creative commons license</a> . Users often have the ability to Retain, Reuse, Revise, Remix, and Redistribute (the 5R's) the content for educational purposes. Licensing is important to review and can limit use.
The <b>cost</b> is set as pay-as-you-go or by subscription.	Materials are distributed at low or no cost with legal permission for the public to use, share, and build upon the content.
Sometimes customized and designed to align to <b>curriculum standards</b> .	Rarely ever aligned to curriculum standards. Mapping them to the curriculum, localizing them, and ensuring that they work together are the responsibility of the user (in this case, an MOE).

## WHAT are the potential solutions?

### TYPES OF DIGITAL CONTENT

#### DIGITAL CONTENT FOR MOBILE PHONES

Given that Mobile phones are the most prevalent technology tool available to teachers, students and parents, they could be better suited to access and use digital content.

There are four ways Mobile Phones can be used to access digital content:

- **Through a Smart Phone browser-** Smartphones can access online digital content through a browser just like a Desktop or Laptop. Online repositories of digital content or Learning management systems are increasingly designed as “mobile friendly” and in some cases even as “mobile first”.
- **Through a Smartphone App-** there

are thousands of educational apps that contain all formats of digital content that can be downloaded from Google Play Store (Android) or Apple Store (iOS).

- **Via SMS or USSD-** given that most phones in Low Income Countries are “feature phones” without data capabilities, there are well established SMS text or USSD (text messaging system that establishes a real-time communication session between the phone and a server that can host content) content providers.
- **Offline access with memory cards-** for both smartphones and feature phones, content can be pre-loaded on

memory cards which can be inserted into the phone to provide offline access.

- **QR codes-** Smartphones are used to scan QR codes in physical books to link to additional digital content.

## WHAT are the potential solutions?

### TYPES OF DIGITAL CONTENT

#### DIGITAL LIBRARIES AND CONTENT REPOSITORIES

Digital Content can be available offline and/or online.

When online, digital content can be available through:

- **Content repository-** a collection of digital content usually arranged by subject and grade and free for access to students and teachers
- **Digital Library-** while similar to a content repository, digital libraries also offer gateways to paid and free digital resources including journal databases, research papers and research tools
- **Content Management System (CMS)-** is a system for creating, editing and

publishing content. CMS are a popular way of creating and maintaining content repositories and websites.

- **Learning Management Systems-** can be thought of as content management systems with many additional capabilities such as tracking and managing students and managing content including sequencing and reporting.

## WHAT are the potential solutions?

### TYPES OF DIGITAL CONTENT

#### DIGITAL LIBRARIES AND CONTENT REPOSITORIES

Teachers and students can and do create digital content. However, this digital content raises several questions which Ministries of Education and Educational Institutions should think about in advance. These questions and additional information can be found in this [World Bank EdTech Blog Post](#).

How easy is it for you to **export** your content and data to some other platform or system?

Who **owns** this content?  
Who owns the **Intellectual Property (IP)** of the content?

Who is **liable** if this content is misused, or where the existence of such data or content potentially violates an existing law or regulation? Some countries require all content to be “vetted” by a competent authority that ensures adherence to standards before being used by students.

Who has rights to **use** this content (in various ways)? Is it for any student or teacher? Who can assign or **transfer** these ownership and usage rights to others, and under what conditions? This is related to who owns the IP.

Who has rights to **access** this content?



## are the potential solutions?

### WHAT HAS BEEN DONE IN OTHER COUNTRIES

#### MALAYSIA, SOUTHEAST ASIA

[Wawasan Open University in Malaysia](#) created a team to find OER linked to specific units of study. Educators will only use OER if they are aware of them (and if they can find and modify relevant OER). Regular outreach, advocacy and training in ways of finding, modifying and using OER are essential to any effective OER program.

#### AFGHANISTAN, SOUTH ASIA

For the [Darakht-Danesh Library](#) (DDL) in Afghanistan, a full-time multilingual editor organized the work of global teams of volunteer translators to adapt OERs into Dari and Pashto.

