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RESEARCH ON UNIVERSAL DESIGN FOR LEARNING

Middle East and Northern Africa (MENA) Region
Final Report

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ACRONYMS

ATL	Antura and the Letters
COVID-19	Coronavirus disease 2019
DGBL	Digital game-based learning
EGRSLA	Early Grade Reading and Sign Language Assessment
FTM	Feed the Monster
INTEGRATED	Integrated Services, Indigenous Solutions
ISELA	International Social and Emotional Learning Assessment
MENA	Middle East and Northern Africa
MSA	Modern Standard Arabic
MSL	Moroccan Sign Language
MoE	Ministry of Education
NRC	Norwegian Refugee Council
RFS-IDCRT	Reading for Success-Improving Deaf Children's Reading through Technology
SDQ	Strengths and Difficulties Questionnaire
SEL	Socio-emotional Learning
SME	Subject matter expert
UDL	Universal Design for Learning
UNICEF	United Nations International Children's Emergency Fund
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

BACKGROUND

Universal Design for Learning (UDL) is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn.¹ It aims to address a wide variety of learning needs and abilities, reduce learning barriers or obstacles, and allow students to engage with learning in a way that most benefits them.² The framework acknowledges learner variability and promotes the principles of engagement, representation, and action and expression.³

PURPOSE

This study aims to survey promising models in applying and using UDL in education to support improved learning in the Middle East and Northern Africa (MENA) region; document instructional approaches for in-school or out-of-school and public or private settings; and provide key attributes of individual models and United States Agency for International Development (USAID) recommendations for future investment in the MENA region. The study team gathered and analyzed relevant data to respond to the following research questions:

1. Which promising education models are using UDL in the MENA region?
2. What is the evidence base to support these models? What are the conditions for implementation?
3. What uses of UDL in education programming are recommended in the MENA region?

METHODOLOGY

The study team used a phased approach to research. Data collection began with a desk review of UDL approaches globally and in the MENA region. Using 33 references, the study team identified and assessed nine models, then narrowed the selection down to three of the most promising models based on the following criteria:

- Alignment with UDL principles: provide multiple means of engagement, representation, and action and expression
- Implementation strategy: awareness-raising, capacity-building, and community engagement
- Evidence of progress or positive outcome: stakeholder feedback, project monitoring, and impact evaluation

This was followed by field interviews to verify initial findings and gather relevant and detailed information about each model.

MAIN FINDINGS

Key findings from the desk review and primary research are presented in this section, with summary data on the nine UDL models identified during the desk review and more detailed information on the three promising models, namely: The Aures School, EduApp4Syria, and Reading for Success—Improving Deaf Children’s Reading through Technology (RFS-IDCRT).

¹ CAST 2018

² Center for Teaching Innovation, n.d.

³ CAST 2018

Research Question 1: Which promising education models are using UDL in the MENA region?

The study identified nine models that employed UDL-aligned approaches to reduce barriers to learning, increase access to learning opportunities, and improve student learning outcomes in basic education. Some models focused on literacy learning, while others used the approaches more broadly across curriculum content. Most of the models referred to addressing the needs of children with disabilities, refugee children, and children from linguistically diverse backgrounds. The models also illustrated the applicability of UDL-aligned approaches in different contexts: four models were adopted in public schools in collaboration with education ministries; two were private schools established as laboratory or model schools for inclusive education practices; two were implemented in refugee camps to ensure learning continuity for refugee children; and one was piloted in both public and private education centers catering to children who are deaf or hard of hearing.

The models reviewed in this study employed the following approaches to provide learners with multiple means of engagement, representation, and action and expression.

- The Grand Atlas Primary School (Algeria), The Aures School (Algeria), and the Inclusive Education Pilot Project (Lebanon) emphasized **flexible and learner-centered teaching strategies** as part of creating a more inclusive and equitable learning environment for children with and without disabilities.⁴
- The Reading for Success–National Program for Reading (Morocco) focused on **curriculum revision and dynamized literacy instruction** for primary school learners.⁵
- The education programming of the Norwegian Refugee Council (Jordan) provided learning support services and catch-up education for Syrian refugee children, children with disabilities, and Jordanian learners in general.⁶
- Some models used technology to improve children’s access to literacy learning resources using edtech multimedia materials⁷ (Let’s Live in Harmony in Jordan), digital library (Qyas/Stories: An Arabic Leveled Digital Library for Every Classroom in Jordan),⁸ digital game-based learning (EduApp4Syria in Jordan), and sign language assistive software (RFS-IDCRT in Morocco).⁹

Specific to the three promising UDL approaches:

Algeria: The Aures School. The Aures School is a private K–12 school catering to 221 Algerian and international students between the ages of 5 and 19. The school was established in 2016 to serve as a model for inclusive education in Algeria within the framework of the Algerian national curriculum. A respondent in this study reported that seven percent of its students have disabilities and estimated the figure to be closer to 12 percent, including students with unidentified disabilities in the range of dyslexia and dysgraphia. The school optimizes learning opportunities by creating an inclusive learning environment; increasing student engagement; adopting flexible, learner-centered teaching strategies; and employing choice-based assessment.¹⁰

Jordan: EduApp4Syria. Antura and the Letters (ATL)¹¹ and Feed the Monster (FTM)¹² are digital game-based learning (DGBL) applications that may be downloaded using smartphones and played offline. The DGBL applications were piloted in the Azraq refugee camp in Jordan in 2017 to improve

⁴ Merhej 2021

⁵ CREATIVE, n.d.

⁶ Shah 2017

⁷ INTEGRATED 2019

⁸ All Children Reading 2017

⁹ All Children Reading 2018

¹⁰ Choice-based assessment is a learner-centered approach to assessment that allows students to choose, to some extent, what, how, and/or when their learning is assessed. <https://scholarworks.iu.edu/journals/index.php/josotl/article/view/31471>

¹¹ Koval and Plass 2018a

¹² Koval and Plass 2018b

the Arabic literacy skills and psychosocial well-being of Syrian refugee children between the ages of 5 and 10 and ensure learning continuity through autonomous learning in a non-formal education setting.¹³ EduApp4Syria provided learning opportunities to Syrian refugee children in a non-formal education setting by incorporating literacy lessons into digital games and facilitating children's access and engagement with educational content.

Morocco: Reading for Success-Improving Deaf Children's Reading through Technology (RFS-IDCRT). This approach aimed to improve the reading skills of students in Grades 1-3 who are deaf or hard of hearing by developing Moroccan Sign Language (MSL) Clip and Create, an assistive technology software that enables teachers to create sign-language-supported educational materials. The program was implemented from 2015–2018 in 10 schools: nine private education centers catering specifically to students who are deaf or hard of hearing and one public general education school with an integrated classroom. RFS-IDCRT improved learning opportunities for students who are deaf or hard of hearing by providing access to MSL-supported educational materials, promoting appropriate reading instruction techniques, and designing a reading and sign language assessment tool.¹⁴

Research Question 2: What is the evidence base to support these models? What are the conditions for implementation?

The desk review and primary research showed that the nine UDL models monitored and evaluated their progress vis-à-vis the intended outcomes using classroom-based assessments, larger-scale standard assessments, and other education performance indicators, as enumerated below. Some models received mixed results, while others lacked the necessary data to serve as an evidence base for supporting the models (see Annex E. Overview of the UDL Models Identified During the Desk Review for more information). Nevertheless, available data showed promise and indicated a move in the right direction.

- The Grand Atlas Primary School (Algeria) focused on students' engagement and attitude toward school, while The Aures School (Algeria) tracked students' progress through their engagement and participation in class and mastery of competencies through choice-based assessments and as documented in Individual Education Plans.
- Models that focused on literacy measured learning outcomes using the Early Grade Reading Assessment (Qysas: An Arabic Leveled Digital Library for Every Classroom in Jordan, EduApp4Syria in Jordan, and Reading for Success–National Program for Reading in Morocco), the Early Grade Reading and Sign Language Assessment (RFS-IDCRT in Morocco), and the Rapid Assessment for Reading Skills (Let's Live in Harmony in Jordan).
- Models with socio-emotional learning components used the International Social and Emotional Learning Assessment (ISELA) tool (Let's Live in Harmony in Jordan) and the Strengths and Difficulties Questionnaire (EduApp4Syria in Jordan).
- The education programming of the Norwegian Refugee Council (Jordan) gathered relevant data on student attendance, academic performance, and well-being, while the Inclusive Education Pilot Project (Lebanon) assessed the extent to which the school culture, policy, and practice have become more inclusive as a result of its interventions.

Findings from the desk review and primary research also showed common factors or conditions that facilitated the delivery and implementation of promising models. These include educator capacity-building, integration into the education ministry, stakeholder engagement, phased implementation, and the strategic use of edtech resources.

¹³ Koval and Plass 2018a

¹⁴ All Children Reading 2018

Specific to the three promising UDL models:

Algeria: The Aures School

Evidence base. Respondents reported higher levels of student engagement and mastery of grade-level competencies. With the recent move toward choice-based exams, teacher-respondents have also observed increased confidence among students in their ability to progress and acquire new skills. Providing students with options to demonstrate what they have learned has reduced fear and anxiety surrounding examinations. At the same time, helping students become more aware of how well they have mastered the target competencies has increased their motivation to learn and challenge themselves.

Conditions for implementation. Factors that contributed toward the implementation of more inclusive and UDL-aligned practices in The Aures School include competent and supportive school leadership, engaged and empowered teachers, the establishment of an active community of practice for teachers, engagement of parents in their children's education, and opportunities for teachers to witness and reflect on the impact on students' personal development and academic progress.

Jordan: EduApp4Syria

Evidence base. Early Grade Reading Assessments and Strengths and Difficulties questionnaire (SDQ) were administered to measure literacy learning and psychosocial outcomes among Syrian refugee children who used the DGBL applications. Overall, the positive trends in literacy learning¹⁵ and emotional and social outcomes as a result of gameplay show promise. In addition, developers have already adapted ATL and FTM to support literacy learning for other languages¹⁶ and are exploring how they may be used in other contexts. Moving forward, further studies need to be conducted to determine the impact of DGBL and how to improve design and delivery in different contexts. Game analytics may also be considered for future use to gather data on learning and engagement.

Conditions for implementation. Factors that contributed to the promising design and implementation of EduApp4Syria include engaging an interdisciplinary team to develop the applications, conducting pilot testing, the availability of smartphones/tablets and internet connection, the cooperation of parents and educators, and technical personnel for ongoing maintenance of the applications.

Morocco: RFS-IDCRT

Evidence base. Early Grade Reading and Sign Language Assessment results showed that students' reading skills improved over time. However, data indicated that improvements were uneven across schools and that the project design did not adequately address the most immediate literacy and MSL needs of deaf students and students with hearing impairments. Many of these limitations were linked to fundamental systemic issues facing hearing impaired and deaf students and the education services provided. Further detail of these systemic limitations is provided in the body of the report. The project evaluation concluded that assistive technologies have the potential to improve the teaching and learning processes and emphasized the importance of engaging parents, experts with disabilities, and other key stakeholders in project design and implementation.¹⁷

Conditions for implementation. Factors that contributed to the promising design and implementation of RFS-IDCRT include phased program implementation, MSL documentation, provision of the necessary technology to educators, capacity-building of educators and parents, the

¹⁵ The evaluation found positive learning outcomes across all age groups and genders after 22 hours of gameplay. Gains were greater in learning of foundational literacy (letters and syllables) and less with reading fluency.

¹⁶ Norwegian Agency for Development Cooperation 2018

¹⁷ All Children Reading 2018

establishment of mechanisms for stakeholder engagement, and integration of the interventions into the Ministry of Education.

CONCLUSIONS

- **UDL provides a viable foundation for reducing barriers to learning and increasing access to learning opportunities.** It promotes a more flexible, learner-centered approach that considers learner variability and supports learners with diverse needs and abilities in different contexts (development and emergency), educational settings (formal, non-formal, and informal), school types (public and private schools and learning centers), and modalities (classroom-based instruction and more autonomous learning). Although the models reviewed in this study have built-in monitoring and evaluation components, **there is limited evidence supporting the effectiveness of UDL approaches in improving student learning outcomes.**
- **The phased implementation of some models in this study has helped inform their design and implementation and made them more responsive to the needs of their target participants.** EduApp4Syria, in particular, has benefitted from having a pilot run with a strong evaluation component. This allowed the ATL and FTM creators/developers to modify and improve the flow, pace, and content of the applications and successfully adapt them to different languages, contexts, and modalities.
- **Competent school leadership and empowered teachers are crucial to adopting, sustaining, and expanding UDL-aligned approaches in classrooms, schools, and other education settings.** As illustrated by The Aures School, a competent and supportive school leader is instrumental to creating an inclusive environment where learners with diverse needs and abilities are welcome and accepted and where teachers feel adequately motivated, supported, and empowered. Having been trained on how to implement and strengthen their UDL practice, teachers feel more confident to explore how UDL looks in their own classroom and have become more proactive in their continuous professional development.
- **Technology, if designed well and used strategically with other interventions, has the potential to help optimize the teaching and learning process.** As demonstrated by the models presented in this study, utilizing technology can increase children's access to learning resources—through edtech multimedia materials, digital libraries, and DGBL applications—and allow them to learn at their own pace. The MSL assistive software was particularly helpful in making learning resources accessible to children who are deaf or hard of hearing. Technology can also facilitate communication, research-sharing, and further research among educators, parents, and other stakeholders.
- **The support and engagement of education ministries, educators, parents, students, civil society organizations, and other community stakeholders are essential conditions for implementing the models** and have helped in making the interventions more relevant and responsive to the needs of the target participants, facilitating the smoother implementation of activities, and activating parental and community cooperation and participation. These conditions are also vital for making the models more sustainable and increasing their potential for replication and scaling.

RECOMMENDATIONS

Research Question 3: What uses of UDL in education programming are recommended in the MENA region?

1. **Embed UDL principles in education programming in the MENA region to reduce barriers to learning, improve access to learning opportunities, and improve learning outcomes for all learners.** Examine current and emerging education interventions in the MENA region and identify, strengthen, or include approaches that align with the UDL principles

of engagement, representation, and action and expression to optimize teaching and learning for all learners. Although UDL does not directly target a specific group of students, marginalized students with different learning styles may find more opportunities for engagement and participation in classrooms guided by UDL principles and can serve as a benchmark to evaluate the success of education interventions. Although the models examined in this study were limited to addressing needs and issues in basic education (K–12), UDL principles may be applied in other areas, including higher education and workforce development.

