

Toolkit for Implementing AI-Enhanced Digital Personalized Adaptive Learning Programs

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WORLD BANK GROUP

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Hello!

Welcome to the Adaptive Learning Toolkit, designed to equip World Bank Task Team Leaders (TTLs) with the necessary guidance and resources for implementing adaptive learning technology activities in formal education systems.

This comprehensive toolkit has been curated to offer essential information for every stage of your activity, from preparation to evaluation. Whether you're a seasoned professional or new to the realm of adaptive learning, this toolkit aims to support you in harnessing the power of technology to enhance educational outcomes.

The toolkit is structured into chapters, each tailored to address a specific stage of implementation.

These chapters will guide you through every aspect of your activity journey, providing actionable insights and practical resources to navigate challenges and seize opportunities.

Whether you're laying the groundwork, selecting appropriate technology, designing learning interventions, or evaluating activity impact, each chapter is designed to empower you with the knowledge and tools needed to succeed.

0. Assessment
1. Preparation
2. Implementation
3. Monitoring & Evaluation
4. Scaling up

** While the order of implementation steps is informed by previous interventions in adaptive learning, it is only informative and might vary depending on the specific activity being implemented.*

The team acknowledges the financial support received from the Mastercard Foundation.

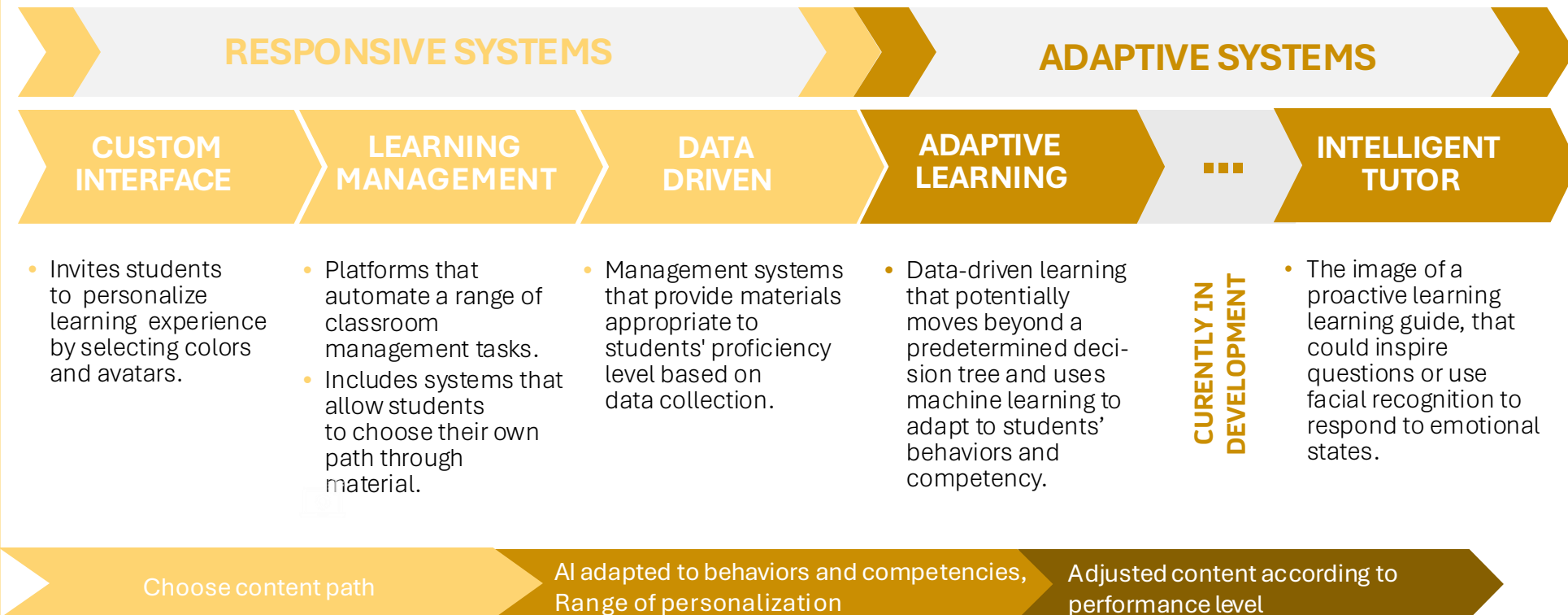
What is adaptive learning?

This toolkit focuses on adaptive learning systems, which can be described as:

- Providing effective and customized learning paths at scale to engage each student.
- Using a data-driven approach to instruction and remediation.
- Dynamically adjusting to student interactions and performance levels, delivering the types of content in an appropriate sequence to support learners to make progress at a specific moment. The adaptation level can go from differentiated instruction to complete personalized learning for each student.
- Being uniquely positioned to function as a computer cognitive tool and a tutor, providing opportunities for meaningful engagement in authentic experiences to represent and construct knowledge and assist in complex decision-making.

What is adaptive learning?

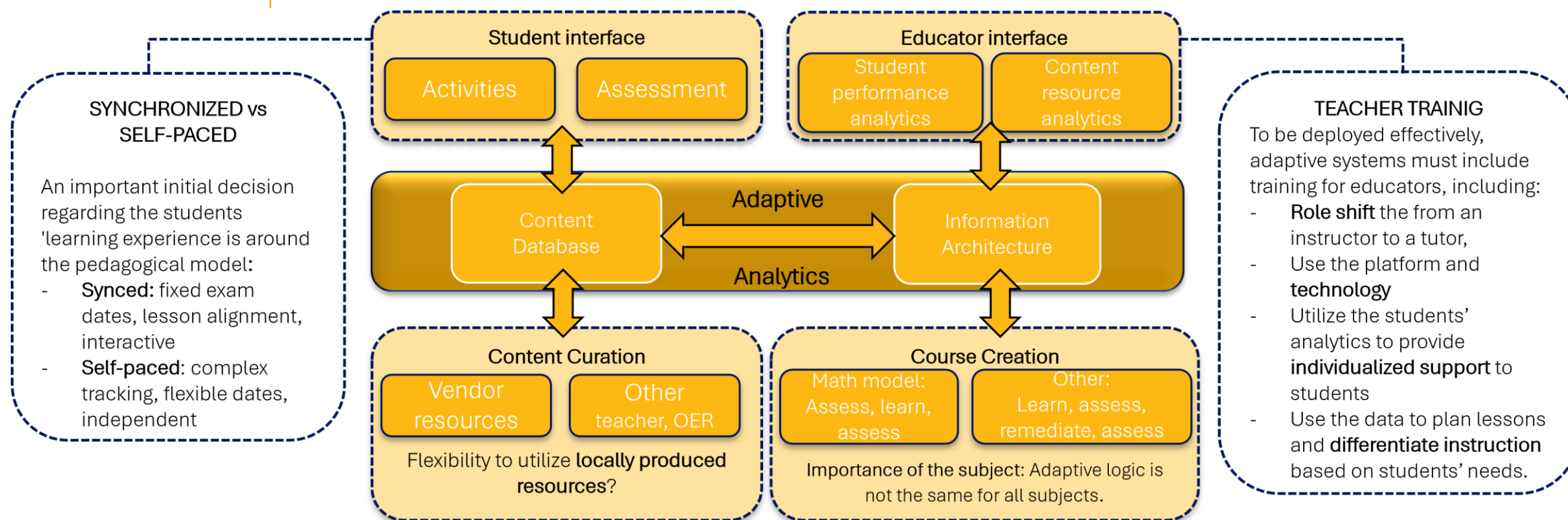
Technologically-enabled personalized learning systems have several levels of adaptation:



What is adaptive learning?