#### UAE, MIDDLE EAST

[Madrasa](#) is an e-learning platform with more than 5,000 freely available educational videos in Arabic for k-12 learners. Videos are available across subjects including science and mathematics. Madrasa works directly with school districts and has reached over 10 million users throughout the COVID-19 pandemic. It is part of the Mohammed Bin Rashid Al Maktoum Global Initiatives (MBRGI).

#### PERU, LATIN AMERICA

The government curated already existing content to fit the curriculum during the Covid 19 pandemic. They also created some content in the areas that had no content to ensure continuity in learning, and made content [available and free](#).

#### KENYA, AFRICA

As part of the [Digital Literacy Program](#), Kenya has developed standards and a framework for evaluating Digital Content. Content is sourced from publishers and OER providers, evaluated and made available to students on the DLP Tablets as well as online at the [Kenya Education Cloud](#).

Traps to avoid along the way

## HOW to implement next steps ?

### A SIX-STEP IMPLEMENTATION PROCESS

- #1 ASK WHY- Establish goals and objectives to be achieved by using digital content**
  - Goals can include remote learning, remedial learning, use by teachers to improve learning, to support students etc.
- #2 Establish minimum STANDARDS and quality assurance processes**
  - Standards can include formats, technical specs, offline vs online capability, user interface design, accessibility, curriculum alignment/ coverage, license types.
- #3 EVALUATE, adapting digital and aligning (mapping and sequencing) the content to the curriculum**
  - Especially for OERs, content will still need to be mapped and sequenced to the curriculum and evaluated.
- #4 ACQUIRE/ Procure/ develop digital teaching and learning materials**
  - Digital content could be free (OER), commercial or produced in-house. Free and in-house content may not need a formal procurement process.
- #5 TRAIN teachers to use and adapt digital teaching and learning materials**
  - Without training teachers, the content may go unused! Teachers can also be a source to curate or create content.
- #6 DEPLOY content for use**
  - Deploy content to a Learning Management System, other content repository or container.

Ministries should not under-estimate the effort required PRE and POST acquiring/ procuring the content. Time spent at these two stages is critical for successful usage of the content.

## HOW to implement next steps ?

### #1 ASK WHY

#### ESTABLISHING GOALS AND OBJECTIVES

Before jumping to procurement or creating a repository of free and open-source content, it is critical to ask what the end goals and objectives are for use of the content. The objectives you set could have major impact on the type of content and content acquisition strategy you follow.

Some examples of common goals are:

- Replace print books with digital books- this may mean working more with commercial publishers, dealing with licensing and IP protection issues and ensuring every child has a device to access the e-books.
- For remote or hybrid learning- this may require content that is developed for self-led learning and may usually require an accompanying learning management system (offline or online) that sequences the content and tracks and supports student learning.
- For use in the classroom to improve student engagement, explain concepts- this may require that content be designed for use by teachers, is easy to find, is accompanied by teacher guides, can be modified by teachers and that teachers are well trained to find and effectively use the content.
- For remedial learning- this may require that the content is delivered through an adaptive learning system or use of gamification apps.
- To enrich practical courses e.g. in vocational education- this may require more use of simulations, AR//VR and gamification type content.



## to implement next steps ?



### #1 ASK WHY

## UNDERSTANDING CONSTRAINTS TO YOUR DIGITAL CONTENT STRATEGY

After determining your goals and objectives, it is important to understand the constraints in the learning environment that may hinder the use of some formats or influence your acquisition strategy.

### Internet access

Where internet access is limited or expensive, consider content that can be downloaded and consumed offline. This has implications for licensing (especially commercial content).

### Digital skills

Video and audio-based content doesn't require much digital skills but when using highly interactive content or game-based or simulation type content, then you will need to ensure that your teachers and students have basic and even intermediate digital skills.

### Type of access devices

The access devices available to schools and students in and outside school will dictate the formats of content likely to be acquired. Screen size, amount of processing power, amount of storage and availability of the devices are all factors to consider. If Radio is the mostly widely used/ available device, then your content be primarily audio. If feature phones are the target device, then consider text and image-based content over SMS, on a memory card or audio content.