- 2. Consider implementing phased interventions that include data collection and pilot testing to inform program design and rollout.** This study examined models that have undergone phased implementation, which allowed designers and implementers to determine the feasibility and effectiveness of the model, foster trust and credibility among partners, and build on promising features and processes. The research and evaluation components of a phased implementation can generate insights on how to improve the intervention, incorporate sustainability measures, and course-correct in a more agile and efficient manner.
- 3. Build the capacity of school leaders to create an inclusive school climate and model UDL practices.** Embracing UDL means rethinking school leadership around the key concept of inclusive school climate that necessarily has transformative repercussions on many different practices and policies within the school.¹⁸ As such, capacity-building should aim to support school leaders in adopting a school-wide community-building approach, helping them foster new meanings about diversity, promote inclusive practices within the school, and build connections between the school and the wider community.¹⁹
- 4. Build the capacity of teachers to meet learners' diverse needs and abilities by moving toward more flexible teaching strategies and away from a rigid, one-size-fits-all approach.** Capacity-building should aim to motivate and empower teachers, providing them with the necessary competencies to try more flexible teaching strategies and build on existing practices that promote inclusion. The Aures School, in particular, conducted trainings designed to model UDL principles and allow teachers to experience what it means to be engaged and included in the learning process. In addition, the trainings were designed to help teachers recognize how they may already be incorporating UDL in the classroom. This approach to capacity-building empowered teachers to apply their learnings in the classroom and try more flexible approaches to teaching, as well as take control of their professional development through their own research and involvement in a community of practice.
- 5. Consider how technology can increase access to learning materials, improve learner engagement, and increase ways to express or demonstrate learning.** Although technology is not required and does not automatically equate to UDL, it can be used to reduce educational barriers for all learners. A UDL-aligned, technology-enhanced methodology is an effective way to create flexible learning environments for learners and a more dynamic learning experience for all involved.²⁰ In a well-designed UDL environment, the technology assistance most commonly needed by students with disabilities is frequently built into the materials and technology used by all students.²¹ In addition, it is essential to recognize the need for assistive technology and reasonable accommodation that will be required for children with disabilities.²²
- 6. Integrate UDL interventions into the education ministry to ensure relevant programming and increase the potential for impact, sustainability, and scaling.** The integration of education programming into the country's education system, as demonstrated by alignment with the national curricula, learning standards, and education priorities, can help garner support from the education ministry and facilitate the involvement of ministry personnel

¹⁸ Fovet, n.d.

¹⁹ Inclusive Schools Communities, n.d.

²⁰ Morra and Reynolds 2010

²¹ Cortiella 2008

²² McKenzie, Karisa, Kahonde, and Tesni 2021

at the national, regional, division/district, and school levels in program design, implementation, and review. This, in turn, can increase the potential of education programs to be implemented on a broader scale, sustained after program completion, and replicated or scaled up in other contexts.

- 7. Establish stakeholder consultation and engagement mechanisms, including government partners, educators, parents, students, academia, private institutions, and civil society organizations, to facilitate sharing insights, expertise, and resources on UDL implementation.** Stakeholder consultation and engagement can inform programming, facilitate the smooth implementation of activities, and reinforce the interventions in school, at home, and in the wider community. Establishing and strengthening mechanisms, such as steering committees, advisory groups, technical working groups, and parent and teacher associations, can also help institutionalize participatory planning and decision-making. At the school level, when teachers implement UDL and involve parents in their classrooms, they create an environment that values the students, their families, and all the variability in their learning environment, which can impact student growth and success.²³
- 8. Install a system for monitoring and evaluating UDL models.** Proof of the validity and reliability of UDL as a guiding theory for positive and inclusive learning results is both needed and welcome.²⁴ A robust monitoring and evaluation system can help inform ongoing implementation, facilitate continuous learning and improvement, identify critical factors for results achievement, and determine the impact of UDL on student learning outcomes, as well as equity and accessibility. Aside from larger scale assessments conducted at specific program phases (baseline, midline, and endline), education programming must reinforce formative and summative assessments that help teachers monitor student progress in mastering target competencies and allow them to provide more immediate and relevant support based on diverse needs and abilities. As demonstrated by The Aures School in Algeria, when conducted with a clear purpose and some creativity and with due consideration for learners, assessments can go beyond correct/incorrect responses and grades on a piece of paper. Assessments can be a way for learners to demonstrate what they have learned and for teachers to motivate them to move forward and actively participate in their own learning.

²³ Novak 2017

²⁴ Gronseth, Stefaniak, and Dalton 2022

BACKGROUND

OVERVIEW OF THE RESEARCH STUDY

Universal Design for Learning (UDL) is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn.²⁵ It aims to address a wide variety of learning needs and abilities, reduce learning barriers or obstacles, and allow students to engage with learning in a way that most benefits them.²⁶ It acknowledges learner variability based on parts of the brain that manage the why (affective network), the what (recognition network), and the how (strategic network) of learning.²⁷ The three principles of UDL are:

- The principle of **multiple means of engagement** is the “why of learning” and refers to providing options that stimulate the interest and motivation of students to learn.
- The principle of **multiple means of representation** is the “what of learning” and refers to presenting information to students using a range of formats and techniques.
- The principle of **multiple means of action and expression** is the “how of learning” and refers to providing different ways for students to express or demonstrate what they have learned.

PURPOSE AND OBJECTIVES

The study aims to identify promising models in applying and using UDL in education to support improved learning in the Middle East and Northern Africa (MENA) region, document instructional approaches for in-school or out-of-school and public or private settings and provide key attributes of individual models and United States Agency for International Development (USAID) recommendations for future investment in the MENA region.

The study team gathered and analyzed relevant data to respond to these research questions:

1. Which promising education models are using UDL in the MENA region?
2. What is the evidence base to support these models? What are the conditions for implementation?
3. What uses of UDL in education programming are recommended in the MENA region?

The study team attempted to identify UDL models within the following parameters: UDL models applied in MENA region contexts; effective global and regional models; relevant for a conflict and crisis environment; include both public and private schools; cover all donor interventions (not just USAID); include gender-inclusive and students-with-disabilities approaches; and include a remedial learning focus on learning loss due to school closures during the COVID-19 pandemic.

METHODOLOGY

DATA COLLECTION

The study team used a phased approach to research. Data collection began with a desk review of UDL approaches globally and in the MENA region, allowing the research team to identify and assess promising models based on a set of criteria. This was followed by field interviews to verify initial findings and gather relevant and detailed information about each model.

²⁵ CAST 2018

²⁶ Center for Teaching Innovation, n.d.

²⁷ CAST 2018

Desk review

The desk review for UDL consisted of an internet-wide search using academic and non-academic search engines as well as website-specific research across government agencies, intergovernmental organizations, non-governmental organizations, and other development partners in the education sector within and beyond the MENA region.

Keywords used in the search included universal design for learning, inclusive education, accessible education, flexible curriculum, flexible instruction, flexible assessment, accessible learning materials, education design, teaching methodology, education technology, assistive technology, and student engagement.

Education reforms, programs, and initiatives were reviewed by exploring the websites of various agencies and organizations, including country-specific education ministries, the United Nations Educational, Scientific, and Cultural Organization, the United Nations High Commissioner for Refugees (UNHCR), the United Nations Children's Emergency Fund (UNICEF), the Norwegian Refugee Council, implementing partners, the Department of Foreign and Trade, the UK Department for International Development, USAID, the World Bank, and the UN Office for the Coordination of Humanitarian Affairs.

A total of 33 references were reviewed, including country frameworks, research studies, project reports, website articles, and interviews via podcast and YouTube. Refer to [Annex A](#) for the annotated bibliography. The study team identified and assessed nine models; three were considered the most promising and recommended for further research based on the following criteria:

- Alignment with UDL principles: provide multiple means of engagement, representation, and action and expression
- Implementation strategy: awareness-raising, capacity-building, and community engagement
- Evidence of progress or positive outcome: stakeholder feedback, project monitoring, and impact evaluation

Field interviews

Primary research was undertaken to gather more detailed information on the promising UDL models, particularly in five thematic areas: participants, modality, sustainability, evidence base, and effectiveness. To facilitate this process, the subject matter expert (SME) developed a set of field interview questions drawing on initial findings from the desk review and insights gained from on-ground implementation. Refer to [Annex B. Field Interview Questionnaire](#).

A hybrid approach was used: in-country researchers conducted in-person interviews in the field, while the SME conducted remote interviews via videoconferencing. Throughout this phase, close collaboration was maintained between the SME and in-country researchers, enabling the identification of key contacts for each model, and providing guidance on the interview and documentation process.

Sampling

Convenience and purposive sampling were employed to identify the research participants. A total of 15 implementers, educators, civil society organization representatives, and parents were interviewed as part of the primary research. Below is a breakdown of the research participants per model. A complete list of the interviews is in [Annex C](#).

Model	Stakeholder Group	No. of Participants
Algeria: The Aures School	Teachers (4) and school leader (1)	5
Jordan: EduApp4Syria (<i>Antura and the Letters and Feed the Monster</i>)	Developers/implementers (4)	4
Morocco: Reading for Success—Improving Deaf Children’s Reading through Technology	Educators/civil society representatives (3), implementers (2), and parents (1)	6
Total		15

DATA ANALYSIS

To gain insights into the promising practices within each identified model, a qualitative methodology was employed in this study. Thematic analysis was conducted to draw meaningful conclusions by examining data across predetermined criteria and categories. The primary data collected from the field interviews and the secondary data from the desk review were assembled, classified, and simplified. The data were also triangulated to identify patterns, areas of agreement, and topics that required additional investigation. The analysis resulted in the identification of enabling factors, challenges, and opportunities for replication. The findings from the data analysis contributed to the development of training modules for a workshop held in May 2023 and informed the finalization of this report.

LIMITATIONS

The study team acknowledges certain limitations in its conduct of the desk review and field interviews. The internet-wide search for UDL concepts, studies, and models used keywords in English. Reference materials presented in common languages in the MENA region, such as Arabic, Farsi, Hebrew, and Turkish, if available, were not accessed. As such, the identification of promising models was based on limited information. However, it is also important to consider that this might be a general reflection of the limited awareness and utilization of UDL practices in the region and around the world. Two of the three promising models—EduApp4Syria and RFS-IDCRT—had been completed before the study began, which limited the availability of key informants during the primary research phase. While remote coordination with The Aures School facilitated the participation of school personnel in this study, ministry representatives familiar with the school’s approaches and activities could not be reached within the timeframe. The limited time also hindered in-country researchers from conducting classroom observations. Hence, the actual application of UDL approaches at the classroom level, including learner-centered approaches and flexible teaching strategies, could not be verified and evaluated.

ETHICAL CONSIDERATIONS

The design and implementation of this research were guided by ethical considerations to uphold the dignity, well-being, and rights of all participants. The research team proactively addressed potential ethical issues such as informed consent, privacy, confidentiality, and conflict of interest. The following measures were taken to ensure ethical standards were maintained:

Privacy and confidentiality. Strict adherence to ethical principles of privacy and confidentiality was maintained. The data collected were used exclusively for research purposes, and confidential participant information or data were securely stored. Measures such as password protection and restricted access to identifying data were implemented to safeguard the confidentiality of the information.

Informed consent. Informed consent was sought from all participants involved in the field interviews. Participants were provided with clear information about the nature of the research and the voluntary nature of their participation. Their decision to participate or not, including any disagreement or refusal, was respected. Consent to record and conduct interviews was obtained

from participants in online interviews, and for face-to-face interviews, participants were asked to sign an informed consent form.

Conflict of interest. The research team signed a disclosure and conflict of interest agreement to ensure objectivity and integrity. This agreement confirmed that they had no actual or potential conflicts of interest under the contract and that they did not share any sensitive information that could provide an unfair competitive advantage in future contracts.

MAIN FINDINGS

RQ1: Which promising education models are using UDL in the MENA region?

This section presents key findings from the desk review and primary research, with a focus on the three promising models, namely: The Aures School, EduApp4Syria, and RFS-IDCRT. [Annex D](#) presents summary information on the three promising models pertaining to the thematic areas examined during primary research.

The first research question is addressed by providing brief background information about each model, including its goals, target participants, and modalities, followed by a description of how its interventions and approaches support the improvement and optimization of teaching and learning by addressing a wide variety of learning needs and abilities, reducing learning barriers or obstacles, and allowing students to engage with learning in a way that most benefits them. The second research question is addressed by presenting the evidence base supporting each model, including educators' observations and results of standard assessments, and identifying factors that made implementation possible and, for the most part, successful.

MAIN FINDINGS OF UDL PROGRAMS IN THE MENA REGION

The study identified nine models that employed UDL-aligned approaches to reduce barriers to learning, increase access to learning opportunities, and improve student learning outcomes in basic education. Some models focused on acquisition of literacy, while others used the approaches more broadly across curriculum content. Most of the models made particular reference to addressing the needs of children with disabilities, refugee children, and children from linguistically diverse backgrounds. The models also illustrated the applicability of UDL-aligned approaches in different contexts: four models were adopted in public schools in collaboration with education ministries; two were private schools established as laboratory or model schools for inclusive education practices; two were implemented in refugee camps to ensure learning continuity for refugee children; and one was piloted in both public and private education centers catering to children who are deaf or hard of hearing.

The models reviewed in this study employed the following approaches to provide learners with multiple means of engagement, representation, and action and expression.

- The Grand Atlas Primary School (Algeria), The Aures School (Algeria), and the Inclusive Education Pilot Project (Lebanon) emphasized **flexible and learner-centered teaching strategies** as part of creating a more inclusive and equitable learning environment for children with and without disabilities.
- The Reading for Success–National Program for Reading (Morocco) focused on **curriculum revision and “dynamized”²⁸ literacy instruction** for primary school learners, which uses games and fun activities to help children understand the features of language.

²⁸ the new literacy approach with [dynamized instruction](#), used games and fun activities to help children understand the features of language.

- The Norwegian Refugee Council’s (Jordan) education programming provided **learning support services and catch-up education** for Syrian refugee children, children with disabilities, and Jordanian learners in general.
- Some models **utilized technology** to improve children’s access to literacy learning resources through the use of edtech multimedia materials (Let’s Live in Harmony in Jordan), digital library (Qysas/Stories: An Arabic Leveled Digital Library for Every Classroom in Jordan), DGBL (EduApp4Syria in Jordan), and sign language assistive software (RFS-IDCRT in Morocco).

For an overview of the nine UDL models identified and assessed in the desk review, refer to [Annex E. Overview of the UDL Models Identified During the Desk Review](#). More detailed discussions on the UDL-aligned approaches implemented by The Aures School, EduApp4Syria, and RFS-IDCRT follow.