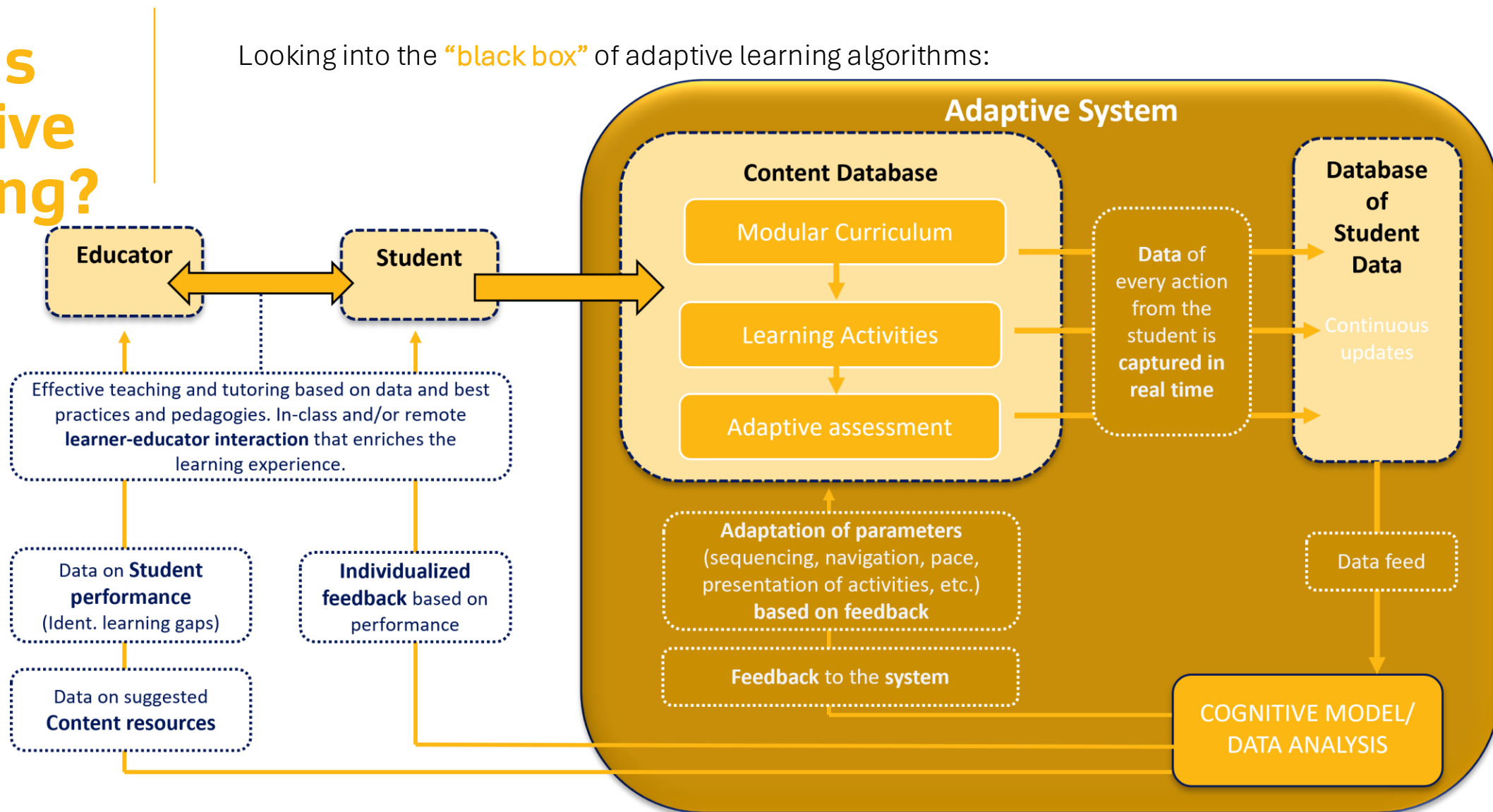
An adaptive learning software includes **multiple system components**, including:

- The **curriculum** (modules of the content to be learned by the students),
- The **resources and activities** to increase student's engagement and interaction,
- the **assessment** (datapoints about progress, provides feedback, linked to the next activities), and
- a **database** with the students' information.



What is adaptive learning?

Looking into the “black box” of adaptive learning algorithms:



Why adaptive learning?

Worldwide, an education crisis persists as learning gaps accumulate, often resulting in student dropout.

Compounding this issue is the **continual increase in the number of students per teacher**, making personalized instruction both challenging and costly to implement.

Inequities in access and learning persist within and across countries, further exacerbating the education crisis.

Amidst these global educational challenges, the **quality of teaching** remains paramount in driving student achievement.

Pedagogical interventions promoting **personalized**

learning and teaching at appropriate levels have demonstrated effectiveness in addressing these issues.

Adaptive learning technology emerges as a **promising solution to be integrated into teaching**, by facilitating the creation of personalized teaching and learning experiences tailored to meet the diverse needs of learners through the **systematic use of a data-driven approach**, thereby addressing the pressing challenges faced in education worldwide.

Why adaptive learning?

Various studies have indicated a range of **positive correlations** between technology-supported personalized learning and improved learning outcomes, with promising results in primary and post-secondary education settings:

	STUDIES	POSITIVE OUTCOMES	MIXED OUTCOMES	NEGATIVE OUTCOMES
RCTs	12	10	2	0
Quasi-experiments	8	5	0	4
Case studies	4	3	0	1
Total	24	18	2	5

Why adaptive learning?



Software Examples*

1/3

	BRIEF EXPLANATION	RESEARCH & EVIDENCE
ALEKS	<p>ALEKS is a research-based, online learning program that offers course products for Math, Chemistry, Statistics, and more.</p> <p>Constantly adapting to update each student's knowledge state, ALEKS guides students to precisely what they are ready to learn at all times.</p>	<p>"On average, students in the treatment group scored 0.28 standard deviations (sd) more than the control group, with a statistical significance at a 1 percent level. This result is quantitatively similar to the impact of an online tutoring program implemented in Italy during the COVID-19 school closing [...] and relatively close to the average impact of in-person math tutoring for pre-K to 12 students."</p> <p>Angel-Urdinola, Avitabile & Chinen, 2023.</p>
Knewton Alta	<p>Includes text-based and video instruction, interactive learning content, assignments and review materials.</p> <p>It can identify and dynamically boost knowledge gaps while you're completing assignments.</p>	<p>Alta makes an impact on learning outcomes for students of all ability levels.</p> <p>Wolf R. and all, 2018.</p>
ASSIST-ments	<p>Students receive hints and explanations to assist their understanding as they complete their assignments. Teachers get real-time assignment reports detailing student and class performance and common wrong answers and other rich insights.</p>	<p>"The intervention significantly increased student scores on an end-of-the-year standardized mathematics assessment as compared with a control group that continued with existing homework practices."</p> <p>Roschelle, Feng, Murphy & Mason, 2016.</p>

Source: [Technologies for Personalized and Adaptive Learning Knowledge Pack](#), World Bank (2022)

* The software landscape is evolving rapidly with new solutions arising and old solutions discontinued. You should therefore always look for the most recent developments and evidence.

Why adaptive learning?