### Content Standards and Interoperability

Digital content should be able to be integrated across multiple learning management systems and use of standards such as [SCORM](#) should be reviewed to ensure interoperability.

### Budget

Limited budget can require a careful consideration of the types of content e.g. commercial vs OER that will be acquired. Please note that OER require significant time (and money) to align to the curriculum so consider the Total Cost of Ownership (TCO) when evaluating costs against budget.



## HOW to implement next steps ?

### #2 ESTABLISHING STANDARDS

Standards are critical to selecting appropriate content, procuring content (as part of requirements) and evaluating content. Examples of Standards include:

- Alignment to the curriculum- the extent to which the content is already “mapped” to the curriculum .
- Technical Standards can cover a range of specifications including:
  - Whether the content meets [common standards such as SCORM, xAPI, IMS Cartridge](#) to ensure that the content can work across multiple platforms.
  - Size of files (large video and audio files can require more powerful device, increase internet access costs and require large storage.
  - Meets W3C accessibility standards.

- Visual and Layout- includes user interface, navigation, text sizes
- Assessment – does the content measure student learning and progress as per national assessment standards
- Data and Privacy- does the content collect student and teacher data, how is data handled, who owns the data, what are the privacy safeguards
- IP and Licensing- license type is clear about access, use, adaption and license or IP owner is clear

### EXAMPLES OF STANDARDS

Kenya Institute of Curriculum Development [Standards for Digital Content](#)

- Relevance to the curriculum designs
- Accuracy and currency of the content in the material
- Language use
- Promotion of positive values and attitudes
- Responsiveness to pertinent and contemporary issues
- Multimedia elements
- Technical design
- User guide
- Content optimized for online use with ease of download and smooth streaming
- Compliance with the Kenyan education policies
- Provision of assessment activities to deepen the understanding of concepts and develop required skills

British Columbia [Standards for Digital Learning](#)

ISTE- [Qualities of Good Digital Content](#)

## HOW to implement next steps ?

### #3 EVALUATING DIGITAL CONTENT

Here are some key considerations in evaluating content:

Test the content on the devices and platforms it will be used on- this is obvious but not always followed!

Have pre-established [standards](#) (covered earlier) against which content will be evaluated.

Level of digital skills of the users is a key aspect to inform decisions on content selection. Including end user testing is required to “pilot” the content with students and teachers and receive their feedback.

Have the right [team](#) and mix of skills to evaluate the content. Key team members include:

- Subject matter experts
- Curriculum experts
- Learning/ Instructional designers