MODEL 1: ALGERIA: THE AURES SCHOOL

The Aures School is a private K–12 school catering to Algerian and international students between the ages of 5 and 19. The school was established in 2016 to serve as a model for inclusive education in Algeria. It aims to develop inquisitive, knowledgeable, and caring young people able to contribute positively to their communities, with teachers applying best practices in international teaching methods within the framework of the Algerian national curriculum.²⁹ A respondent in this study reported that seven percent of its students have disabilities³⁰ and estimated the figure to be closer to 12 percent, including students with unidentified disabilities in the range of dyslexia and dysgraphia.

The Aures School optimizes learning opportunities by creating an inclusive learning environment, increasing student engagement, adopting flexible, learner-centered teaching strategies, and employing choice-based assessment.³¹

CREATING AN INCLUSIVE LEARNING ENVIRONMENT

The school welcomes and accepts learners with diverse needs and abilities, with teachers implementing an inclusive approach that considers children’s needs and allows them to learn at their own pace. As one respondent shared, “All kids are welcome here. We have students with different levels, languages, and needs. We adapt to students’ needs. They are allowed to learn at their own pace.”

“When everybody in the classroom gets to choose and learn in the way that works for them; then everybody is more likely to succeed.”
-Aures School Teacher

Another respondent highlighted that an inclusive approach benefits all learners and increases their potential to succeed: “We don’t wait for that piece of paper to come in and say that this child has this disability. We build the inclusive approach first so that all children can benefit ... When everybody in the classroom gets to choose and learn in the way that works for them; then everybody is more likely to succeed.” The respondent also acknowledged that more targeted support must be provided to ensure equitable participation: “When we have kids who are a bit further along in the autism spectrum, who need more targeted accommodations, we layer those on top.”

INCREASING STUDENT ENGAGEMENT BY MULTIPLE MEANS OF ENGAGEMENT

Teachers recognize that learning begins by stimulating the interest and motivation of children to learn. As pointed out by one respondent, “If the student is not interested, he will not learn. We engage their feelings. That makes a huge difference in kids.” The respondent emphasized that this is grounded in a positive learning environment where trust and rapport exist among teachers and

²⁹ Les Aures School 2023

³⁰ Disabilities include autism spectrum (ranging from mild to non-verbal), dyslexia/dysgraphia/dyscalculia, attention-deficit/hyperactivity disorder (ADHD), motor (cerebral palsy with processing difficulties), and global developmental delay.

³¹ Choice-based assessment is a learner-centered approach to assessment that allows students to choose, to some extent, what, how, and/or when their learning is assessed. <https://scholarworks.iu.edu/journals/index.php/josotl/article/view/31471>

learners: “Build trust and respect. If you treat them as someone who is capable of understanding, they will resonate with you. Engage them in solving problems. I follow their solution, and we try it, see how it works.”

“The kids learn through play. We make it fun.”

-Aures School Teacher

Learning through play has helped make lessons more fun and engaging: “The kids learn through play. We make it fun. We use vocabulary games and flashcards.” Respondents also found that engagement increased when lessons were connected to real-life events: “We connect our lessons with current events. For example, during [the] World Cup, we have a sports-themed lesson. We have stations for each continent. We teach them about different countries—their capital and flag. I ask them to tell me about their favorite sports in Arabic.” Similarly, language learning became more interesting when students were confronted with realistic situations: “We use Pearson’s methodology. To learn a language, they need to live the language.”

Another respondent reported that employing a flipped classroom, where students were introduced to the learning content at home and given time to practice their learnings in school, facilitated more active participation among learners: “I try to build up excitement. I try to do a flipped classroom. When they come to class, they are already talking about the lesson. They look forward to it. Less time of me talking, more about summarizing, more time for students to practice.”

ADOPTING MORE FLEXIBLE, LEARNER-CENTERED TEACHING STRATEGIES

Teachers focus on helping students master the necessary competencies while recognizing their diverse abilities, starting points, and learning styles. Respondents shared, “We want success for each student. We have an objective. We work towards mastery of competencies.” To achieve this, teachers target the relevant competencies by designing different learning activities that allow all students to participate: “I think about how they will be learning through different activities. All activities are relevant and related. No one will feel left out.” Another respondent said, “We have different stations. Some are more basic, some more advanced. There are different activities. We rotate to see how they are doing.”

Teachers present information in different formats and platforms. Respondents reported using multiple means of representation including spoken language, written text, pictures, videos, and songs to present information. Learning resources are also shared online to allow students to prepare for class and/or review previous lessons: “We use Google Classroom to share the lessons with our students and parents. They can be prepared. They have an idea of the lessons ... They can follow. They can also review.”

EMPLOYING CHOICE-BASED ASSESSMENT WITH MULTIPLE MEANS OF ACTION AND EXPRESSION

Teachers provide options for students to demonstrate what they have learned and how well they have mastered the target competencies. Respondents reported, “Assessment is based on competencies. They [students] have the freedom to choose the activity.” Another respondent shared, “We have [a] choice-based exam. I plan three levels of activity per competency that students can choose from. I give them a choice to work on something they can do.”

Teachers also support students in monitoring their own progress: “We make them [students] aware of their competencies—what are your strongest points, what competencies do you need to practice more?” Respondents shared that this has reduced students’ fear and anxiety surrounding examinations and increased their motivation to learn and challenge themselves: “I encourage them to challenge themselves. It’s like a game. After unlocking the first level, try another, something more challenging. There is inner motivation. They are making the effort. I’ve seen it in many students. We see results.”

MODEL 2: JORDAN: EDUAPP4SYRIA

EduApp4Syria is an international competition that sought to develop open-source smartphone applications to improve the Arabic literacy skills and psychosocial well-being of Syrian refugee children between the ages of 5 and 10 and ensure learning continuity through autonomous learning in a non-formal education setting. It was funded by the Norwegian government and implemented in partnership with the Norwegian Agency for Development Cooperation, Norwegian University of Science and Technology, All Children Reading: A Grand Challenge for Development (USAID, World Vision, and the Australian Government), mobile operator Orange, and the Inter-Agency Network for Education in Emergencies.

Antura and the Letters (ATL) and Feed the Monster (FTM) won the international competition and were piloted in the Azraq refugee camp in Jordan in 2017. ATL was developed by Cologne Game Lab, Video Games Without Borders, and Wixel Studios, while FTM was developed by the Apps Factory, The Center for Educational Technology, and the International Rescue Committee. Both games followed the Syrian primary school curriculum and offered an alternate means for students to access learning. Integrated Services, Indigenous Solutions (INTEGRATED) piloted and evaluated the digital games, with funding from the Digital Learning for Development and All Children Reading: A Grand Challenge for Development and in collaboration with the Consortium for Research and Evaluation of Advanced Technologies in Education of New York University.³²

EduApp4Syria provided learning opportunities to Syrian refugee children, between the ages of 5 and 10, in a non-formal education setting by incorporating literacy lessons into digital games and facilitating children's access and engagement with educational content. Six hundred children were sampled to test the impact of the programs.

INCORPORATING LITERACY LESSONS INTO DIGITAL GAMES

ATL comprises journey maps that correspond to the six major stages of the Syrian primary school curriculum, which include the introduction of letter names in groupings of two or three; letter shapes and how letters change shape at the beginning, middle, and end of a word for the first half of the alphabet; letter shapes and how letters change shape at the beginning, middle, and end of a word for the second half of the alphabet; main diacritics and their placement in whole words; more specialized diacritics, articles, and vocabulary; and common phrases and vocabulary.³³

Similarly, FTM incorporates literacy learning by introducing children to Arabic letters, syllables, and words. FTM divided the Arabic alphabet into letter clusters, with lessons on the letter and its sound; the letters with vowel symbols (diacritical markings) and its sound; the letters in the written form of a syllable segment with its sound; the single letter, letter/vowel combination, syllable, or letter sequence within a word with its sound; and words using the letters and their sound.³⁴

FACILITATING CHILDREN'S ACCESS TO AND ENGAGEMENT WITH EDUCATIONAL CONTENT

Respondents highlighted that the DGBL applications were designed for autonomous learning, allowing children to access literacy lessons with minimal or no adult supervision. This was confirmed in the technical and impact evaluations, which found that children, regardless of literacy level, age, or gender, could generally navigate DGBL applications with ease.^{35,36} Moreover, children reportedly enjoyed playing the digital games and felt a sense of accomplishment as they progressed and accomplished each task. In-game reinforcements and rewards also helped sustain their motivation to keep going and complete all levels.

³² Ibid.

³³ Ibid.

³⁴ Koval and Plass 2018b

³⁵ Koval and Plass 2018a

³⁶ Koval and Plass 2018b

MODEL 3: MOROCCO: RFS-IDCRT

RFS-IDCRT aimed to improve the reading skills of students in Grades 1–3, who are deaf or hard of hearing, by developing MSL Clip and Create, an assistive technology software that enables teachers to create sign-language-supported educational materials. The program was implemented from 2015–2018 in 10 schools—nine private education centers catering specifically to students who are deaf or hard of hearing and one public general education school with an integrated classroom—located in the provinces of Agadir, Casablanca, Fes, Marrakech, Meknes, Rabat, Sale, and Tangier.

IDCRT was part of the second phase of the RFS program³⁷ and was funded by All Children Reading: A Grand Challenge for Development and implemented by the Institute for Disabilities Research and Training and École Nationale Supérieure des Mines de Rabat.

RFS-IDCRT improved learning opportunities by providing access to MSL-supported educational materials, promoting appropriate reading instruction techniques, and designing a reading and sign language assessment tool.

INCREASING REPRESENTATION BY PROVIDING ACCESS TO MSL-SUPPORTED EDUCATIONAL MATERIALS

Using the MSL Clip and Create software, teachers were able to create educational materials and present information in formats that were accessible to students who were deaf or hard of hearing. The software has the following inclusions:

- A dictionary of nearly 3,000 signs (including variations gathered in different regions of Morocco), with each sign containing a graphic depiction, the corresponding word in Arabic, a clip art image of the concept, a video clip of the sign being produced by an individual, and its definition in written Modern Standard Arabic (MSA) and in an MSL video clip.
- A publisher function for producing print materials using graphics, photos, and texts.
- Customizable templates for crossword puzzles, word searches, SIGN-O cards (similar to bingo cards and used for vocabulary development), flashcards, fingerspelling scrambles, and matching games.
- A story-builder function that allows students to read a story in MSA with illustrations and video of the story being signed in MSL.³⁸

PROMOTING ENGAGEMENT THROUGH APPROPRIATE READING INSTRUCTION TECHNIQUES

Teachers were trained on MSL storytelling techniques and how to incorporate bilingual instruction strategies into their lesson plans. They were also observed in the classroom and provided individualized coaching to reinforce learnings from the training, highlighting the importance of differentiated instruction for students who are deaf and hard of hearing.³⁹

ACTION AND EXPRESSION: DEVELOPING A READING AND SIGN LANGUAGE ASSESSMENT TOOL

RFS-IDCRT adapted an existing MSA Early Grade Reading Assessment, modifying the content and protocols for MSL administration. The resulting Early Grade Reading and Sign Language Assessment (EGRSLA) instrument had six subtasks: letter name identification, syllable identification, familiar word reading, reading passage, reading passage comprehension, and MSL comprehension. All timed subtasks were administered for two minutes instead of the standard one minute. Most of the

³⁷ The RFS program was designed to enhance the educational development of children at the primary level. The first phase focused on gathering evidence and data for the implementation of early-grade reading activities. The second phase was divided into three activities: RFS-Improving Deaf Children's Reading through Technology (2015–2018), RFS-Small Scale Experimentation (2015–2018), and RFS-National Program for Reading (2017–2022).

³⁸ All Children Reading 2018

³⁹ Ibid.

subtasks were video recorded to verify accuracy in scoring, considering the range of regional variations in sign language for specific words.⁴⁰

RQ2: What is the evidence base to support these models? What are the conditions for implementation?

The desk review and primary research showed that the nine UDL models monitored and evaluated their progress vis-à-vis the intended outcomes using classroom-based assessments, larger-scale standard assessments, and other education performance indicators, as enumerated below. Some models received mixed results, while others lacked the necessary data to serve as evidence for supporting the models (see Annex E. Overview of the UDL Models Identified During the Desk Review for more information). Nevertheless, available data showed promise and indicated a move in the right direction.

- The Grand Atlas Primary School (Algeria) focused on students' engagement and attitude toward school, while The Aures School (Algeria) tracked students' progress through their engagement and participation in class and mastery of competencies through choice-based assessments and as documented in Individual Education Plans.
- Models that focused on literacy measured learning outcomes using the Early Grade Reading Assessment (Qysas: An Arabic Leveled Digital Library for Every Classroom in Jordan, EduApp4Syria in Jordan, and Reading for Success–National Program for Reading in Morocco), the EGRSLA (RFS-IDCRT in Morocco), and the Rapid Assessment for Reading Skills (Let's Live in Harmony in Jordan).
- Models with socio-emotional learning components used the International Social and Emotional Learning Assessment (Let's Live in Harmony in Jordan) and the Strengths and Difficulties Questionnaire (EduApp4Syria in Jordan).
- The education programming of the Norwegian Refugee Council (Jordan) gathered relevant data on student attendance, academic performance, and well-being, while the Inclusive Education Pilot Project (Lebanon) assessed the extent to which the school culture, policy, and practice have become more inclusive as a result of its interventions.

Findings from the desk review and primary research also showed common factors or conditions that facilitated the delivery and implementation of the promising models. These include educator capacity-building, integration into the education ministry, stakeholder engagement, phased implementation, and strategic use of edtech resources.

More detailed discussions on the evidence base and conditions for implementation for The Aures School, EduApp4Syria, and RFS-IDCRT follow.

⁴⁰ All Children Reading 2018

MODEL I: ALGERIA: THE AURES SCHOOL

EVIDENCE BASE SUPPORTING THE MODEL

A respondent in this study acknowledged the need to capture hard data to illustrate the effectiveness of The Aures School's approach to teaching and learning. This is particularly important as the school continues to advocate for more inclusive and UDL-aligned practices in Algeria. As stated by one respondent in this study, "We want to serve as a model for how to take the national education curriculum and create an inclusive school that reaches high standards for learning. Here's the Algerian curriculum. This is how it looks using modern inclusive teaching methods. Expand the impact across the country. Keeping sustainable change going is very difficult."