Software Examples

2/3

	BRIEF EXPLANATION	RESEARCH & EVIDENCE
Mathia	Students get the 1-to-1 feedback and encouragement they need and the chance to own their learning and monitor their progress in Math , even as they work from home.	An independent study funded by the U.S. Dep. of Education, conducted by the RAND, the Carnegie Learning blended approach nearly doubled growth in performance on standardized tests relative to typical students in the 2nd year of implementation. Pane JF et al, 2015.
Matific	This Digital Math Platform designed by education experts can work offline and is device agnostic, offering a wide range of possibilities to be used in different environments and contexts.	A study from the University of Western Sydney shows Matific can help raise academic performance by up to 34%. Attard, C. 2016.
Onecourse	onecourse is a comprehensive course for children learning to read, write and become numerate . Children work offline on tablets, at school or home, through a carefully structured course made up of thousands of engaging activities, games, and stories.	“The tablet literacy intervention produced a statistically significant positive effect on overall gains in literacy, with an effect size of .34 standard deviations. This translated into gains of 5.3 months of additional literacy learning over the control group for learners in the literacy intervention group, an added value of about 66%.” Imagine Worldwide, 2020.
Math-Whizz	This is an adaptive learning program that uses AI and gamification elements designed to support students from kindergarten to grade 8 in Math .	Studies carried out by independent evaluators have shown a relationship between learning gains on Math-Whizz and increased performance in external assessments. Whizz Education Proof Pack, July 2020.

Why adaptive learning?



Software Examples

3/3

	BRIEF EXPLANATION	RESEARCH & EVIDENCE
Mindspark	Mindspark is a computer-based, online self-learning tool that helps children improve their skills in Math and English. It allows each student to follow a learning path that is based on their current level and at a pace they are comfortable with. <i>Math, English, Science.</i>	“[students using Mindspark] scored 0.37 standard deviations higher in math and 0.23 standard deviations higher in Hindi over just a 4.5-month period. Karthik Muralidharan, Abhijeet Singh, Alejandro J
Read Along	Read Along (called “Bolo” in the past) is an AI-powered <i>reading</i> app designed to help primary grade kids learn to read. So far Bolo has launched in Hindi, English, Urdu, Bengali, Tamil, Telugu, Marathi, Spanish, Arabic and Portuguese.	Google piloted the Read Along app in 200 villages in Unnao district, UP India from Oct ‘18 to Jan ‘19 with the help of operational support from the ASER Centre. 64% of participants from the India pilot study with access to the app showed an improvement in reading proficiency, and 92% of the parents noticed some improvement in their child’s reading skills.
Khanmigo	It is an AI-powered personal tutor and teaching assistant from trusted education nonprofit Khan Academy. It is incorporated with Khan Academy’s world-class content library that covers <i>math, humanities, coding, social studies</i> , and more.	Not available yet.

Why adaptive learning?

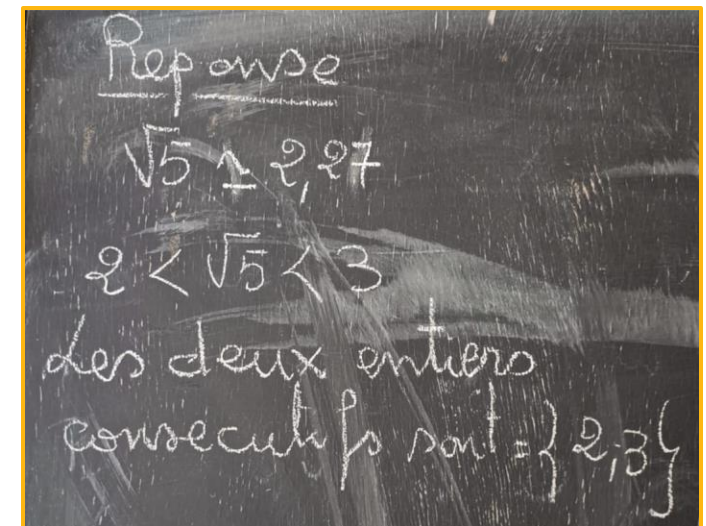
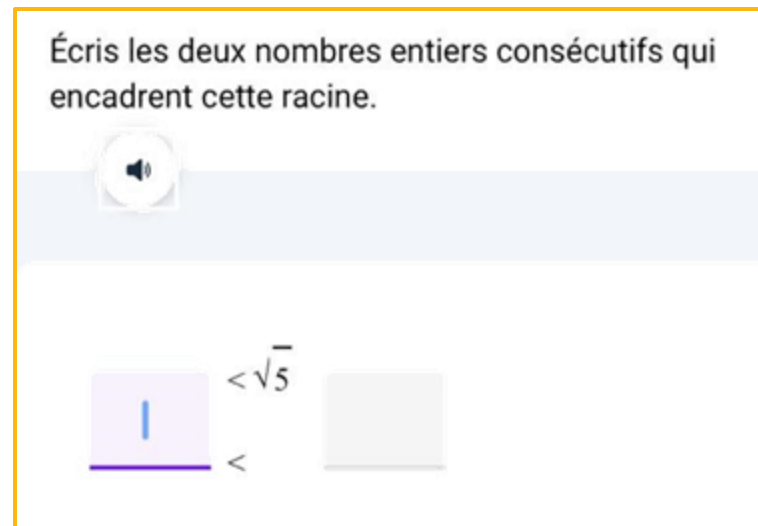
BACKGROUND

In the spring of 2024, the World Bank conducted a small-scale study of the adaptive learning software EvidenceB for French and mathematics at the secondary school level in Côte d'Ivoire and Mali. Lessons learned from the pre-pilot test will inform a larger pilot program in the fall of 2024.

Adaptive learning software can **support teachers** in personalizing their teaching to the various needs of their students.

In Mali, a student could not understand a question on the software and shared a screenshot with their teacher.

The teacher then tailored their explanation to the student's specific question and demonstrated during class how to find the solution.



Why adaptive learning?

BACKGROUND

In 2019 and 2020, the Ministry of Education of the DR (MINERD) and the World Bank implemented the adaptive learning activity PROGRÁMATE to improve math learning across 612 subjects among 9th-grade students using adaptive software.

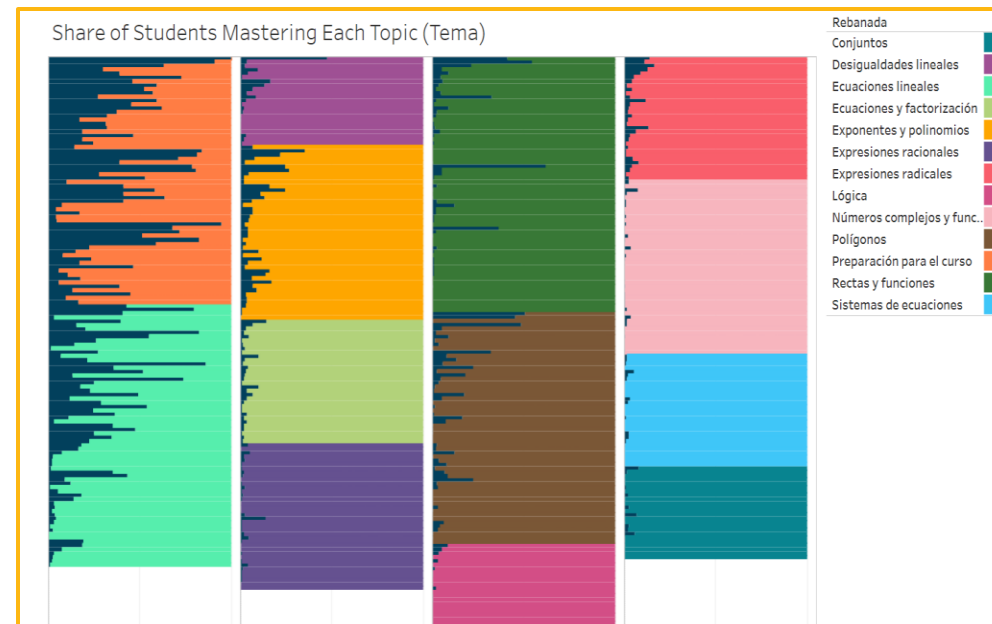
51 schools participated in 2019 and 33 in 2020.