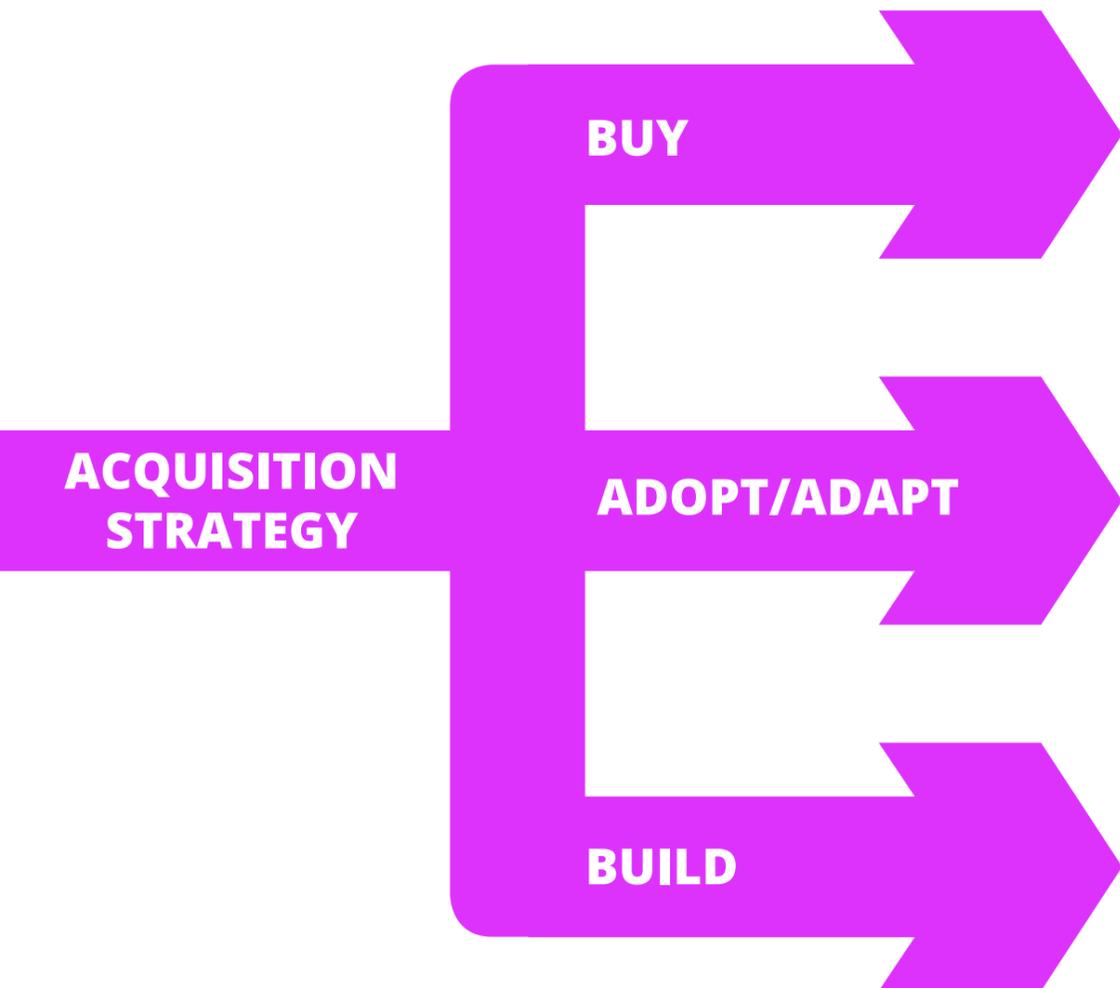


## to implement next steps ?



### #4 ACQUIRE

#### THREE MAIN OPTIONS FOR ACQUISITION OF DIGITAL CONTENT



#### Buy (commercial content)

Commercial content or digital content for pay is digital education content developed by private-sector companies. Commercial content could also be content developed by teachers on various topics and available at a cost.

#### Adopt/Adapt (OER)

OERs are low-cost or free content. OER are often leveraged as supplemental materials that can complement existing commercial content to address content gaps.

#### Build own content

There is also the option for an MOE to develop original digital teaching and learning content in-house. It's important to consider if it's more advantageous to buy or build content.

# HOW to implement next steps ?

## #4 ACQUIRE

### COMPARING ACQUISITION APPROACHES

	PROS	CONS
Buy Commercial Content	<ul style="list-style-type: none"> <li>• Can be high quality</li> <li>• Mostly likely to be aligned to the curriculum reducing time to use</li> <li>• Get regular updates to the content</li> <li>• Flexible access options</li> </ul>	<ul style="list-style-type: none"> <li>• Can be expensive</li> <li>• Procurement process can take long</li> <li>• Licensing costs can be confusing</li> <li>• Sustainability is an issue</li> <li>• not open to adjust, adapt or reuse without permission of owner</li> </ul>
Adopt/ Adapt low-cost or free content (like OER)	<ul style="list-style-type: none"> <li>• Often Free!</li> <li>• Quick to acquire (best option to start in an emergency)</li> <li>• Can modify (depending on license) to customize to user environment</li> </ul>	<ul style="list-style-type: none"> <li>• Quality can be an issue</li> <li>• Rarely ever aligned to curriculum standards. Often requires extensive effort to map and align to curriculum</li> <li>• Maintaining OERs can be a challenge</li> </ul>
Build content	<ul style="list-style-type: none"> <li>• Full control over content</li> <li>• Can fill niches with low economies of scale e.g. local languages</li> </ul>	<ul style="list-style-type: none"> <li>• Requires significant expertise that Ministries don't have</li> <li>• Content takes a long time to develop</li> <li>• Sustainability (regular updates)</li> </ul>

## HOW to implement next steps ?

### #4 ACQUIRE

#### PROCUREMENT OF DIGITAL TEACHING AND LEARNING RESOURCES - IMPLEMENTATION STEPS

##### #1: Source resources from multiple publishers and repositories.

It can be challenging to find high-quality resources if you don't know where to look. Use a multi-pronged approach which includes local repositories, global repositories and reaching out to local content producers. You can also run a brainstorm session to map all the content producers in your local ecosystem, and draft a strategy of how you can collaborate with them to acquire open resources or content for pay.