Nevertheless, teachers' observations indicate that The Aures School is moving in the right direction. Respondents reported higher levels of student engagement and mastery of grade-level competencies. With the recent move toward choice-based exams, teacher-respondents have also observed increased confidence among students in their ability to progress and acquire new skills. A respondent also reported that the Ministry of National Education has started looking into the school's practices: "We directly report to the ministry. What we do there is we try to trickle up. We multiply opportunities. They have started sending us public school teachers within the neighborhood where we teach to observe how we do [a] particular lesson. They seem to be watching the way we assess kids, and they're rolling out a whole change in the national assessment, which looks almost identical to what we've been doing for the last couple of years."

CONDITIONS FOR IMPLEMENTATION

You have to constantly catch [teachers] doing great things. You have to help them celebrate and boost their morale. [...] You have to celebrate those little efforts that they make. Look at that; that's UDL right there. You didn't think it was but that's UDL: greeting kids at the door, letting kids choose. Do they want [to] high five, hug, or do a little dance? That's engagement."

-Aures School Leader

Factors that contributed to the implementation of more inclusive and UDL-aligned practices in The Aures School include competent and supportive school leadership, engaged and empowered teachers, the establishment of an active community of practice, engagement of parents in their children's education, and opportunities to witness and reflect on the impact on students' personal development and academic progress.

Competent and supportive school leadership

The school leader at The Aures School has had extensive experience in teaching, training teachers, and leading special education programs. Teacher-respondents also shared that the school leader is strongly committed to promoting inclusive education and reducing barriers to education for all learners and has helped them learn about UDL practices: "We have a training workshop before the year starts. Leah [school leader] shows and models teaching. We have the perspective of our students. Leah said the way you're learning is what you're showing to students."

Moreover, the school leader nurtures an enabling environment where teachers feel trusted and supported to apply what they have learned from the training and grow their own practice in the classroom. As one teacher-respondent said, "Leah [school leader] shared her ideas and gave us the freedom to try. We get the chance to do it, try different things ... see how it works. I have confidence that if it doesn't work out, I will not be reprimanded. I am not scared to fail. I can try to do my best." The relationship of trust appears to extend to other aspects of teaching: "One of the best things in school is the way the admin will always have the back of the teachers. They encourage us to try. Admin will always be on our side. When parents bypass the teachers, they let us in. They never disappoint."

In addition, the school leader recognizes the value of celebrating teachers' efforts and successes to affirm and reinforce good practices. The respondent said, "You have to constantly catch [teachers] doing great things. You have to help them celebrate and boost their morale. In our Google Classroom, I'll post pictures of the work that they're doing so that their peers can see actual classrooms. You have to celebrate those little efforts that they make. Look at that; that's UDL right there. You didn't think it was but that's UDL: greeting kids at the door, letting kids choose. Do they want [to] high five, hug, or do a little dance? That's engagement."

Engaged and empowered teachers

"When we break down UDL, we realize it's something we're already doing. It was great to see how we have been using UDL. We do not have to start all over again. It is not extra work. It's not starting from zero."

-Aures School Teacher

Teachers must be motivated and able to implement more inclusive and UDL-aligned classroom practices. One respondent emphasized, "To have a teacher that can successfully lead an inclusive classroom, the teacher has to be personally committed to doing that. Their attitude needs to fully embrace that. No matter how much training the teacher goes through, if they don't fundamentally believe that those kids should be in their classroom, they're not going to do what it takes. They might go through the motions but that child is not going to be meaningfully included. They need to have the skill set and the resources to have the confidence that they can take this on."

Likewise, a teacher-respondent expressed the need to address teachers' mindset and apprehensions: "We need to change the mindset. Give the teachers the means to do it, have access to materials, make them feel less afraid." The respondent also highlighted the importance of conducting and sharing relevant studies on UDL: "We need more studies like what you're doing, more exposition of these theories."

Teachers at The Aures School were trained on UDL through modelling and microteaching. In this context, respondents described modeling as a training strategy that allows participants to experience firsthand what it means to be provided with multiple means of engagement, representation, and participation; while microteaching involved having one teacher facilitate a session while others take on the role of students. This was followed by a reflection and feedback session on good practices and areas for improvement.

One respondent reported, "Our UDL trainings for teachers use universal design from the get-go ... We tend to go through 10 different modules as we go through the UDL framework. We do it in a model approach, where we're guiding the teachers through completing an activity as if they're the students. Then we step back and reflect. When we did this activity, what was that? This is the theoretical underpinning of what we do now. [They] get to do a microteaching in which they try to replicate this process, and then the teachers start to innovate."

The training sessions were also designed to help teachers to recognize how they may already be incorporating UDL in the classroom: "When we break down UDL, we realize it's something we're already doing. It was great to see how we have been using UDL. We do not have to start all over again. It is not extra work. It's not starting from zero."

Explaining its impact on teachers, the respondent shared: "These teachers who come out of a very restrictive, classic education system feel the difference in an inclusive classroom. We identify everything that we did that was mindfully designed to increase engagement. We show them how universal design for learning made them feel so included so they can personally feel, wow, that's inclusion."

Teachers at The Aures School also took the initiative to learn more about UDL outside of the school-organized trainings. A teacher-respondent shared, "We do our own research. We use

Google a lot. See what other teachers are doing.” Another said: “I conducted research. I listen to UDL in 15 minutes.⁴¹ Other teachers are doing it. I give it a try.”

Establishment of an active Community of Practice⁴²

“I like that I can collaborate with other teachers. Teachers help each other. Could you give me advice? We are like a community. We talk. You seek help. Learn from others.

-Aures School Teacher

Teachers at The Aures School have benefitted from having a collaborative community where teachers can freely share how they are doing and what they have been learning through weekly sessions, online communications, and other, less formal, interactions. As expressed by a respondent, “There’s a lot of fear in teaching because you have a huge pressure on your shoulders to do it right. Teachers get scared and panic and think: I can’t do this. You cannot do this on your own. You need to be able to speak to other teachers, consult with other teachers. I’ve tried it this way. How can I do it better? Tell me how you are doing ... Create a collaborative space. That’s what they need.”

Being part of such a community has helped teachers deal with their struggles and find possible solutions with the help of their peers. A teacher-respondent stated, “Our community has always been built on sharing. We know the struggles that other teachers have. I know I can share what happened, my difficulties. I will be listened to. We always share solutions.” Another said, “I like that I can collaborate with other teachers. Teachers help each other. Could you give me advice? We are like a community. We talk. You seek help. Learn from others. Teachers teaching the same grade level work together and meet one day a week ... We use Google Classroom to share teaching resources.” As confirmed by another respondent, “We have coaching sessions among teachers. I talk to other teachers. I like sharing ideas with others. They encourage you and give feedback. We have formal session meetings on Tuesdays. We talk about new strategies for exams. We have weekly meetings to discuss what we’re doing and exchange ideas. We also use Google Classroom. We email.”

Engagement of parents in their children’s education

Teachers at The Aures School involve parents in establishing learning objectives for their children. They provide parents access to teaching and learning materials and communicate with them through in-person meetings and social media. A teacher-respondent stated, “We need to change parents’ mindset from the traditional way. We have to redefine what school is for, what the purpose of education is. We set objectives and what students need to work towards. Setting IEPs [Individual Education Plans], talking to parents, students, the community.” Another teacher-respondent reported, “Every parent has access to Google Classroom. Google Classroom has our lesson plan, the daily slides. We have individual meetings with parents. We explain what we’re doing.” While another shared, “We want to make the parents live the experience with us. We also share a lot of things on Facebook.”

Opportunities to witness and reflect on impact

Teachers at The Aures School have had opportunities to see for themselves and reflect on the impact of UDL on their students’ personal development and academic progress, which has kept them motivated despite the many challenges in teaching. A teacher-respondent shared, “It [teaching] requires time and energy. It can be mentally [and] physically exhausting. They spend time with us. I

⁴¹ UDL in 15 minutes is a podcast hosted by Loui Lord Nelson where educators share their experiences in implementing UDL in their own classrooms. <https://udlin15minutes.podbean.com/>

⁴² A community of practice is a group of people who share a common concern, a set of problems, or an interest in a topic and come together to fulfil both individual and group goals. It often focuses on sharing best practices and creating new knowledge to advance a domain of professional practice. Interaction on an ongoing basis is an important part of this. <https://www.communityofpractice.ca/background/what-is-a-community-of-practice/>

try to be with them and have an impact on them. I want to be the teacher I wish I had. I love sharing information, shaping someone’s heart, someone’s life.” Another teacher-respondent said, “With dedication, it’s not impossible. Be flexible. It takes time and effort. Seeing my students implement what they learned and communicate with me, I see the huge impact. When you see the students, you feel proud.”

When asked what they were most proud of, a teacher-respondent said, “I’m most proud of how I helped students change their behavior about exams. They used to be very set on their marks. Now they are more concerned about their own competencies. My students are excited about exams instead of scared.” Emphasizing the importance of witnessing impact, the teacher-respondent continued: “The more teachers can see the change, the more willing they will be to accept. What they do not know, they do not trust. Teachers may have some resistance to using it. It’s a lot of work, but it’s worth it when you see the improvements.”

MODEL 2: JORDAN: EDUAPP4SYRIA

EVIDENCE BASE SUPPORTING THE MODEL

Standard assessment tools were administered to measure literacy learning and psychosocial outcomes among Syrian refugee children who used the DGBL applications. Overall, the positive trends in literacy learning and emotional and social outcomes as a result of gameplay show promise⁴³. In addition, developers have already adapted ATL and FTM to support literacy learning for other languages and are exploring how they may be used in other contexts. Moving forward, further studies need to be conducted to determine the impact of DGBL and how to improve design and delivery in different contexts. Game analytics may also be considered for future use to gather data on learning and engagement.

Literacy learning and psychosocial outcomes

The impact evaluation employed a longitudinal quasi-experimental design to estimate the impacts of the DGBL applications on children’s literacy skills and compare growth in literacy outcomes for children in the control and treatment groups. The Early Grade Reading Assessment was used to measure the children’s literacy skills, particularly letter-sound identification, syllable reading, non-word reading, and oral reading fluency. Overall, the use of DGBL applications resulted in positive learning outcomes across all age groups and genders with a relatively low dosage (hours played). While the Difference in Difference analyses did not demonstrate statistical significance, the learning gains and positive trends in learning outcomes as a result of gameplay show promise.^{44,45}

The impact evaluation also employed a longitudinal quasi-experimental design to estimate the impacts of the DGBL applications on children’s psychosocial outcomes over time and compare growth in psychosocial outcomes for children in the control and treatment groups. The Strengths and Difficulties Questionnaire was used to measure children’s strengths, difficulties, and pro-social behavior. Overall, the use of DGBL applications appeared to have supported the development of positive emotional and social outcomes, contributing to children feeling happy and increased peer interaction. In addition, gameplay generated high levels of motivation for children to attend summer camp, which had implications for further learning.^{46,47}

⁴³ For further detail, the impact evaluation report can be found at: [Antura-Report-Final-Web.pdf \(allchildrenreading.org\)](https://allchildrenreading.org/antura-report-final-web.pdf)

⁴⁴ Koval and Plass 2018a

⁴⁵ Koval and Plass 2018b

⁴⁶ Koval and Plass 2018a

⁴⁷ Koval and Plass 2018b

Adaptation of DGBL applications to other languages

“The original Feed the Monster was an Arabic version, but we saw the game had potential for scalability. [...] We took it up and translated it to 50 languages. Game mechanics were good. The back end was good in the way it was built. It lends itself well to scaling.”

-ATL Respondent

The DGBL applications have been adapted to support literacy learning in other languages, with developers making modifications that match language needs and features and incorporating user feedback and learning from previous iterations.

One ATL respondent in this study reported that improvements had been made since the impact evaluation: “We took into account many aspects from the 2018 study. Every time we developed an iteration, we created a lot of content. Then we choose and we focus on what really brings value. Now students review the game. We do improve on iterations but need the budget to work on them ... The way we made the game was very modular and adaptable. We are quite confident on modification and what we want through the cycle of upgrading.”

Another ATL respondent reported the adaptation of the application to other languages: “We support about 12 languages as mother languages. You choose your mother language, and you choose what you want to learn. [The] overall universe of gameplay is more or less the same. We adapted the curriculum to include foreign languages.”

Similarly, FTM had expanded its language coverage: “The original Feed the Monster was an Arabic version, but we saw the game had potential for scalability. [...] We took it up and translated it to 50 languages. Game mechanics were good. The back end was good in the way it was built. It lends itself well to scaling.”

Explaining how they match language needs and features and adjust based on data on average users, the respondent shared: “We go through the scope and sequence of the language. Some languages are syllabic, so we have tweaked the game based on what the language needs are. We also have our quality assurance experts, and we incorporate user feedback ... We will look at the data for a specific language and we assess where do learners drop off, where do they repeat levels multiple times. This provides data for pacing. If it moves too slowly, they lose interest, and if it moves too fast, they lose interest. While AI [Artificial Intelligence] is helpful, we are not yet at a point where we can use that to create an individualized approach. We have to make the best choice for the average user experience.”

Potential for using the DGBL applications in other contexts and modalities

Developers are partnering with other organizations to explore how the DGBL applications may be integrated into classroom instruction. FTM has been discussing with a partner organization how the application can reach more children: “We are in conversation around the modalities—how can they get it to kids. They have reading circles, and they want to use tablets in the circles. The parents’ phone is the ideal scenario. The other is when schooling systems provide tablets to schools—and this allows [a] one-on-one interface.”

ATL has also been working with a partner organization to adapt the application to engage students and teachers and support classroom instruction: “[N]ow we want it to be usable in the classroom. We will include teachers in the co-design process. If we want the teacher to focus on creating mini-games within the games, we can configure that so the teacher can include 2–3 letters ... The teacher can use it with students and now we can also connect teacher and student tablets more readily.”

Another ATL respondent shared that guidelines have been developed for a partner organization on

“how to use it in the classroom using some printable playing cards and some group activities” and how to “adapt [the] game in schools where they operate and where [the] tool runs on tablet.”

Aside from literacy learning, ATL is also considering how the application can be used to teach numeracy skills: “Right now, we are exploring numeracy ... We can scale easily. Now we can develop with very little money, at 20–30 percent much cheaper than [the] original investment.”

An ATL respondent emphasized that DGBL applications must be integrated into the Ministry of Education (MoE): “They are meant to be integrated [into the] MoE. They need to be adapted in a classroom approach ... [W]e look at [the] entire system and we need to see where it aligns in curriculum development, teacher training, results, supervisors checking in on whether it’s being rolled out [...] to have [a] manual. It needs to be part of in-service training and professional buy-in from all relevant departments and professional development points and aligned to blended learning strategies.”