PROGRÁMATE

Using information from the adaptive technology activity PROGRÁMATE in the Dominican Republic, the team extracted the “DNA of learning” of students.

By analyzing students’ assessment outcomes in the learning platform, the team gained **precise insights** into students’ strengths and weaknesses across the math curriculum.

This facilitated **targeted adjustments in teaching methods**, enabling teachers to better support each student's learning journey.





Assess the potential challenges in implementing an adaptive learning activity

In navigating the implementation of adaptive learning activities, it is essential to recognize that the “perfect” conditions may never fully materialize. However, by initiating the process with a thorough assessment of potential challenges and risk drivers, the TTL can proactively mitigate risks and enhance project preparedness.

The TTL can use a [checklist](#) to systematically identify and address obstacles specific to their context.

Key areas of examination include the current infrastructure, levels of teacher collaboration, the compatibility between the platform and the local context, and policy readiness.

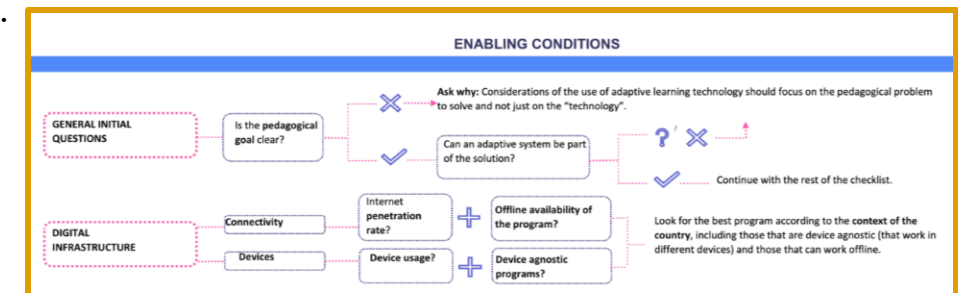


RESOURCES

1. [Checklist](#)

It is particularly critical to consider how the implementation of an adaptive learning activity will **support teachers** and not add more to their workload.

The TTL can also rely on the [Education and Technology Readiness Index tool](#) for a full diagnostic analysis of the country’s readiness for education technology.





Lessons learned

Connectivity. When discussing connectivity, it's important to separate the data network inside the school and the access to the internet. In no/low internet access areas, digital learning may be used using school servers.

LMS, digital teaching, and learning materials. Curated digital content organized according to the curriculum and with different levels of depth according to the learner in a Learning Management System (LMS) are great ways to support teachers integrate a blended education approach while tracking usage/progress.

Teacher training and support. It is critical to provide training - prior to the implementation - and support - throughout the implementation - to teachers on how to best integrate the EdTech solution into their lessons and leverage data for teaching.

Upfront costs. Usually, the biggest costs on adaptive learning programs can be upfront costs such as hardware and connectivity infrastructure.

Accessibility. It is important to make software accessible across multiple devices - namely, laptops, desktops, smartphones and tablets. Offline features should be prioritized in settings with low bandwidth/no connectivity to make products accessible. Offline features may include access to learning content, practice drills, and/or feedback.

Contextualization. The process for localizing the EdTech solution is a key step for the success of any adaptive learning activity, and includes curriculum mapping but also updating voices, illustrations, and stories to fit the context.

Section 1.

Preparation



IN THIS SECTION

- 1.1 Planning
- 1.2 Initial engagement with vendors
- 1.3 Approval of the project
- 1.4 Curricular alignment and material adaptation



1.1. PLANNING

Initial engagement of the activity with the government

Once the TTL has identified the potential challenges to the implementation of an adaptive learning activity in its unique context, the next step is to initiate the discussion with government counterparts.

When engaging with the government about the activity, it's crucial to present a clear and practical overview.

1. Start by explaining why adaptive technology is beneficial for education, outlining how it can improve learning experiences and outcomes and bridge learning gaps.
2. Highlight how adopting adaptive learning can be part of a broader process of data improvement to achieve data-informed decision-making.
3. Discuss how schools can integrate this technology and specify the roles and responsibilities of various stakeholders.
4. Compare the costs of adaptive learning interventions with traditional methods to demonstrate value.
5. Discuss sustainability considerations, such as who should be the owner of the data or how might the data be migrated from one solution to another.
6. Request the establishment of a governance structure, highlighting the need for clear coordination and oversight.



RESOURCES

1. [Ivory Coast PPT](#)



LESSONS LEARNED

Data System Interoperability.
Governments should have a strategic vision and plan for implementing safe and secure interoperable data systems, which they should share with vendors.

Source: [Trends in personalized learning in low- and middle-income countries](#), UNICEF (2022)

To guide you, you can find the PowerPoint presentation used in the [Ivory Coast](#) to initiate discussions on adaptive learning.