Check out the following global repositories to start: [Kolibri](#), [Ustad Mobile](#), [Rumie](#), [PBS Learning Media](#).

##### #2: Schedule content demos.

Once you've identified repositories and content publishers that meet your criteria list, set-up content demos to see the resources in action. Ask for analytics, assessment data, implementation models and any information that can help you narrow down the list and make an informed decision.

Sites like [OER Commons](#) are designed to provide reviews of OER after classroom use.

##### #3: Weigh the pros and cons of different types of resources.

Digital teaching and learning resources will have various cost models, from annual subscriptions and licenses, to pay-as you go, to freemium access and free OER. Consider how you might acquire different types of models according to your budget, in order to meet your resource needs. Also consider the viability of resources that will require a budget for subsequent years.

## HOW to implement next steps ?

### #4 ACQUIRE

#### DEVELOPING CONTENT IN-HOUSE

Where a careful cost-benefit analysis favors in-house development or where there isn't enough content in the open market, then Ministries of Education and education institutions looking at in-house development need to consider:

- **Creating a dedicated team** of experts with various skills including having strong project managers on the team
- **Creating a unit**, department or even an agency dedicated to content development. These units are often called Instructional Design Units.
- **Procuring equipment and software:** special (high-powered) computers, cameras, studio equipment, editing equipment, animation equipment and content authoring, editing and

publishing software will be required.

- **Selecting an instructional design model:** there are [many models](#) in use but one of the more [common ones](#) is [ADDIE](#).
- Developing in-house content should also follow the key steps outlined earlier including asking why, setting standards, evaluating content, training teachers and deploying content.

#### EXAMPLES OF CONTENT AUTHORIZING TOOLS

**Presentation software** such as [Microsoft PowerPoint](#) or [GoogleSlides](#) can create and integrate text, photos, video, animations and audio.

[HP5](#)- Open-source tools to create, share and reuse HTML5 content and applications

[Adobe Captivate](#)- a popular content development tool

[Ispring](#)- main feature is ability to convert powerpoint slides into elearning content

[Articulate Storyline 360](#)- great for sequenced content with learning paths for LMS



## to implement next steps ?



### #5 TRAIN TEACHERS ON HOW TO USE THE CONTENT

**Whether the content is teacher-led or student self-paced, it is critical that teachers are exposed to and trained on how to use and integrate the content in their lessons.**

- For student-self paced learning- the teachers need to know the sequence, how to support students, when to recommend the content, how to monitor and track students and how to use any data that the content generates to improve student learning
- For teacher led content- the teachers need to know when, where and how to use the content. Most teacher led content used in the classroom could involve the use of computers, a projecting device and monitor, an interactive whiteboard or a radio or TV. Teacher need to know how to operate the devices, load the content and undertake basic troubleshooting so as not to waste time. Remember a typical lesson is 40 mins and teachers don't want to waste half the time setting up!
- Have clear linkage of the content in the lesson guides
- In addition to the pedagogical skills, include digital skills training for teachers



## HOW to implement next steps ?

### #6 DEPLOY DIGITAL CONTENT

#### Deployment means making the content available to users

- Consider the device that users will use to access the content and ensure that devices are available to students
- Interactive Digital content will need to be “packaged” and delivered through:
  - An online or offline content repository
  - An online or offline Learning Management System (LMS)
  - A mobile app
- Video and audio content can be delivered through TV and radio broadcasts or streamed through the internet: YouTube Channel for video-based content and Podcast channel for audio content or through the content repository or LMS
- For online content, you will need

to consider access and cost of connectivity for schools, teachers and students

- For offline content, you will need to think about logistics of getting the content into the hands of students and teachers. This could involve:
  - Local servers shipped to schools
  - Flash disks and other portable digital media shipped to schools
  - Pre-installed on computing devices before they are shipped to schools