Further studies on the DGBL applications

A respondent reported that a multi-country study is being conducted on FTM, and pilot runs are being held in Bangladesh and Nigeria. ATL also reported an assessment that will be conducted in France involving the use of the application in the classroom: “[F]or the test we will do in France, we will be in a classroom of refugee children. They will have traditional lectures and Antura twice a week ... This will highlight a lot and help us to understand how to integrate Antura into the classroom.”

However, financial considerations have limited ATL developers from conducting further studies. According to one respondent, “We have not been able to do field testing besides [in] Jordan. We didn’t have [the] budget to do more. If we have a European project funded, we may be able to field test [the] impact of Antura as a tool for [the] integration of kids into a new environment, not just language-wise but also in terms of culture.”

Another respondent shared that more research could have been done on adjusting content: “We didn’t know how to change content based on the child’s state. If he wasn’t happy, does that mean we should simplify the game to make him feel better, or would that be boring? The project was mostly a development project, and so the research part was limited, and we had these types of challenges on a daily basis.”

Potential for using game analytics

Using the game analytics, data can be extracted and manipulated, that is, organized to make data easier to interpret, to monitor children’s access, usage, and progress. For future use, developers may consider how to synchronize data and increase capacity and resources to analyze data and generate insights on learning and engagement.

According to an ATL respondent, “We can keep track of scores when you play. But this is not our strength. The data can be manipulated, and it can be filtered by age [and so on], but we need to invest more in this area. This could be possible within future projects. It could be possible in future data ... Now we have more analytics, but in our original version, we couldn’t include much.”

Likewise, an FTM respondent shared, “[W]e haven’t verified the data beyond downloads and usage and some anecdotal stories. We measure the levels that they progress on, and it is possible to record their time on tasks so we could tally that per user. The data can be manipulated using our dashboards, but there is more work that needs to be done in this area, especially when the app is downloaded and played offline, then we can’t track anymore.”

CONDITIONS FOR IMPLEMENTATION

Factors that contributed to the promising design and implementation of EduApp4Syria include engaging an interdisciplinary team to develop the applications, conducting pilot testing, the availability of smartphones/tablets and an internet connection, the cooperation of parents and educators, and technical personnel for the ongoing maintenance of the applications.

Engagement an interdisciplinary⁴⁸ team to develop the DGBL applications

Respondents reported that people from different fields worked together to develop the DGBL applications, including Arabic literacy experts, pedagogical experts, experienced educators, psychologists, computer science professionals, and software creators.

Conduct of pilot testing of the DGBL applications

INTEGRATED, an international research firm based in Amman, Jordan, piloted and evaluated the applications within the remedial education centers managed by Relief International in Azraq Camp. Children were provided with tablets uploaded with ATL (Village 2) and FTM (Village 6), while Village 5 served as the control group. This enabled EduApp4Syria to measure children's literacy learning and psychosocial outcomes and recommend ways to further improve the design and delivery of the applications.

Availability of smartphones/tablets and internet connection

The applications were designed to be downloaded even with a limited internet connection and played offline using tablets or smartphones. An ATL respondent said, “[i]t’s fully adaptable to the refugee situation. The game was initially made to be easy to download when there is a limited internet connection, and you can even share it phone to phone. The child can play it whenever.”

Cooperation of parents and educators

Although the games were designed for autonomous learning, the cooperation of parents and volunteer educators was necessary, especially during tablet distribution and downloading of the applications. The impact evaluation confirmed that most parents expressed a willingness to download the application, with one parent sharing that she used it to improve her own literacy skills.⁴⁹

Technical personnel for ongoing maintenance of the DGBL applications

Developers are committed to maintaining, updating, and troubleshooting the applications despite limited resources allocated for continuing support. An FTM respondent stated, “There is a need to remain compliant and update the app ... so our role is a maintenance role.” An ATL respondent highlighted that an application is a service that developers provide over time: “Games are services. We have a team, and the technical person is really committed. When we need it, the modifications are done.” The respondent also shared that funding must be allocated for the continuing service: “The funding should integrate the capacity to continue to communicate, so it’s [also about] five years of community management. It isn’t as expensive as development, just maybe one to two people, but for five years, we need to continue to solve problems in the game and to continue the communication.”

⁴⁸ An interdisciplinary approach involves drawing appropriately from several disciplines (or separate branches of learning or fields of expertise) to redefine problems outside of normal boundaries and reach solutions based on a new understanding of complex situations. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/interdisciplinary-approach#:~:text=An%20interdisciplinary%20approach%20involves%20drawing,new%20understanding%20of%20complex%20situations>. An interdisciplinary approach involves team members from different disciplines working collaboratively, with a common purpose, to set goals, make decisions and share resources and responsibilities. <https://www.health.vic.gov.au/patient-care/an-interdisciplinary-approach-to-caring>

⁴⁹ Koval and Plass 2018a

MODEL 3: MOROCCO: RFS-IDCRT

EVIDENCE BASE SUPPORTING THE MODEL

An EGRSLA was developed and administered to assess the MSL and MSA skills of students who are deaf or hard of hearing. Assessment results showed that students' reading skills improved over time. The greatest areas of gain were in the letter name identification and syllable identification portions of the test as well as the MSL vocabulary assessment in both grades 1 and 2. Higher level reading comprehension saw no significant increase in test scores for both grades. The 2018 Final Evaluation Report noted that the design of the intervention did not consider the limited comprehension in early grade students in terms of letter recognition and sign language vocabulary.

The 2018 Final Evaluation found that the level of reported usage of the MSL software *Clip and Create* varied greatly by school. One of the challenges noted was the limited teacher training and fluency in MSL of teachers working with hearing impaired students in Morocco. In addition, Morocco has no specialized degree or program for training teachers for working with hearing impaired students or MSL training for teachers interested in specializing in this area. Most schools that provide education services to students with hearing impairments cover only the primary level and are not overseen by the Ministry of Education. Since private schools are not required to follow the national curriculum, they do not always have formally trained teachers, and their teachers and administrators have limited knowledge of MSL. Adding to these constraints is the fact that there is no one single standardized sign language, which varies across regions.

The project final evaluation concluded that assistive technologies have the potential to improve the teaching and learning processes but that the larger challenges of no standardized MSL or specialized training for teachers also need to be addressed.⁵⁰ Based on this experience, USAID Morocco is currently focused on standardizing MSL within the Ministry of Education and improving teacher training curriculum in both pedagogy approaches for people with hearing impairments as well as fluency in MSL as part of the current Morocco Inclusive Education Teacher Training Initiative.⁵¹

CONDITIONS FOR IMPLEMENTATION

Factors that contributed to the promising design and implementation of RFS-IDCRT include phased program implementation, MSL documentation, provision of the necessary technology to educators, capacity-building of educators and parents, the establishment of mechanisms for stakeholder engagement, and integration of the interventions into the MoE.

Phased implementation of the Reading for Success program

The first phase focused on gathering data to inform the design and implementation of early grade reading activities. Following key findings from the study, RFS-IDCRT was designed and launched to address the needs of students who are deaf or hard of hearing.

MSL documentation

RFS-IDCRT documented MSL to develop the software and adequately capture regional language variations. One respondent in this study shared the following account: "It soon became apparent that there was almost no MSL documentation. Thus, to develop software that incorporated sign language, the language had to be documented. This became part of the project's mission. Not only did this involve networking with the deaf community for language sampling and verification, but it also resulted in the development of software to capture regional variations. Recognizing regional variations was also critical for developing the EGRSLA. The assessment could not reliably capture student performance if the sign language used within it could not be understood by deaf students throughout Morocco."

⁵⁰ All Children Reading 2018

⁵¹ Morocco Inclusive Education Training Fact Sheet (usa.gov)

Provision of the necessary technology to educators

RFS-IDCRT provided the computer hardware and MSL Clip and Create software on CD-ROMs. As confirmed by a respondent, “An initial review of all the educational programs involved in the project revealed that most lacked technology, and those that did were not making good use of the technology that they had. Consequently, both hardware and software (for example, Microsoft Office) were provided for all the programs.”

Respondents confirmed that teachers found the software helpful but that it could be improved to provide further support to teachers and students. A respondent stated, “All the teachers that use the software reported its utility to create educational materials that help in all subjects ... [T]he software needs more enrichment to include all components of the curriculum.” Another respondent suggested, “It will be very helpful if the software included vocabulary for subjects such as science, mathematics, and history, as well as more complex content, like full sentences.”

Capacity-building of educators and parents

RFS-IDCRT conducted trainings for teachers, school directors, and parents, which included the basics of deaf education, an overview of the sequences and basic principles of special education, behavior management, addressing vision issues that impact learning, instructional strategies for teaching deaf children, involving families in the educational process, how to use a logic model for implementing change, and the science of attaining and sustaining successful change.⁵²

As confirmed by a teacher-respondent, “Several training courses were organized in Rabat and in the regions to develop the capacities of teachers, directors, heads of associations, and parents of deaf children to improve their integration into the educational milieu.” The trainings highlighted how educators can use different formats and techniques in presenting information: “Much of the training provided to educators focused on expanding instructional techniques so that there was less reliance on copying off the board only. The training included a wide variety of teaching strategies that used multimodalities, technology, individual and small group instruction, projects, games, puzzles, stories, printable, [and so on].”

Participants appreciated the trainings and requested more follow-on sessions. An implementer-respondent shared, “Teachers and directors were very enthusiastic about the knowledge gained through the trainings. They had positive feedback regarding the trainings. Teachers requested more practical trainings focused on lesson demonstrations to facilitate teaching subjects other than Arabic, such as science or history.” Teacher-respondents expressed the need for trainings on “the practical application of teaching techniques to support students who are deaf or hard of hearing” and “pedagogical intervention in the classroom and how to adapt learning for the benefit of deaf and hard-of-hearing students.”

Establishment of mechanisms for stakeholder engagement

The greatest success of the project is the steering committee where the dialogues were instigated between relevant ministries and deaf education stakeholders and the mobilization of civil society in an organized group.

-Moroccan Educator

The greatest success of the project is the steering committee where the dialogues were instigated between relevant ministries and deaf education stakeholders and the mobilization of civil society in an organized group. The Deaf Association and Steering Committee members had increased pressure on the MoE to support deaf education. The main benefit of the committee was to create and strengthen linkages between the different deaf associations through meetings and exchange visits

⁵² All Children Reading 2018

RFS-IDCRT engaged key stakeholders by establishing a steering committee to direct interventions toward addressing priority needs, convening an advisory group to develop the EGRSLA, and strengthening coordination and linkages among stakeholders.

Describing stakeholder involvement, an implementer-respondent reported: “The project had a Steering Committee of school and ministry administration representatives who met monthly to identify needs, recommend strategies for implementing change, and coordinate training and materials dissemination. The meetings took place at different schools countrywide to encourage collaboration and information-sharing. Parents, local agency representatives, school administration and staff, deaf community members, USAID representatives, MoE and Ministry of Solidarity representatives, and subject matter experts provided input into the development of training and feedback.” The respondent also identified those involved in developing the assessment tool: “One of the primary goals of the project was the development of the EGRSLA. To this end, a large Advisory Group was convened composed of deaf education experts, sign language experts, reading specialists, assessment specialists, school and agency representatives, and deaf community representatives.

An educator-respondent highlighted how RFS-IDCRT has helped strengthen coordination and linkages to advocate greater support for deaf education: “The greatest success of the project is the steering committee where the dialogues were instigated between relevant ministries and deaf education stakeholders and the mobilization of civil society in an organized group. The Deaf Association and Steering Committee members had increased pressure on the MoE to support deaf education. The main benefit of the committee was to create and strengthen linkages between the different deaf associations through meetings and exchange visits.”

Integration of the interventions into the MoE

RFS-IDCRT collaborated with the MoE to facilitate the approval and rollout of project interventions and the involvement of personnel at various levels. A respondent reported, “The MoE approved the software and all curricula for the various training activities, and educational staff in each school received training in their use in addition to the software developed by the project.” Another respondent confirmed, “Training in the use of the software was provided in Rabat at project-affiliated programs and in communities throughout the country.”

During implementation, RFS-IDCRT was mindful of how training materials were developed and disseminated to the MoE and other stakeholders: “The project sought to ‘productize’ every aspect of training so that there could be sustainability. Every topic of training provided in Rabat was supported by a PowerPoint presentation and handout materials that were translated into Arabic. These were given to all training attendees, USAID Moroccan Office of Education, and the MoE with full permission for replication.”

Moreover, RFS-IDCRT ensured that the MoE and other stakeholders would have continued access to the technology and could replicate the intervention in other areas: “These pieces of software were left with all the educational programs, USAID Morocco Office of Education, and the MoE with full permission to replicate ... The final activity of the project was sharing project information, results, and products at the provincial level in many of the regions.”

CONCLUSIONS

The following conclusions were drawn from the key findings and discussions on the promising UDL approaches in the MENA region, the evidence base supporting these models, and the conditions that made implementation possible.

- **UDL provides a viable foundation for reducing barriers to learning, increasing access to learning opportunities, and improving student learning outcomes in basic education.** It promotes a more flexible, learner-centered approach that considers learner variability and supports learners with diverse needs and abilities in different contexts (development and emergency), educational settings (formal, non-formal, and informal), school types (public and private schools and learning centers), and modalities (classroom-based instruction and more autonomous learning). Although the models reviewed in this study have built-in monitoring and evaluation components, **there is limited evidence supporting the effectiveness of UDL approaches in improving student learning outcomes.**
- **The phased implementation of some models in this study has helped inform their design and implementation and is more responsive to the needs of their target participants.** EduApp4Syria, in particular, has benefitted from having a pilot run with a strong evaluation component. This allowed the ATL and FTM creators/developers to modify and improve the flow, pace, and content of the applications and successfully adapt them to different languages, contexts, and modalities.
- **Competent school leadership and empowered teachers are crucial to adopting, sustaining, and expanding UDL-aligned approaches in classrooms, schools, and other education settings.** As illustrated by The Aures School, a competent and supportive school leader is instrumental in creating an inclusive environment where learners with diverse needs and abilities are welcome and accepted and where teachers feel adequately motivated, supported, and empowered. Having been trained on how to implement and strengthen their UDL practice, teachers feel more confident to explore how UDL looks in their own classroom and have become more proactive in their continuous professional development.
- **Technology, if designed well and used strategically with other interventions, has the potential to help optimize the teaching and learning process.** As demonstrated by the models presented in this study, utilizing technology can increase children's access to learning resources—through edtech multimedia materials, digital libraries, and DGBL applications—and allow them to learn at their own pace. The MSL assistive software was particularly helpful in making learning resources accessible to children who are deaf or hard of hearing. Technology can also facilitate communication, research-sharing, and further research among educators, parents, and other stakeholders.
- **The support and engagement of education ministries, educators, parents, students, civil society organizations, and other community stakeholders are essential conditions for implementing the models** and have helped in making the interventions more relevant and responsive to the needs of the target participants, facilitating the smoother implementation of activities, and activating parental and community cooperation and participation. These conditions are also vital for making the models more sustainable and increasing their potential for replication and scaling.