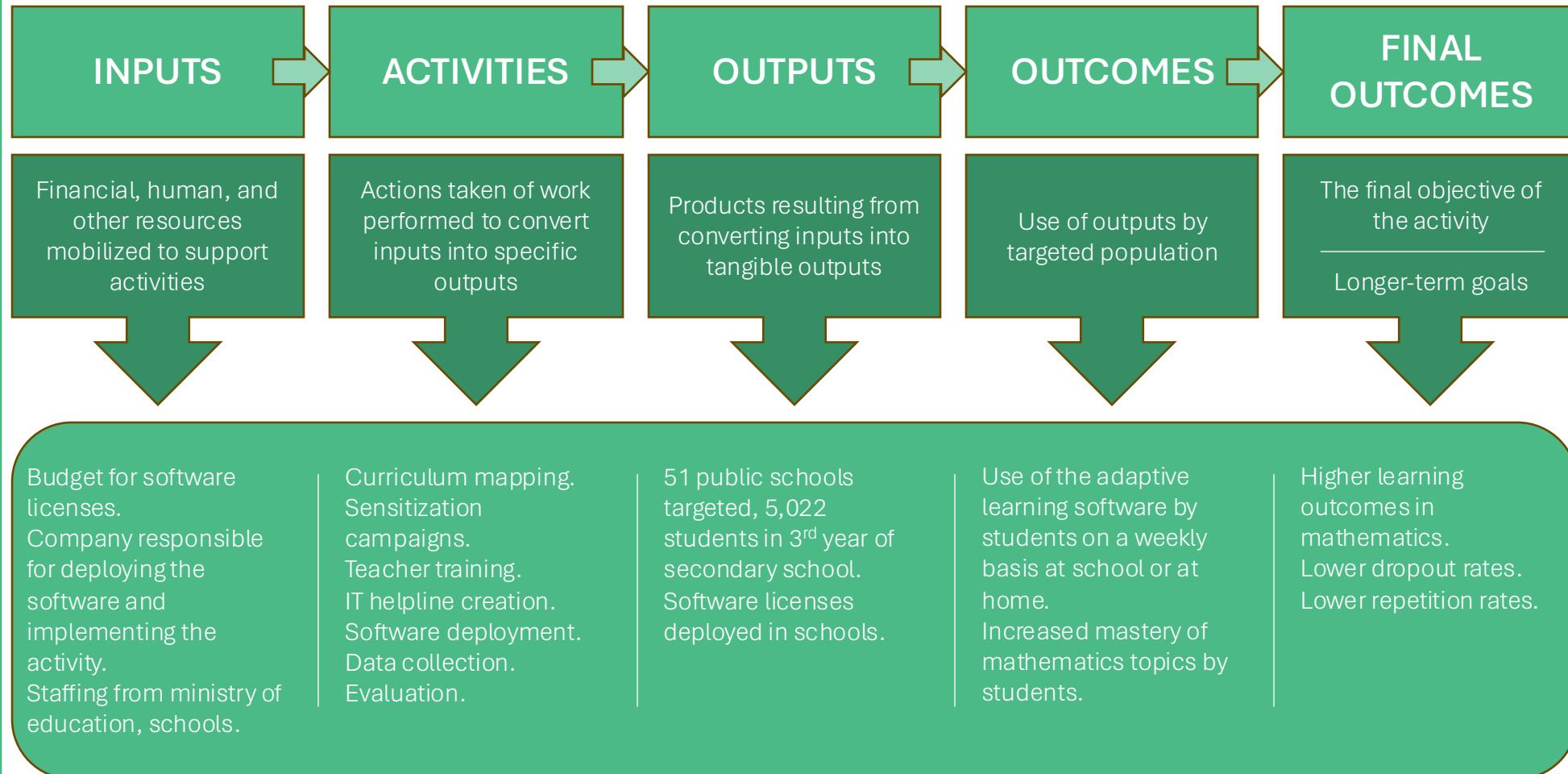


1.1 PLANNING

Theory of Change

The team should design a visual theory of change with tools addressing the various mechanisms of programmatic change.

Below is an example of a Results Chain applied to Programate:





1.1. PLANNING

Identification of target beneficiaries and implementation models

This process involves establishing criteria for selecting schools and beneficiaries and outlining various implementation approaches.

For **school selection** criteria, factors such as internet access, availability of electricity, presence of devices, and human resources should be considered.

Similarly, **beneficiary selection** criteria should involve collecting relevant data on students and schools, including demographics, literacy levels, digital literacy skills levels, language proficiency, disability, and educational achievement

When considering **implementation models**, it is essential to develop a comprehensive scheme outlining the involvement of beneficiaries, intermediaries, and the roles of different stakeholders. This scheme should address key questions like:

1. the number of schools or students in the intervention
2. the academic calendar and the scheduling of sessions
3. teachers' current workload
4. the frequency and duration of platform usage (where and when it can fit into teachers' lesson planning)
5. the type of school-level support (tech, pedagogical, opportunities to share ideas of what worked/did not, etc.)
6. where the adaptive learning will take place (in a computer lab or the mainstream classroom)
7. with what devices (school/personal, laptop/tablet/phone)
8. strategies for engaging students and schools.



RESOURCES

1. [Dominican Republic implementation model](#)



LESSONS LEARNED

Co-design. *It is critical to review and co-design implementation modalities with schools or educational institutions. This collaborative approach ensures that the intervention aligns with the specific needs and capabilities of the implementors, fostering greater effectiveness and sustainability.*



1.1.1. PLANNING

Cost forecasting and scalability

With the target beneficiaries and implementation modality identified, the focus shifts to cost forecasting and scalability, enabling the TTL to gain insight into the financial requirements for sustaining the project beyond the World Bank's involvement.

Using the [Excel template](#) provided, the TTL can methodically estimate costs across project aspects like technology maintenance, personnel, training, and ongoing support.

Additionally, the TTL can evaluate the project's potential for expansion by analyzing the financial implications of **scaling operations** to additional schools, regions, or nationwide.

Scaling up means expanding, adapting, and sustaining successful policies, programs, and projects in different places and over time to reach a greater number of people ([Hartmann and Linn, 2008](#)).



RESOURCES

1. [Excel template](#)

Through this cost forecasting and scalability analysis, the TTL can develop a **practical financial plan and strategic roadmap**, to be revisited throughout the project's life, ensuring its sustainability and long-term impact.

This becomes especially crucial when engaging with the government to evaluate their **capacity for long-term implementation**, particularly at a national level.



1.1 PLANNING

Lessons learned

Fixed costs. *The expertise/ implementation layer is relatively fixed and at scale is a small percentage of overall cost, yet highly impactful.*

Content. *Curate existing content, instead of developing new content, to lower costs.*

Licenses. *Negotiate a better price per license, including maintenance and updates, based on scale.*

Capacity-building. *The upfront cost of investing in building local field support capacity for schools and communities sets up for lower overall long-term costs.*

Devices. *In schools with computers, the cost of expanding/starting an adaptive learning activity can be lower if those can be used.*

Task delegation. *Responsibilities of each institution within the activity system should be very clear (who is in charge of the teacher training, of ongoing teacher, of the tech, etc.)*



1.2 INITIAL ENGAGEMENT WITH VENDORS

Identification of potential vendors

In the process of identifying with the government potential vendors for adaptive learning software, it is crucial to recognize the diversity of options available and the importance of selecting the right software to meet specific needs and contextual requirements.

To help in this process, this toolkit provides a [non-exhaustive list](#) of existing software solutions, offering a starting point for exploration. The landscape evolves rapidly as new software comes onto the market or existing ones get adapted for other levels; check [EdSurge](#) for new solutions.

Additionally, a [checklist](#) is included to guide the selection of the most appropriate adaptive program for a given context. This checklist encompasses factors such as:

1. Compatibility with existing infrastructure
2. Alignment with educational objectives
3. Customization options
4. Scalability
5. Technical support
6. Data analytics

[EdTech Tulna](#) has also developed standards to define expectations for EdTech products' design. UNICEF has also launched the [EdTech for Good Framework](#) which enables the evaluation and curation of safe, impactful and scalable tools.



RESOURCES

1. [Non-exhaustive list of existing software](#)
2. [Selection checklist](#)
3. [EdTech Tulna](#)
4. [UNICEF EdTech for Good Framework](#)

By leveraging these resources and employing a systematic approach to vendor selection, TTLs can ensure that the government chooses software solutions that effectively address their specific needs, maximize impact, and support the goals of the adaptive learning activity.



1.2 INITIAL ENGAGEMENT WITH VENDORS

Collection of expressions of interest

Once the suitable solutions identified, you can start gathering expressions of interest from adaptive technology software providers.

This involves drafting Terms of Reference (see [two examples of TORs](#) in the resources section) that outline critical aspects for consideration, including:

- **Proprietary licensing terms:** Clarify the terms governing the use and distribution of proprietary software.
- **Curriculum alignment:** Specify the requirement for software content to align with local curriculum standards and language preferences.
- **Teacher training:** Mandate comprehensive training for teachers on software usage and refresher training throughout the first 12 months by the contracting company. See [Capacity Building of teachers and headmasters to use the software \(Section 2.2\)](#) for a detailed description of the training's content.
- **Tech helpline:** Include a helpline for ongoing tech support.
- **Governance structure:** Define the relationship between the firm and the governmental entity at both national and subnational levels.
- **Data usage policies:** Address data collection and usage, specifying access permissions (e.g., teachers, school principals) and presentation of data analysis.