#### Realize that today, most digital content is likely to generate data

- Data can be generated from:
  - User interaction with the content (frequency, duration, which content is used most by who, when etc.)
  - Progress data- how students and teachers are progressing through the content, time spent on tasks,

time spent on a piece of content, learning path taken

- Assessment and quizzes built into the content

- Determine who is collecting the data and who owns the data – commercial and third party OERs may collect this data and make it available to the content owners. The Ministry or Education institution should specify upfront (in the contract or license agreement) who owns this data, who can use this data, how the data can be used etc.
- Gather and analyze this data to track user engagement, to improve the content, to identify content gaps etc.
- Be careful with privacy issues- ensure that data doesn't include personal, identify data or that if it does, the right security, privacy and safeguard controls are in place.

## Conclusion

### WHO

Key stakeholders include **multi-disciplinary development teams**, **developers of digital content** such as publishers and **commercial startups and users** such as teachers, students and parents.

### WHAT

Digital teaching and learning resources are **content that is published and distributed in a digital and/or electronic form and used for teaching and learning purposes**. This includes commercial content, open educational resources (OER), and in-house content.

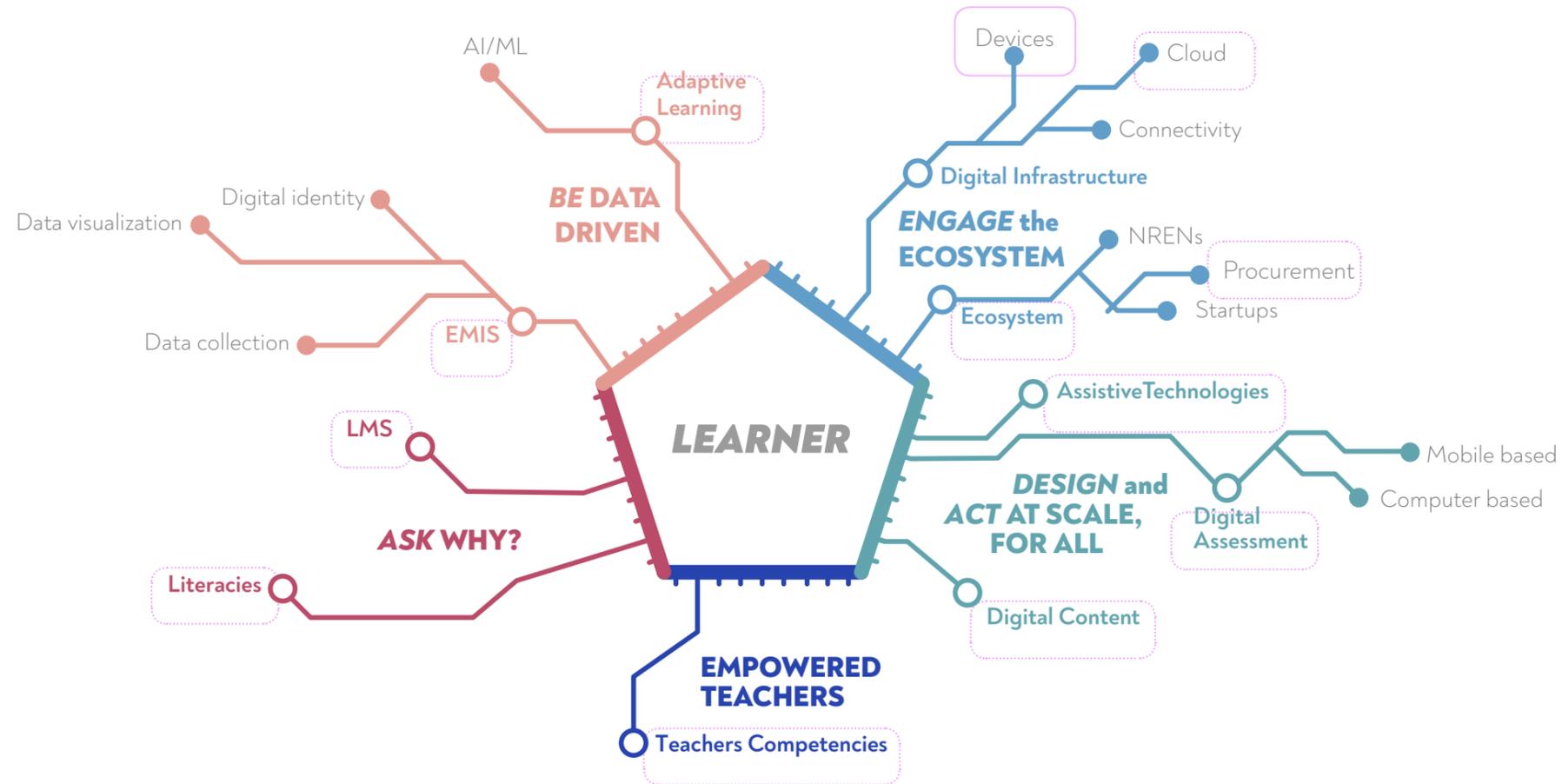
### WHY

Digital learning and teaching resources are not an all-encompassing solution, but they can **address challenges such as textbook cost and procurement, accessible content, and pedagogical training for teachers**.

### HOW

The **key ingredients for a successful intervention** with digital teaching and learning resources include **procurement, evaluation and adaptation, and training teachers** to use and adapt these resources.

**To go further**  
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## Annexes

### REFERENCES

#### PODCASTS

- [Crowdsourcing and Curating Education Content: Lessons from Educlan in Spain \(episode in Spanish\)](#)  
[Listen on Apple Podcasts](#)
- [Creating Edutainment TV for Kids in Africa: A Conversation with Ubongo](#)  
[Listen on Apple Podcasts](#)  
[Listen on Anchor](#)

#### BLOGS

- [Investing in digital teaching and learning resources: Ten recommendations for policymakers](#)