RECOMMENDATIONS

RQ3: What uses of UDL in education programming are recommended in the MENA region?

Based on the conclusions, this study has the following recommendations for education programming using UDL in the MENA region.

- 1. Embed UDL principles in education programming in the MENA region to reduce barriers to learning, improve access to learning opportunities, and improve learning outcomes for all learners.** Examine current and emerging education interventions in the MENA region and identify, strengthen, or include approaches that align with the UDL principles of engagement, representation, and action and expression to optimize teaching and learning for all learners. While UDL does not directly target a specific group of students, marginalized students may find more opportunities for engagement and participation in classrooms guided by UDL principles and can serve as a benchmark to evaluate the success of education interventions. And although the models examined in this study were limited to addressing needs and issues in basic education (K–12), UDL principles may be applied in other areas, including higher education and workforce development.

As the world emerges from the COVID-19 pandemic, education stakeholders must focus on overcoming the pre- and post-pandemic barriers in the education of all learners. Although there is no “silver bullet” that can fix these persistent and long-standing issues, the UDL framework supports a viable foundation for beginning the process of recovery and rebuilding.⁵³

- 2. Consider implementing phased interventions that include data collection and pilot testing to inform program design and rollout.** This study examined models that have undergone phased implementation, which allowed designers and implementers to determine the feasibility and effectiveness of the model, foster trust and credibility among partners, and build on promising features and processes. The research and evaluation components of a phased implementation can generate insights on how to improve the intervention, incorporate sustainability measures, and course-correct in a more agile and efficient manner.
- 3. Build the capacity of school leaders to create an inclusive school climate and model UDL practices.** Embracing UDL means rethinking school leadership around the key concept of an inclusive school climate that necessarily has transformative repercussions on many different practices and policies within the school.⁵⁴ As such, capacity-building should aim to support school leaders in adopting a school-wide community-building approach, helping them foster new meanings about diversity, promote inclusive practices within the school, and build connections between the school and the wider community.⁵⁵

Moreover, capacity building should focus on developing UDL skills, as well as leadership in UDL that supports the empowerment of local educators to adapt and use UDL within their own contexts.⁵⁶ This allows school leaders to work with teachers toward a shared vision, model the desired changes in instructional practices, and provide moral support for teachers as they explore, apply, and practice UDL approaches in the classroom.⁵⁷

⁵³ Basham, Blackorby, and Marino 2020

⁵⁴ Fovet, n.d.

⁵⁵ Inclusive Schools Communities, n.d.

⁵⁶ McKenzie, Karisa, Kahonde, and Tesni 2021

⁵⁷ Lewis 2018

4. **Build the capacity of teachers to meet learners' diverse needs and abilities by moving toward more flexible teaching strategies and away from a rigid, one-size-fits-all approach.** Capacity-building should aim to motivate and empower teachers, providing them with the necessary competencies to try more flexible teaching strategies and build on existing practices that promote inclusion. The Aures School, in particular, conducted trainings designed to model UDL principles and allow teachers to experience what it means to be engaged and included in the learning process. In addition, the trainings were designed to help teachers recognize how they may already be incorporating UDL in the classroom. This approach to capacity-building empowered teachers to apply their learnings in the classroom and try more flexible approaches to teaching, as well as take control of their professional development through their own research and involvement in a community of practice.
5. **Consider how technology can increase access to learning materials, improve learner engagement, and increase ways to express or demonstrate learning.** Although technology is not required and does not automatically equate to UDL, it can be used to reduce educational barriers for all learners. A UDL-aligned, technology-enhanced methodology is an effective way to create flexible learning environments for learners and a more dynamic learning experience for all involved.⁵⁸ In a well-designed UDL environment, the technology assistance most commonly needed by students with disabilities is frequently built into the materials and technology used by all students.⁵⁹ In addition, it is essential to recognize the need for assistive technology and reasonable accommodation that will be required for children with disabilities.⁶⁰
6. **Integrate UDL interventions into the education ministry to ensure relevant programming and increase the potential for impact, sustainability, and scaling.** The integration of education programming into the country's education system, as demonstrated by alignment with the national curricula, learning standards, and education priorities, can help garner support from the education ministry and facilitate the involvement of ministry personnel at the national, regional, division/district, and school levels in program design, implementation, and review. This, in turn, can increase the potential of education programs to be implemented on a broader scale, sustained after program completion, and replicated or scaled up in other contexts.
7. **Establish stakeholder consultation and engagement mechanisms, including with government partners, educators, parents, students, academia, private institutions, and civil society organizations, to facilitate sharing insights, expertise, and resources on UDL implementation.** Stakeholder consultation and engagement can inform programming, facilitate the smooth implementation of activities, and reinforce the interventions in school, at home, and in the wider community. Establishing and strengthening mechanisms, such as steering committees, advisory groups, technical working groups, and parent and teacher associations, can also help institutionalize participatory planning and decision-making. At the school level, when teachers implement UDL and involve parents in their classrooms, they create an environment that values the students, their families, and all the variability in their learning environment, which can impact student growth and success.⁶¹
8. **Install a system for monitoring and evaluating UDL models.** "Proof of the validity and reliability of UDL as a guiding theory for positive and inclusive learning results is both needed and welcome."⁶² A robust monitoring and evaluation system can help inform ongoing implementation, facilitate continuous learning and improvement, identify critical factors for results achievement, and determine the impact of UDL on student learning outcomes, as well as equity and accessibility. Aside from larger-scale assessments conducted at specific program

⁵⁸ Morra and Reynolds 2010

⁵⁹ Cortiella 2008

⁶⁰ McKenzie, Karisa, Kahonde, and Tesni 2021

⁶¹ Novak 2017

⁶² Gronseth, Stefaniak, and Dalton 2022

phases (baseline, midline, and endline), education programming must reinforce formative and summative assessments that help teachers monitor student progress in mastering target competencies and allow them to provide more immediate and relevant support based on diverse needs and abilities. As demonstrated by The Aures School, when conducted with a clear purpose and some creativity and with due consideration for learners, assessments can go beyond correct/incorrect responses and grades on a piece of paper. Assessments can be a way for learners to demonstrate what they have learned and for teachers to motivate them to move forward and actively participate in their own learning.

DISSEMINATION OF FINDINGS

The primary objective of the research study has been to provide relevant, practical, and up-to-date information to USAID country offices in the MENA region. This empowers them to incorporate and adapt the latest developments and insights in UDL into their project planning and design processes effectively.

At the USAID MENA Regional Education Workshop held from May 1–5, 2023, the findings of the desk review were successfully disseminated. To promote engagement and enhance understanding of UDL, workshop materials were thoughtfully developed based on the promising practices observed during the study. These materials played a crucial role in facilitating collaborative group work that centered around UDL during the workshop.

The research findings will be presented to key stakeholders, including the USAID/MENA Bureau, bilateral mission education staff, and the USAID/Education Office. The goal is to cultivate meaningful discussions and foster collaboration to promote the widespread implementation of UDL throughout the region.

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ANNEXES

ANNEX A. ANNOTATED BIBLIOGRAPHY

Introduction

This annotated bibliography reviews current and past programs on models of universal design for learning (UDL) in the Middle East to identify successful models for TALEEM.

The desk review approach consisted of an internet-wide search using Google and Google Scholar and website-specific research across government agencies, intergovernmental organizations, non-governmental organizations, and other development partners in the education sector within and beyond the MENA region. Keywords used in the search per theme included the following: universal design for learning, inclusive education, accessible education, flexible curriculum, flexible instruction, flexible assessment, accessible learning materials, education design, teaching methodology, education technology, assistive technology, and student engagement.

Education reforms, programs, and initiatives were reviewed by exploring the websites of various agencies and organizations, including country-specific education ministries, UNESCO, UNHCR, UNICEF, Norwegian Refugee Council, implementing partners, DFAT, DFID, USAID, World Bank, and the UN Office for the Coordination of Humanitarian Affairs, etc.

UDL Bibliography

1. *World Learning (March 2021). Universal Design for Learning: Impact on policy, practice, and partnerships for inclusive education.* <https://www.worldlearning.org/story/world-learning-algeria-helps-advance-the-udl-field-with-new-white-paper/>
Description: A white paper published by World Learning Algeria together with international inclusive education advocates to expand the knowledge and practice of UDL in international development education.
Evaluation: N/A
2. *Haigazian University (July 2021). Case Study on the Inclusive Education Pilot Project in Lebanese Public Schools.* UNICEF. <https://www.unicef.org/lebanon/media/8391/file>
Description: A report on how five host countries invest in the education of Syrian refugees by promoting integration in national systems and inclusive education policies targeting all children.
Evaluation: N/A
3. *Klein, T. (November 2019). Power of inclusion mapping the protection responses for persons with disabilities among refugees in the Middle East and North Africa region.* United Nations High Commissioner for Refugees (UNHCR). <https://www.unhcr.org/tr/wp-content/uploads/sites/14/2020/10/Power-of-Inclusion.pdf>
Description: A report that summarizes UNHCR-supported practices in education inclusion and related challenges. In Egypt, the UNHCR response is to fund an NGO partner to identify suitable education options (inclusive and specialized), and to administer cash-for-education grants. In Jordan, 300 children are supported through the Portage Program (home-based early intervention), and 200 parents participated in awareness sessions where one of the topics was related to education opportunities for children with disabilities. In addition, 60 children are supported with specialized education through a partner who provides rehabilitation, assistive devices and other disability specific support. In Lebanon, there are 28 inclusive public schools supported through international funding, but they are dispersed, and distances pose a travel or transport barrier. Additionally, it is unlikely that these schools will have the capacity to include children with intellectual disabilities. The Ministry of Social Development runs a special education center for Lebanese children with moderate to severe disabilities. In Yemen, two centers in the south have provided

comprehensive group and individual early intervention and education services. The objective is for children, who successfully complete their individual education program and demonstrate improvement in functioning, to be able to access the regular education system and institutions.

Evaluation: N/A

4. Bitat, L. (February 2019). *UDL in Algeria: Engaging parents and teachers to build an inclusive school culture*. learning designed. <https://www.learningdesigned.org/resource/udl-algeria>

Description: The Grand Atlas Primary School is an inclusive K-5 school established in 2014 by Leah Bitat, Director of World Learning Algeria, and a team of local educators as a laboratory of best practices in inclusive education design. The school adopted UDL to ensure the participation of a diverse group of students and success in mastering grade-level vocabulary in Arabic, English, and French. The school focused on the following aspects that support UDL principles and practices: use of social media in community outreach for teachers and parents; selection and ongoing professional development of teachers; parental engagement in the learning process; use of high- and low-tech tools across the curriculum; and collaboration with community stakeholders. To demonstrate replicability and scalability in the larger Algerian community, the project team prioritized the recruitment of local teachers and adoption of the national curriculum.

Evaluation: N/A

5. UDL IRN (2018 May 7). *World Learning, UDL in Algeria [Video]*. YouTube. Retrieved on March 22, 2023, from <https://www.youtube.com/watch?v=C0cCKFdAhYw&t=3s>

Description: A YouTube video which describes how UDL in Algeria look like. World Learning Algeria's Leah Bitat explores the importance of UDL as it pertains to language, engagement, and professional development: (1) Address the needs of students from different linguistic backgrounds (2) Address the needs of students with learning disabilities per teacher (trained by World Learning Algeria) and students from Aures School: (3) Students are more engaged due to use of different teaching strategies, classroom arrangements (workstations), activities, and groupings (4) The school allows students to do presentations and participate in workshops and "work while having fun."

Evaluation: N/A

6. Ghoneim, Salah ElDin. (2014). *Requirements for inclusion of children with disabilities in public education in Egypt*. *Journal of Educational and Social Research*. 4. 192-199. doi: [10.5901/jesr.2014.v4n4p192](https://doi.org/10.5901/jesr.2014.v4n4p192)

Description: A study that enumerates barriers to inclusive education in relation to the standards for the universal design for learning. Findings include: (1) children with disabilities do not receive enough attention by the public education teacher, as they do not get adequate services in the context of this type of education; (2) teachers in public education did not receive appropriate training to deal with the needs of children with disabilities; (3) the school as an environment for inclusion should rethink the curriculum, school schedules and plans to be flexible enough to allow children with disabilities to participate in an active way; (4) participating in the responsibilities and performance standards for school and educational management require providing opportunities for parents and families to participate.

Evaluation: N/A

7. Momberg, N. (2008). *Teachers' attitudes towards working with students with special educational needs in mainstream classes in Egypt*. [Master's Thesis, Stellenbosch University]. <https://scholar.sun.ac.za/handle/10019.1/20448>

Description: A study on the development of inclusive education and teachers' attitudes to children with disabilities in mainstream classes. Findings include: (1) teachers were apprehensive about having students with emotional and/or behavioral disorders in the

classroom. Regardless of gender, age, experience and training, teachers found hyperactive behavior challenging; (2) training seemed to be ineffective and together with continuous in-service training and behavioral management, curriculum adaptations with supplemented support from educational psychologists would possibly be more beneficial; (3) respondents were more willing to integrate students with physical disabilities than to accommodate those with intellectual impairments; (4) with the present overwhelming mass of visual material to which students are continually exposed (viz. textbooks, handouts, class schedules and blackboard writing), accommodating a visually impaired or blind student in overcoming their limitation will be extremely difficult. Educational facilities for the blind generally fall short of fulfilling their demands.

Evaluation: N/A

8. *School to School International (2017). Qysas (Stories): An Arabic leveled digital library. Retrieved on March 15, 2023, from <https://allchildrenreading.org/wp-content/uploads/2019/07/Little-Thinking-Minds-Project-Evaluation-2.pdf>*

Description: An evaluation of the project which shows that Qysas advances literacy outcomes, particularly in syllable fluency, oral reading fluency, and reading comprehension. Girls who had access to the Qysas platform had greater gains than girls in the comparison group in the three sub-tasks. Teachers and parents also noted that children were motivated to come to school on “tablet days” and improved their reading confidence through practice on Qysas.