RESOURCES

1. [TOR example 1](#)
2. [TOR example 2](#)

- **Content diversity:** Encourage the inclusion of varied learning content modalities, such as audio and images, to cater to diverse learning preferences.
- **Cost breakdown:** Provide a transparent cost breakdown.
- **Evidence generation:** Request that the evaluation phase includes the generation of evidence on what works where and why (ex: RCT, agile evaluation).



1.2 INITIAL ENGAGEMENT WITH VENDORS

Lessons learned

Interoperability. *Personalized Learning companies should strive to align with industry standards for interoperability while being mindful of responsible data practices.*

Track record and reputation. *The team should look for vendors with a proven track record in delivering effective adaptive learning solutions. The team should consider factors such as the number of years the vendor has been in the industry, the variety of clients they have served, and the scale and complexity of the projects they have undertaken.*

Technological capabilities. *It is important to assess the vendor's technological infrastructure, including their Learning Management System (LMS) capabilities, mobile compatibility, and how their system integrates with other systems.*

Content specialization. *The vendor's proficiency in Instructional Design, learning theories, and educational methodologies is important. An experienced adaptive learning vendor will not only understand the technology but will also have a deep knowledge of pedagogical principles.*

User-friendliness. *The software solution should afford easy use and navigation, such as apt use of style, color, graphics, and icons for readability, visual signposts or voice-based assistance, and introduction/orientation to the product.*

Registration process. *Consider easier registration and login features (ex: single sign-on, bulk registration process) to reduce barriers to accessing the platform from cumbersome procedures in LMIC contexts (ex: requiring users to register themselves using their email or phone).*



1.3 APPROVAL OF THE PROJECT

Co-design of a concept note with government

The creation of a concept note with government is a pivotal step in initiating activity implementation.

This structured document serves as a comprehensive overview of the proposed intervention, ensuring alignment with government priorities and garnering official endorsement before proceeding further. The concept note should encompass the following key elements:

- **Country Context and Motivation:** Provide a concise overview of the educational context and the rationale behind the proposed intervention, highlighting challenges, needs, and opportunities.
- **Intervention Description:** Offer a detailed description of the proposed intervention, including its objectives, methodologies, and expected outcomes, emphasizing its relevance and potential impact on addressing identified issues.
- **Beneficiary Group:** Clearly define the target beneficiary group(s) of the intervention, outlining demographic characteristics and specific needs addressed by the activity.
- **Implementation Modality:** Present a comprehensive plan for implementing the intervention, including the roles and responsibilities of key stakeholders, referencing the earlier designed implementation modality.
- **Costs:** Provide a breakdown of the estimated costs associated with implementing the intervention, including budget allocations for technology procurement, training, monitoring, and evaluation.
- **Communications Strategy:** Outline a communication strategy to engage schools, parents, and other stakeholders throughout the activity lifecycle, fostering buy-in, participation, and support.



RESOURCES

1. [Dominican Republic proposal](#)
2. [Timeline chart template](#)

- **Evidence:** Suggest how evidence will be generated on what works where and why (ex: RCT, agile evaluation).
- **Timeline:** Present a clear and realistic timeline for project implementation, with key milestones, deliverables, and deadlines, to ensure effective project management and accountability.

Drawing from a [proposal example](#) from the Dominican Republic can offer valuable insights and lessons learned to inform the development of the concept note.

Moreover, this toolkit includes a [template timeline chart](#) to be tailored to each activity, ensuring a structured and organized approach to project planning and management.



1.4 CURRICULAR ALIGNMENT AND MATERIAL ADAPTATION

Curriculum Mapping

The curriculum mapping is a critical step in ensuring the effective adaptation of software to the educational context.

TTLs can systematically collect information from the government on the target grade's curriculum, as well as the curricula of previous and subsequent grades.

By considering the broader educational trajectory, including alignment with both preceding and succeeding grade levels, TTLs can ensure **seamless integration** of the software within the overall curriculum framework and teachers' weekly teaching.



LESSONS LEARNED

Integrated technology. *Merely training teachers on how to use the adaptive learning software will not be sufficient to guarantee its effective and seamless utilization in the classroom. Rather, it is crucial to comprehensively understand how the technology will enhance teaching. One way of doing this is by integrating the software into teachers' lesson plans.*



1.4 CURRICULAR ALIGNMENT AND MATERIAL ADAPTATION

Adaptation of the software's content

Once the curriculum mapping is complete, the software's content must be adapted to ensure its relevance and effectiveness in the activity's unique educational context.

Research shows that successful ed-tech programs are more likely to align with the local curriculum. This **alignment is crucial** for several reasons:

1. It ensures that the software **content is appropriately scaffolded and builds upon prior knowledge**, facilitating a coherent and progressive learning experience for students and enabling smooth transitions between grade levels. This effectively allows students to **overcome learning gaps** from previous grades and learn the topics corresponding to their de facto level.
2. It ensures that students are adequately prepared for **national assessments**.



LESSONS LEARNED

Engage teachers. *Their review and validation of the content enhances its utility and promotes teacher buy-in during implementation. This collaborative approach ensures that the adapted content aligns with classroom realities and meets the needs.*



1.4 CURRICULAR ALIGNMENT AND MATERIAL ADAPTATION

Adaptation of the software's content

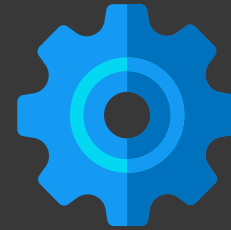
Once the curriculum mapping is complete, the software's content must be adapted to ensure its relevance and effectiveness in the activity's unique educational context.

Curriculum adaptation can be of two forms, and each team should select the one that best aligns with the realities and objectives of their intervention:

- The first involves primarily **selecting items from an extensive pool of aligned items**, which has the advantage of not incurring additional costs to the project. This is more common.
- The second involves **the creation of a more tailored course** and possibly additional items to the existing ones, which would incur additional costs as well as additional steps, such as identifying a committee of curricular experts to collaborate with to develop the program, which may extend the length of the program.

Section 2.

Implementation



IN THIS SECTION

- 2.1 Sensitization of the school community
- 2.2 Capacity building on the software
- 2.3 Adaptive implementation of the software



2.1 SENSITIZATION OF THE SCHOOL COMMUNITY

Sensitization campaigns in schools

The initial step in the implementation phase involves effectively communicating the project details to the implementing stakeholders in schools to ensure their full commitment to the implementation.

The [Ministry of Education must take the lead](#) in communicating with participating schools to ensure institutional leadership and alignment with broader educational goals. This can be achieved by sending a [formal letter of invitation](#) to officially request schools' participation in the project.

Once participating schools are confirmed, the team must [identify any knowledge gaps](#) school actors might have about the intervention, before creating a [tailored PowerPoint presentation](#), containing specific information about the potential benefits of the adaptive interventions, including expected learning outcomes, the implementation scheme, and details about the platform intended for teacher use, in addition to any additional knowledge gaps.

Unlike the general presentation made to the government during the preparation phase, this PPT should offer comprehensive insights into how the project will be executed and how the adaptive learning platform will be integrated into the educational framework.



RESOURCES

1. [Dominican Republic Letter of invitation](#)
2. [Dominican Republic PPT](#)



LESSONS LEARNED

Systematic engagement. *As local engagement efforts tend to be ad-hoc, more emphasis on a systemized process and models for engaging local stakeholders are needed to build local capacity and cultivate buy-in and support.*

Source: [Trends in personalized learning in low- and middle-income countries](#), UNICEF (2022)

School leaders. *Their buy-in can be essential for the activity's success as they can be a great asset to support teachers throughout implementation.*



2.1 SENSITIZATION OF THE SCHOOL COMMUNITY

Sensitization campaigns with families

While school stakeholders are pivotal implementers, **families also play a crucial role** in determining the success or failure of an adaptive learning activity.