- [Complexities in utilizing free digital learning resources](#)
- [OER may be free, but you still need to invest to use them: Part I](#)
- [How ministries of education work with mobile operators, telecom providers, ISPs and others to increase access to digital resources during COVID19-driven school closures](#)
- [Textbooks of the future: Will you be buying a product ... or a service?](#)

## Annexes

### FAQ

In some cases there may be a dearth of quality materials, and you may want to build your own content rather than purchase it or source OER with in-house capacity. These are some factors to consider in either scenario.

#### If you want to build content:

- Do you have a vision for creating digital teaching and learning resources?
- Does the MOE have technical capacity?  
This might include:
  - ◆ Digital skills
  - ◆ Instructional-design
  - ◆ Content publishing
  - ◆ Learning management systems
- Have you considered where this content will be hosted and how it will be shared?  
Will you host it on an in-house or proprietary learning management system?
- How will you continue to maintain and update these resources responsively?  
What is the technical inhouse capacity of the MOE?

#### If you want to buy or source content

- Is the local market mature and competitive? Have you done a market analysis of the costs to purchase commercial content? Do these costs fall within your budget?
- Are you prepared to cover multi-year subscription licenses? Is the cost the content embedded within a larger digital content or learning management system (CMS or LMS). Embedding in a CMS or LMS presents added value, but could also drive costs higher. Visit the LMS knowledge pack to learn more.
- If the cost is in perpetuity, what is the process when an upgrade is required for the content to run in the CMS or LMS?  
Who will adjust the content so that it runs in the new CMS or LMS?
- Do MOE personnel have the knowledge and capacity to work with content publishers and ensure that content is relevant, integrated to all toolsets, effective, appropriately catalogued, etc.?
- What mechanisms are in place to work with content publishers to guide content development and ensure that it is aligned with government standards?
- How will you design training for teachers to identify, curate and use commercial content against the standards and curriculum and in the teaching and learning process?



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