Evaluation: Little Thinking Minds implemented the Qysas (Stories): An Arabic Leveled Digital Library for Every Classroom project to increase early grade literacy skills in Arabic by developing a learning platform with self-paced, interactive, electronic reading materials for Grades 1 to 3 and creating literacy groups where students could access the learning platform on tablets. An impact evaluation of the project showed that Qysas advances literacy outcomes, particularly in syllable fluency, oral reading fluency, and reading comprehension. Girls who had access to the Qysas platform had greater gains than girls in the comparison group in the three sub-tasks. Teachers and parents also noted that children were motivated to come to school on “tablet days” and improved their reading confidence through practice on Qysas.

9. *Koval-Saifi, N. (March 2019). Relevance of DGBL in enhancing equity, quality, and efficiency in MENA. Retrieved on March 15, 2023, from <http://dl4d.org/wp-content/uploads/2019/03/Digital-Game-Based-Learning-MENA.pdf>*

Description: A study on digital game-based learning in the MENA region. Findings include: (1) the Qysas early grade digital-level library was designed to help early grade Jordanian students develop and strengthen foundational Arabic reading skills, while providing access to a library of 125 interactive books for Grades 1 to 3; (2) the Qysas app contains five levels, each made up of three main components. As those stages are completed at the child’s own pace, the child is rewarded, and the next level unlocks; (3) an impact evaluation showed that Qysas advances literacy outcomes with statistical significance. Children were motivated to come to school on tablet days, and teachers and parents noted that practicing on Qysas also improved students’ reading confidence; (4) girls who had access to the Qysas platform had greater gains than girls in the comparison group on the syllable identification, oral reading fluency (ORF), and reading comprehension subtasks.

Evaluation: N/A

10. *Shah, R. (2017). Evaluation of NRC’s education programming in the camps of Jordan. Norwegian Refugee Council. <https://www.flyktningshjelpen.no/globalassets/pdf/evaluations/camps-education-clean.pdf>*

Description: An evaluation report of NRC’s education programming to support the Syrian refugee crisis in Jordan. Offered through dedicated learning centers, the program aimed to

provide learning support services (LSS), remedial education, and catch-up education for in and out of school refugee students between the ages of 6-15 residing in the camps. Key impacts of NRC's informal education support have been improved academic achievement amongst participants: (1) reported improved academic confidence as a result of the program; (2) increased focus on engaging parents and caregivers in the learning process through outreach campaigns, awareness sessions and the initiation of Parental Community Groups (PCGs); (3) general impressions were that NRC's current education programming was deemed to be of quality, in part because its facilities, structure and curriculum all appear to be parallel to, and in concert with that of the formal schools; (4) girls have enrolled in higher numbers, but boys appear more likely to complete the full three months of program activity and to attend more regularly; (5) students with identified disabilities are reported to demonstrate the same types of improvements in learning and well-being that their peers enjoy, and appear to attend with equal or higher regularity to their peers.

Evaluation: The education programming of the NRC aimed to support the Syrian refugees in Jordan by providing learning support services, remedial education, and catch-up education for in-school and out-of-school refugee students aged 6-15 residing in the camps. The program evaluation reported that the facilities, structure, and curriculum appear to be parallel to or in concert with that of the formal schools. Data showed improved academic confidence and achievement amongst participants. Students with disabilities attended educational activities with equal or higher regularity compared to their peers and demonstrated the same types of improvements in learning and well-being.

11. *Integrated. (2019). Let's live in harmony (multi-media educational materials and teaching aids): Final evaluation report.* <https://www.unicef.org/jordan/press-releases/lets-live-harmony-multimedia-project-concludes-award-ceremony-educators> (link to press release)

Description: An evaluation report of the program, which is a multi-faceted approach to respond to the educational needs of Syrian and Jordanian students in double shifting schools. Findings include: (1) the program was reported to effectively increased peer-to-peer interaction and encouraged students to persevere in the comprehension tasks to earn stars, thereby building grit as well as motivation to learn; (2) acquisition of deeper terms also reflected a deeper understanding of social acceptance, cohesion and kindness. Students' ability to understand concepts of social cohesion and empathize with emotions of other students significantly improved after being exposed to the program; and (3) most of the teachers reported that the duration of the training was sufficient, and the competency of the trainers was good.

Evaluation: The Let's Live in Harmony program developed a comprehensive set of EdTech multimedia education materials and teaching aids to support students' learning in 100 public schools. Multimedia materials filled the educational gaps for Syrian and Jordanian students and supported students regardless of their status, capabilities, learning experience, skills, and environments. The program evaluation reported increased peer-to-peer interaction, perseverance in comprehension tasks, and motivation to learn.

12. *Haigazian University (2021). Case Study on the inclusive education pilot Project in Lebanese Public Schools. UNICEF.* <https://www.unicef.org/lebanon/media/8391/file>

Description: A case study on the pilot project with the following findings: (1) very positive feedback as more than 50% of participants (educators and therapists) found the training very useful especially in regard to "télé practice."; (2) nine speech therapists and two occupational therapists were recruited to complete the need for paraprofessionals in the 30 inclusive schools; (3) principals' feedback on online teaching (including teaching of all learners) was very positive in spite of nonavailability of digital resources to many schools; (4) principals' flexible and creative initiatives enabled to reach out for the highest possible number of learners; (5) the coordination between all stakeholders ensured the continuous

delivery of services in all 30 schools, without interruption in spite of obstacles, especially the challenges related to the proper implementation of distant learning.

Evaluation: In 2018, the Ministry of Education and Higher Education and UNICEF launched the Inclusive Education Pilot Project in 30 public schools across Lebanon to provide methodological support to teachers in curriculum adjustment and teaching strategies and ensure accessible and quality education for all learners, regardless of their nationality, gender, race, ethnicity, social class, and disability. The pilot project is based on the Multi-Tiered Systems of Support (MTSS) model, which consists of three tiers across academic and behavioral dimensions. The case study conducted in 2021 reported positive feedback from stakeholders and presented recommendations for a national policy on inclusive education in Lebanon.

13. UNICEF Lebanon (2018, May 22). *The Ministry of Education and UNICEF promote inclusive education: A pilot program launched in 30 public schools across Lebanon create a fair chance for children with disabilities through inclusive education.* <https://www.unicef.org/lebanon/press-releases/ministry-education-and-unicef-promote-inclusive-education#:~:text=Beirut%2C%202022%20May%202018%20%E2%80%93%20To,inclusive%20education%20programme%2C%20a%20pilot>

Description: An article on UNICEF's website about a pilot program launched in 30 public schools across Lebanon to create a fair chance for children with disabilities through inclusive education: (1) methodological support to teachers on curriculum adjustment and teaching techniques and strategies; and (2) support to children with special education needs and learning difficulties, including the provision of assistive technologies.

Evaluation: N/A

14. Kaloustian, G., Shrestha, R., and Kotob, W. (2022). *A case study describing how the PSS-SEL Toolbox was used in Lebanon to develop a national SEL framework.* World Learning. <http://inee.exploresel.gse.harvard.edu/case-studies/Lebanon%20-%20World%20Learning.pdf>

Description: A case study describing how the PSS-SEL Toolbox was used in Lebanon to develop a national SEL framework. QITABI 2 model of formative assessment in e-lessons intends to create a schooling culture where formative assessment is central to learning and differentiated instruction. Four elements characterize the QITABI 2 model: alignment with the national curriculum, sharing the targeted objectives for each lesson with students, tracking students' learning, and teacher evidence-based planning. These formative assessments call different types of responses targeting by these students of various levels, abilities, and learning styles based on Universal Design for Learning (UDL): (1) as part of the nationwide plan to pivot to distance learning due to COVID-19, QITABI 2 aims to develop free online learning materials to support all students in Lebanon from grades 1 to 6.

(2) QITABI 2 developed a first draft of the national Social Emotional Learning (SEL) framework. The national SEL framework informs educators what SEL skills matter for Lebanese children and are fundamental for their effectiveness in life; (3) QITABI 2 works with the 'whole' child targeting both the child's holistic development including their cognitive, social, and emotional development, as well as the child's 'whole' learning environment that refers to their most immediate to distant environments within their ecosystem that interact with one another; (4) the academic program places great emphasis on memorization and rote learning, which has stagnating implications for children's logic and reasoning skills, interests, and intuitive sense to explore, show curiosity and actively engage in their learning process with more emphasis on trying to 'teach' children content that often neglects and rejects acknowledging children's attempts at learning and understanding.

Evaluation: N/A

15. *Lebanon Education Sector (August 2021). Lebanon Education Sector: Secondary Data Review (SDR) Report Impact of Economic Crisis and COVID-19 on Education in Lebanon September 2019 – May 2021 (no link to report).*

Description: A report that reviews the impact of economic crisis and COVID-19 on education in Lebanon. Findings include: (1) the introduction of technology in distance learning during the school closures has further widened the gap between Lebanese private and public schools and formal and non-formal education; (2) many refugee children did not have access to distance learning programmes due to the lack of support from MEHE and the lack of infrastructure; (3) limited student device access was an impediment to learning, specifically the difficulty to fully embrace with online learning using only their smartphones; (4) the curriculum and learning content proposed by MEHE is not well adapted to distance/online learning as these are not supplemented with the necessary tools and resources to be accessible to all and effectively administered outside classrooms; and (5) the most affected children by the introduction of technology and remote learning are the children with special needs that were not taken into consideration with the new approaches. Children with disabilities pre-existing seclusion and marginalization were heightened as platforms utilized for distance education were not suitable and do not cater for their learning.

Evaluation: N/A

16. *World Learning. Quality Instruction Towards Access and Basic Education Improvement (QITABI II) (n.d.) Retrieved on March 16, 2023, from <https://www.worldlearning.org/program/quality-instruction-towards-access-and-basic-education-improvement-2/>*

Description: An article on the World Learning Algeria's website on QITABI 2, a program that aims to improve the reading, writing, math, and social and emotional learning skills of more than 300,000 students attending primary public schools in Lebanon, include Syrian refugees.

Evaluation: N/A

17. *Libya Education Sector (2022). ECW Multi-Year Resilience Programme (MYRP) framework. Education Cannot Wait. https://www.educationcannotwait.org/sites/default/files/2022-03/21_MYRP_LIBYA_Programme%20Document_20211201.pdf*

Description: A programme framework including plans to sustainably improve access to inclusive and equitable quality education for internally displaced persons (IDP), returnee, refugee migrant, and host community children and adolescents across the East, the West, and the South of the country.

Evaluation: N/A

18. *Ethabti, M. (2015). Inclusive education? Disability, culture, teaching and classroom management in Libya. [Doctoral thesis, University of Huddersfield]. <http://eprints.hud.ac.uk/id/eprint/2717711/Amended%20thesis%20-%20ETHABTI.pdf>*

Description: A study that aims to explore teachers' perceptions and attitudes towards inclusive education practice in supporting children with disabilities in Libya considering the findings of the General People's Committee of Education report (GPCE, 2008). Perspective and attitudes of teachers in Libya on the implementation of an inclusive school culture: (1) although the teachers had undergone some form of training in inclusive education, the implementation aspect at the school and classroom level was lacking; (2) due to the teachers' lack of understanding of the basic concepts of inclusive education, they appeared less able to cater to the specific needs of children with disabilities in mainstream schools/classrooms; (3) most teachers said that only the students who were able to cope and be involved in academic activities should be included in the mainstream schools.

Evaluation: N/A

19. Wafi, L. (2021 January 11). *Advancing toward Morocco's digital goals amid COVID-19*. Creative Associates. <https://www.creativeassociatesinternational.com/insights/advancing-toward-moroccos-digital-goals-amid-covid-19/>
- Description:** An article on Creative's website on the National Program for Reading and how it pivoted its work to ensure continued reach to teachers and students in Morocco, even though in-person training workshops and meetings were no longer possible.
- Evaluation:** N/A
20. Creative Associates. (n.d.). *Reading for Success – National Program for Reading*. Retrieved on March 16, 2023, from <https://www.creativeassociatesinternational.com/projects/morocco-reading-success-national-program-reading/>
- Description:** An article on Creative's website on the National Program for Reading, which aims to support the Government of Morocco to develop a national literacy program to improve Arabic literacy skills in grades 1 through 4.
- Evaluation:** The Reading for Success-National Program for Reading is a USAID-funded program that aims to improve classroom instruction, expand remedial and extra-curricular reading opportunities, and improve national learning and assessment systems for reading and writing. The program pivoted its work during the pandemic to facilitate access to educational resources by: (1) developing Morocco's first digital reading platform for elementary school learners which contains 100 illustrated titles leveled by grade, adapted for Moroccan cultural context, and aligned with gender equity and social inclusion principles; (2) ensuring equal access of Deaf students to educational TV channel and online platform through provision of Morocco Sign Language interpretation; and (3) developing a digital teacher training platform that incorporates UDL principles to help package the curriculum in an accessible and engaging format.
21. Kotob, W., and Shrestha, R. (n.d.) *QITABI 2 Summer Program Tackles Wide-Ranging Needs of Lebanon's Schoolchildren*. Retrieved on March 16, 2023, from <https://www.worldlearning.org/country/ma/>
- Description:** An article on World Learning Algeria's website on its support to the National Program for Reading through online workshops on Universal Design for Learning (UDL) and task design and assessment for online instruction in low-resource contexts.
- Evaluation:** N/A
22. Dayaratna, V., Keaveney, E., Monnard, A., Solum, K., Schmenner, D., Murray, M., Lynd, M., Templeton, S., McHugh, C. (2020). *Whole-of-project performance evaluation of the reading for success project - Morocco*. School to School International (STS). https://sts-international.org/wp-content/uploads/2021/03/wherewework_moroccoRFS_content1.pdf
- Description:** A performance evaluation of the project with the following findings: Stakeholders highlighted the more dynamic instruction, the use of games and fun activities to help children understand the features of language, as a significant improvement over the whole word approach. However, the gains in reading perceived by stakeholders were not clearly reflected in endline EGRA data. Children with disabilities or vulnerable status also remain underserved.
- Evaluation:** N/A
23. School to School International (July 2018). *Moroccan Sign Language Assistive Technology for Reading Improvement of Children who are Deaf/Hard of Hearing*. https://allchildrenreading.org/wp-content/uploads/2019/07/R3_EnsembleMedia_SchoolToSchool_IDRTRReport_digital_lowres.pdf
- Description:** An evaluation of the project using the Early Grade Reading and Sign Language Assessment to assess the Moroccan Sign Language (MSL) and Moroccan Standard Arabic (MSA) skills of students who are deaf or hard of hearing in Morocco. Assessment results

showed that students' reading skills improved over time. However, data indicated that improvements were uneven across schools and that the project design did not adequately address the most immediate literacy and MSL needs of students, much of which was outside the scope of the project and deal with fundamental issues in hearing impaired and deaf education services. The project evaluation concluded that assistive technologies have the potential to improve the teaching and learning process but more needs to be done to adequately support effective learning with students with hearing impairments.