It is essential to engage families by sharing product information to ensure they **give access to and encourage their children** to use the technology beyond school hours if necessary.





2.2 CAPACITY BUILDING ON THE SOFTWARE

Tech helpline/ local tech focal points

In alignment with requirements set out in the [Expression of Interest TOR](#) (see [Step 1.2](#)), the personalized learning software company should **build local capacity for a tech helpline** to support participating schools with any technical issues they might encounter while using the software.

This effort should be conducted in **close collaboration with the Ministry of Education** to ensure they can provide tech support sustainably. An IT service and support strategy should be developed in this regard.



LESSONS LEARNED

Investment. *The upfront cost of investing in building local field support capacity for schools and communities sets up for lower overall long-term costs.*

Email address. *An email account could be set up for teachers to use in case they have questions related to using the platform or require technical support.*

Other channels. *Leveraging social media channels already being used by teachers can be an effective way for them to communicate with the tech helpline (ex: WhatsApp).*



2.2 CAPACITY BUILDING ON THE SOFTWARE

Teachers and school leaders

Capacity building for teachers and school leaders is essential to ensure the smooth and effective utilization of adaptive learning technology.

This step is crucial for the **successful uptake and implementation** of the project. While the adaptive learning software company should lead the capacity-building efforts, teachers should be trained on how to:

- **integrate the software into the curriculum** and understand the implications for pedagogy. It should encompass aspects such as (i) which parts of the curriculum will be covered by the software versus traditional teaching methods, (ii) when to use the software, and (iii) for which student demographics.
- use the platform to shift the role from an **instructor to a tutor**.
- **utilize and access the platform** and associated technology.
- use the technology for **students' knowledge development**.
- utilize the data from the platform to **plan future lessons and differentiate instruction** based on students' needs.
- use the findings from students' participation to provide **individualized support** to students, such as (i) **motivational** support to encourage participation/engagement with the platform, (ii) **technical** support to assist with challenges in accessing/using the software, and (iii) **academic** support to complement the software with additional scaffolding and/or provide additional pedagogical resources for students to use.



RESOURCES

1. [Dominican Republic Teacher Training PPT](#)



LESSONS LEARNED

101 guideline. *Provide teachers with a document where they can find key contacts such as the helpline or the local tech focal point, and key instructions on software usage and data analysis.*

Communications channels. *Facilitate among participating schools communication, using Facebook, Telegram, and/or WhatsApp groups, where teachers can share best practices and help each other.*



2.3 ADAPTIVE IMPLEMENTATION OF THE SOFTWARE

Small pilot test

Deploying a quick pilot in a few schools is crucial to identify potential bottlenecks and challenges when implementing the project in all target schools.

[Key questions](#) to ask during the pilot include:

1. Did all students have adequate access to devices? If not, why?
2. Did all students meet the target usage (e.g. 90 minutes per week) of the software?
3. Did all teachers understand how to support students' use of the software?
4. What did teachers find helpful/difficult when implementing this activity?
5. What are the enabling and constraining factors shaping the program?
6. Could the World Bank team access student data on the platform?

At the end of the pilot, teams should organize a [meeting with schools](#) to **socialize the results**.

Additionally, ensuring **smooth information flow and data collection** is essential. The World Bank team must have continuous access to student data throughout the project to monitor progress effectively. See examples of data points collected during Prográmate in **Data collection** (see **Step 3.1**).

This access is particularly critical as the adaptive learning solution is deployed to all participating schools.



RESOURCES

1. [List of questions](#)
2. [Email template](#)



LESSONS LEARNED

Gendered impact. *Socio-cultural norms can significantly affect how women and girls engage in adaptive learning activities. In a pilot conducted in The Gambia, the team observed that female learners were hesitant to ask questions or ask for support because of social norms which made them overly reserved and shy with the all-male coaches and teachers. This impacted their access to the sessions and support, and, consequently, their capacity to effectively use the software.*



2.3 ADAPTIVE IMPLEMENTATION OF THE SOFTWARE

Data collection on beneficiaries

While the final list of data to be collected will depend on the activity's context and the contracted software, key data points on **student beneficiaries** include gender, age, disability, and ethnicity/language. This information will be particularly useful during the monitoring phase.

Information should also be collected about the **teachers** implementing the adaptive learning activity to ensure the team can easily contact them.

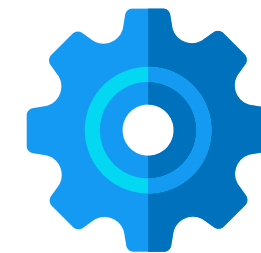
Data privacy and security concerns should be thoroughly considered prior to collecting any beneficiary data.

The resources include a [data collection template](#) used in the Dominican Republic.



RESOURCES

1. [Dominican Republic data collection template](#)





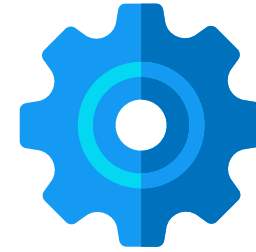
2.3 ADAPTIVE IMPLEMENTATION OF THE SOFTWARE

Software installation on devices

Teams should plan for **substantial time in the work plan to roll out the software** in the participating schools, to prevent any major delays to the start of the project.

Indeed, deploying the adaptive learning software can turn out to be quite challenging, with a fair share of unpredicted complications.

For example, in the Dominican Republic, students and teachers struggled to create their accounts, as they either didn't have email addresses or couldn't access their email, among other problems. While the team can plan for some issues, others will most likely arise, so account for a slower roll-out in the work plan!





2.3 ADAPTIVE IMPLEMENTATION OF THE SOFTWARE

Initial diagnostic assessment of students

Conducting an initial diagnostic assessment of students using the software offers valuable insights into their current learning profiles.

This baseline assessment provides a clear understanding of students' learning needs and abilities, serving as a **foundation for monitoring** their progress as they begin using the adaptive learning platform.

In the resources, TTLs will find an example of how the initial diagnostic assessment in the [Dominican Republic](#) was used to monitor schools' progress.

Following the assessment, it is essential to **engage in a conversation with the government** to present the current situation in targeted schools.



RESOURCES

1. [Dominican Republic](#)

This discussion allows for informed decision-making and strategic planning to support the implementation of adaptive learning initiatives effectively.



2.3 ADAPTIVE IMPLEMENTATION OF THE SOFTWARE

Targeted supervision for students' progress

Data collected from students' performance on the software must be presented in a **user-friendly manner** for teachers to effectively track student progress and tailor their teaching accordingly.

This includes features like the ability to download data in various formats and the platform's creation of progress reports.



LESSONS LEARNED

Evidence-based teaching. *Even when performance results of learners are made available to teachers, parents and/or school leaders, they should aim to translate into actionable recommendations or follow-up interventions.*

Source: [Trends in personalized learning in low- and middle-income countries](#), UNICEF (2022)



2.3 ADAPTIVE IMPLEMENTATION OF THE SOFTWARE

Strategies to increase take-up

TTLs must implement strategies to enhance adoption by schools and students.

TTLs should have already thought about engagement strategies when designing the implementation modality in [Step 1.1](#).

These strategies could include crafting motivational messages tailored for the school community (principals, management team, parents), and offering student incentives.

For more information, refer to the resource on [engagement strategies](#).



RESOURCES

1. [Engagement strategies](#)



LESSONS LEARNED

Student and teacher engagement.

Involving students and teachers in the rollout process of adaptive learning systems is essential for the activity's success. Engagement initiatives aimed at students are designed to create both intrinsic and extrinsic incentives for consistent platform usage. For instance, one successful program selected students to receive training on platform navigation, troubleshooting technical issues, and accessing support services.

Source: [Considering an adaptive learning system? A roadmap for policymakers](#), World Bank (2021)



2.3 ADAPTIVE IMPLEMENTATION OF THE SOFTWARE

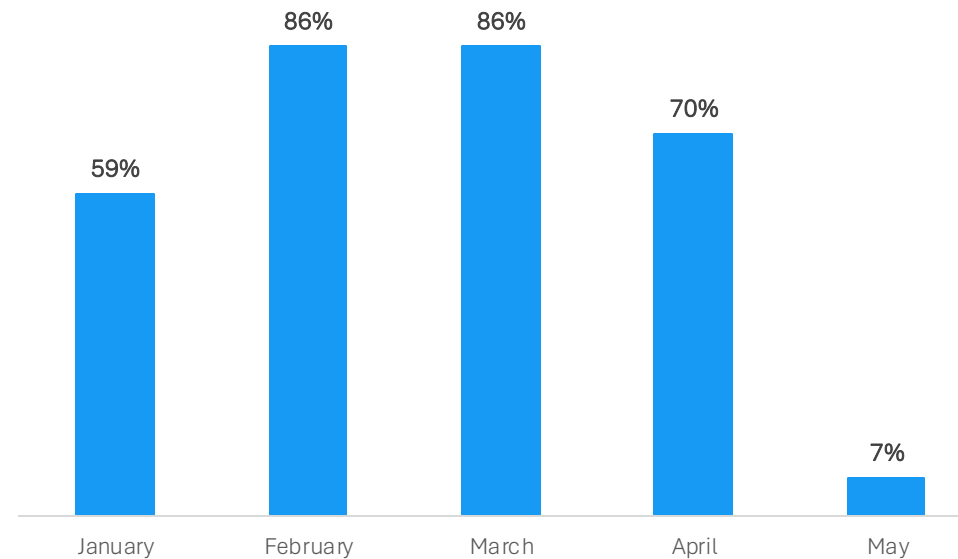
Strategies to increase take-up

BACKGROUND

In 2020 and 2021, the Ecuadorian Secretariat for Higher Education, Science, Technology and Innovation (SENESCYT) and the World Bank implemented an adaptive learning activity using ALEKS to improve pre-calculus learning among over 800 first-year students enrolled in five technical and technological institutes.

The study conducted at the end of the activity showed that software usage per month followed a concave pattern, with an initial increase, followed by a peak, and then a decline (see Figure below).

Therefore, sending motivational messages over time could be critical to both students and teachers to ensure that software usage does not drop off.



Notes: Percent calculated over sample of 5,077 with ALEKS licenses. Percent of treatment students that used ALEKS at least one minute.

Source: [Can Digital Personalized Learning for Mathematical Remediation Level the Playing Field in Higher Education? Experimental Evidence from Ecuador](#), World Bank (2023)

Section 3.

Monitoring & Evaluation



IN THIS SECTION

3.1 Monitoring

3.2 Evaluation



3.1 MONITORING

Data collection

Monitoring activities should inform a continuous adaptation of the activity to improve the implementation of technology and ultimately achieve the indicators.

TTLs must develop indicators to enable policymakers to monitor the adoption of adaptive learning technology by participating schools and students. As such, teams should **collect data throughout the activity** on the implementation and use of the adaptive learning software. A [non-exhaustive list of indicators](#) is available in the resources.

Moreover, monitoring efforts should also include **qualitative data** collected through focus groups and interviews to provide a more **holistic understanding of the experience of beneficiaries** in implementing the activity, as well as the enabling and constraining factors impacting implementation. A list of [questions for focus groups](#) is shared in the resources.



RESOURCES

1. [Non-exhaustive list of indicators to monitor](#)
2. [Focus group questions](#)
3. [Note on how to collect data to measure costs](#)

Lastly, the team should [monitor costs](#) to better understand the **cost structure**, such as the frequency and dosage of certain activities/inputs.



3.2 EVALUATION

Preliminary assessment

At the end of the adaptive learning activity, it is crucial to measure the impact of technology on learning to understand if the intervention achieved the proposed objectives and to adapt according to lessons learned.

Initial questions to answer for a better understanding of the impact include:

- **Infrastructure:** Was the technology adequate to the currently available infrastructure (in terms of electricity, connectivity, and devices)? How did the program's dependency on digital devices impact the existing digital divide of the students?
- **Teachers:** Were teachers trained on how to use the technology and effectively incorporate the tool in their teaching? Were teachers trained on how to leverage the data and findings to support personalized learning?

- **Content and platform:** Was the content mapped to the local curriculum? Was the content contextualized?
- **Equity:** Did all students access and use the platform? Did all students benefit from the adaptive learning activity? What might have driven inequities in access and usage?
- **Policy:** Are national/regional education leaders able to monitor/track progress? Was the Ministry of Education staff trained to work with such systems and were policies adapted accordingly, providing the Ministry with the ability to make evidence-informed policy decisions?



3.2 EVALUATION

Evaluation Design

The team should consider:

- **What evaluation methodology would fit with the activity?** A randomized control trial was used in [Ecuador](#) to assess the effects on academic outcomes of a Digital Personalized Learning Software for mathematics remediation.
- **What key teaching and learning outcomes could be evaluated?** In Ecuador, the project evaluated the percentage of correct answers in the end-of-year evaluation in selected subjects, the enrollment in the third semester, and the probability of repeating at least one subject.
- **What external evaluation tools could be used to complement those included in the platform?** In the Dominican Republic, the project implementation timeline was aligned with existing census evaluations. If these instruments do not exist, the project can develop its own instrument.

To complement the evaluation, **project implementation costs** should be analyzed to calculate the actual cost of implementation.



RESOURCES

1. [Ecuador Evaluation](#)
2. [Strategic Impact Evaluation Fund cost analysis guidance](#)
3. [Strategy Data Project data analysis report](#)

Access the the cost analysis guidance notes from [Strategic Impact Evaluation Fund](#).

For an example of a data analysis report, see the report from [Strategic Data Project](#) on understanding patterns of success among postsecondary CTE students.

Section 4.

Scaling up



IN THIS SECTION

4.1 Keys for scaling up



Keys for scaling up adaptive learning activities

Here is an initial list of key takeaways to consider when TTLs are ready to scale up their adaptive learning activity:

- **Co-design** school-based DPL programs with **teachers and other education personnel**.
- Ensure **adequate timing and sufficient duration** of project implementation.
- Provide **ongoing support to teachers**, so they can support students.
- Ensure an **enabling technological environment**.
- **Diversify learning content**, not just by level, but also by modality.
- Conduct **due diligence** on the EdTech provider to ensure their **financial viability** throughout the project implementation and assess their **capacity to scale up**.
- **Fund, commission, and conduct, more DPL implementation and research**, including in formal school settings.
- Use **qualitative information** collected during the monitoring & evaluation phase to refine the model.
- Facilitate **inter-school collaboration** to share knowledge on what works and give schools the opportunity to learn from one another.



In partnership with



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