Evaluation: The Institute for Disabilities Research and Training implemented the Moroccan Sign Language Assistive Technology for Reading Improvement of Children who are Deaf/Hard of Hearing project in 2015-2018 to improve the reading skills of students who are deaf or hard of hearing using assistive technology: MSL Clip and Create software. The software contains a dictionary of MSL in graphics, video clips, and supporting concept graphics which allowed teachers to: (1) create, publish, and print customized materials that provide MSL-translations of written text; and (2) generate instructional activities incorporating both MSL and MSA. An Early Grade Reading and Sign Language Assessment was also developed and administered to assess the MSL and MSA skills of students who are deaf or hard of hearing in Morocco. Assessment results showed that students' reading skills improved over time. The greatest areas of gain were in the letter name identification and syllable identification portions of the test as well as the MSL vocabulary assessment in both grades 1 and 2. Higher level reading comprehension saw no significant increase in test scores for both grades. The 2018 Final Evaluation Report noted that the design of the intervention did not consider the limited comprehension in early grade students in terms of letter recognition and sign language vocabulary.

The 2018 Final Evaluation found that the level of reported usage of the MSL software Clip and Create varied greatly by school. One of the challenges noted was the limited teacher training and fluency in MSL of teachers working with hearing impaired students in Morocco. In addition, Morocco has no specialized degree or program for training teachers for working with hearing impaired students or MSL training for teachers interested in specializing in this area. Most schools providing education services to students with hearing impairments cover only the primary level and have no oversight by the Ministry of Education. Since private schools are not required to follow the national curriculum, they do not always have formally trained teachers, and their teachers and administrators have limited knowledge of MSL. Adding to these constraints is the fact that there is no one single standardized sign language, which varies across regions.

24. Porter, A., Moktari, K., Taha, H., Saoudi, K., Ghamrawin, N., Chahine, I., Gouleta, E., Amr, M., and Rachidi, J. (June 2021). *Morocco Curriculum Review and Capacity Building Activity (CCA) final report*. https://pdf.usaid.gov/pdf_docs/PA00XX57.pdf

Description: A report that examines the extent to which the new curriculum (all teaching and learning materials) for all subjects at the primary school level are aligned with the basic requirements of accessibility and inclusivity as indicated by Universal Design for Learning (UDL) standards, best practices from multicultural and gender-inclusive education, and international guidance on accommodations for students with disabilities. Findings include: (1) the teaching and learning materials (student textbooks and teacher guides), do not align to a great extent with the UDL principle of multi modes of presentation, largely due to the misalignment between the Educational Directives 2020; (2) the modes of presentations used in the curriculum focus largely on the visual presentations (mainly pictures in student textbook), and much less on other modes such as auditory and hands-on activities and real-life; (3) the comprehensive vision that the written curriculum would incorporate the available digital resources in order to enrich the different modes of presentation, has not been effectively implemented in the teacher guide or student textbook; (4) teaching and learning materials moderately align with the UDL principle "multiple modes of expression," as they rely largely on visual and auditory expressions with limited adaptation of learning and

assessment activities that require kinesthetics expressions; (5) the learning and assessment activities are also characterized by independent learning with limited opportunities for group or collaborative work. However, the learning and assessment activities do not take into consideration the diverse characteristics and needs of the learners (i.e., those who have disability or come from diverse cultural background), and the teacher guides provide little guidance to support teachers catering for the diverse needs of the different learners; (6) the learning and teaching materials do not provide students with opportunities to engage with learning in different modes. Activities that include collaborative learning, learning through play, practical and real-life experiences, peer learning, self-assessment are limited in the curriculum; and (7) limited attention is given to differentiated learning and individual differences in the teacher guides and student textbook.

Evaluation: N/A

25. Porter, A., Muktari, K., Taha, H., and Saoudi, K. (December 2019). *Morocco higher education: Situational analysis report*. https://pdf.usaid.gov/pdf_docs/PA00WDRR.pdf

Description: A report that aims to provide relevant information about the present state of undergraduate primary teacher preparation to inform the Higher Education Partnership program, which aims to support the development of a uniform bachelors in primary education (BPE) undergraduate degree in teaching. Guiding Principles for Evaluating Teacher Training: Principle 6. Teachers can and should make student learning more inclusive by effectively applying the Principles of UDL. The research team did not hear any evidence of modifications to teaching methods based on students' formative assessment results. Beyond assessment, the best teacher preparation programs leverage information gained through formative assessment to structure classroom lessons varied to different learners' needs.

Evaluation: N/A

26. *Organismo di Volontariato per la Cooperazione Internazionale la nostra Famiglia (OVCI) (n.d.) Open School Project: Educational alliances for inclusion*. Retrieved on March 16, 2023, from <https://ovci.org/index.php/en/what-we-do/morocco/morocco-open-school-project>

Description: A article from the OVCI's website on the Open School Project which aims to contribute to equitable, inclusive and quality teaching for girls and boys with disabilities by implementing a support intervention on the scholastic inclusion of children with disabilities: children with disabilities are supported in the path of insertion in the ordinary classes of primary school with a view to inclusive education in the regions of Rabat - Salé - Kenitra, Souss Massa; Oriental; Casablanca - Settat; Tangier – Tetouan

Evaluation: N/A

27. Pulcini, Sara E. (2022 October 28). *Open School: Promoting inclusive education for children with disabilities in Morocco*. Morocco World News. <https://www.morocoworldnews.com/2022/10/352101/open-school-promoting-inclusive-education-for-children-with-disabilities-in-morocco>

Description: An article on the Morocco World News' website on the inauguration of the project. The project aims to integrate 500 children with disabilities into education, in addition to equipping 25 pilot classes, as well as the mobilization of five multidisciplinary teams. The project's human resources will consist of 250 teachers and 25 life assistants. The project will also carry out work outside the educational framework, through the implementation of the community-based inclusive development strategy.

Evaluation: N/A

28. Koval-Saifi, N., and Plass, J. (March 2018). *Antura and the Letters: Impact and technical evaluation*. All Children Reading. <https://allchildrenreading.org/wp-content/uploads/2019/07/Antura-Report-Final-Web.pdf>

Description: An evaluation of an open-source smartphone application developed to build foundational literacy skills in Arabic and improve psychosocial well-being for Syrian refugee children. Overall, the game effectively introduces children to the basics of Arabic literacy and has resulted in positive learning outcomes across all age groups and genders with a relatively low dosage of 27 hours. Antura and the Letters engaged children regardless of literacy level, age, or gender. Antura and the Letters was well designed in its variety of game play and leveling of skill sets, which enabled most children of all ages and genders to play the first two levels. While the initial interface was challenging for some, by midline most children could play independently and make progress. This reflected a relative ease of use by children. Within the game, children reacted positively to Antura as a character; the off task play space motivated children to continue playing and sustained their interest. The mini games were many and varied and were randomized such that child trajectories were not the same, which likely increased the level of sustained engagement.

Evaluation: N/A

29. Koval-Saifi, N., and Plass, J. (March 2018). *Feed the Monster: Impact and technical evaluation. All Children Reading*. <https://allchildrenreading.org/wp-content/uploads/2019/07/Feed-the-Monster-Report-Final-Web.pdf>

Description: An evaluation of an open-source smartphone application developed to build foundational literacy skills in Arabic and improve psychosocial well-being for Syrian refugee children. (1) Overall, the game resulted in positive learning outcomes across all age groups and genders with a relatively low dosage of 22 hours. Absolute gains were greater in learning of foundational literacy (letters and syllables), and less with reading fluency. (2) The game is well designed in its simplicity and polish, which enabled children of all ages and genders to easily and readily play with minimal or no adult supervision. Children were easily able to navigate and complete the game, which gave them a sense of control and achievement.

Evaluation: Feed the Monster and Antura and the Letters are open-source smartphone applications that use digital game-based learning (DGBL) to build foundational literacy skills in Arabic and improve psychosocial well-being of Syrian refugee children. This instructional method has the potential to improve access to learning materials, alleviate the need for physical learning environments, and provide opportunities for iterative and differentiated learning. The impact and technical evaluations concluded that the games were well-designed, which enabled children of all ages and genders to engage with the application with minimal or no adult supervision. Though some modifications to the games were needed, assessment results showed promise in improving learning outcomes because of game play.

30. Alaa Zaza from Syria shares how UDL contributes to hope during the current Syrian tragedy. *UDL in 15 Minutes podcast* (April 9, 2021). <https://udlin15minutes.podbean.com/e/62-ala-a-zaza-from-syria-shares-how-udl-provides-hope-during-the-current-syrian-tragedy/>

Description: A podcast interview of a teacher on how schools are supporting children, including children with disabilities by integrating child-friendly spaces, identifying a referral pathway, and providing psychosocial and academic support amid the Syrian tragedy.

Evaluation: N/A

31. World Bank. (2018 March 22). *Combined project information documents/Integrated safeguards datasheet (PID/ISDS)*. <https://documents1.worldbank.org/curated/en/746621521731055484/pdf/Project-Information-Document-Integrated-Safeguards-Data-Sheet-Strengthening-Foundations-for-Learning-Project-PI62297.pdf>

Description: A datasheet on the project which aims to improve learning conditions in public preschools and primary schools and to increase access to public preschool education in selected districts. The most relevant components include: (1) Component I - the project supports the Ministry of Education's (MOE) strategy aimed at providing universal access to

quality preschool services for all children of five years of age to prepare learners for success in primary school and beyond; and (2) Component 3, which includes the following objectives: (i) develop and reinforce the tools and management practices used at the central MOE and in the regional offices for the improvement of learning conditions in the primary cycle; (ii) support project management; and (iii) strengthen results-based management in the MOE using disbursement linked indicators (DLI).

Evaluation: N/A

32. Al Masri, N. (March 2021). *Inclusive education in occupied Palestinian territories. Disability under siege. Global Challenges Research Fund (GCRF)*. <https://disabilityundersiege.org/wp-content/uploads/2021/03/Literature-Review-Education-OPT-FINAL.pdf>

Description: A literature and practice review aimed at presenting a contextual overview of education provided to persons with disabilities, analyzing the main strategies and policies of the stakeholders in West Bank and Gaza, identifying key issues related to access to education including barriers to inclusion and gaps in policies and research, sharing examples of good practices and stories of success, and reviewing and proposing key recommendations.

Evaluation: N/A

33. Yemen Education Cluster. (n.d.) *Costed Activities Framework and Guidance Notes*. Retrieved on March 16, 2023, from <https://reliefweb.int/report/yemen/yemen-education-cluster-costed-activities-framework-and-guidance-notes-2022>

Description: An education cluster framework that presents the Yemen Education Cluster (YEC) plan which aims for a safe and an inclusive learning environment that promotes well-being and resilience of the most vulnerable girls, boys, IDP children, children with disability, out-of-school children, caregivers and education personnel. This also requires supporting the education system to deliver quality, inclusive and relevant education that protects diverse learners and empowers their caregivers.

Evaluation: N/A

ANNEX B. FIELD INTERVIEW QUESTIONNAIRE

Introductory

- Name of project
- Name of implementer(s)
- Name of funder(s)
- Project years
- Status of the project
- Geographic areas covered
- Intended outcomes
- Status whether the outcomes have been achieved or not

Participants

- Context of model (conflict? Formal/non-formal? Preschool/primary, etc.)
- Type of participant targeted (refugee, IDP, girls, etc.)
- Target age of students
- Number of students reached
- Other participants (teachers, school leadership, parents, community members, etc)
- Number of other participants reached
- What contexts and participants is the model recommended for?
- Could it be replicated for others? Are there limitations to generalization?

Modality

- How is/was the model delivered?
- Who delivered (teachers, project staff, community members, parents, youth, etc.)?
- Where: classrooms, community centers, homes, etc.?
- When: during school, after school, during school holidays or breaks, weekends, etc.
- By what means: instruction by a teacher/facilitator, online digital device, offline digital device, other technology (radio, tv, e-reader, etc.), blended?
- Is it integrated with the curriculum or is it a standalone intervention?
- If possible, probe: What are the professional development topics provided? What is the capacity building needed in order for the model to function? Foundational/basic topics? Advanced topics?
- In addition to teachers, who else is in need of capacity building? Which topics?

Sustainability

- To what extent, if at all, is this model integrated into the education system?
- What motivated the MOE and Implementor to think of this model?
- What stakeholders were involved in the design of the model? How?
- What stakeholders were involved in the implementation of the model? How?
- What stakeholders were involved in monitoring the model? How?
- Is there government willingness to sustain the intervention? If yes, is it likely that it will be sustained? What makes you say that? If no, what are the hurdles to sustaining this? Would you say it is more about political will, availability of resources, or evidence of outcomes of the model?
- After donor funding ends, are the positive results likely to be maintained? If so, how?
- What are the capacity and the commitment of other stakeholder groups to maintain the model and continue to achieve positive results?
- What are the "enabling conditions" that contributed to the success of the model and its potential sustainability?
- Did it lead to any system reform?

Evidence-base

- Are there assessments demonstrating improved student learning outcomes, demonstrating that this model is better than the status quo?
- What assessments have been used?
- Are the assessments aligned to the curriculum?
- Who administers the learning assessments?
- What other evidence has been gathered through monitoring? (participation, attendance, cost, etc.)
- What tools were used?
- How has data been disaggregated? Does the disaggregation show particular benefits (or lack thereof) for certain groups?
- How are monitoring data used?
- Has the project taken corrective actions based on what has been learned through monitoring? Do you have an example of that?
- For digital game-based learning: Were learning analytics available in the app? Were teachers able to access these data?

Effectiveness of approach

- Principle of engagement: Did the model stimulate the interest and motivation of students to learn? How? (For example: connecting topic with real-life situations, facilitating engaging activities that students can do by themselves or with others, providing feedback to encourage sustained effort, providing space for self-assessment and reflection)
- Principle of representation: Did the model present information to students using a range of formats and techniques? How? (For example: presenting information/lesson using written text, pictures, graphs, videos, audio recordings/sounds, virtual or physical manipulatives)
- Principle of action and expression: Did the model provide students different ways to express or demonstrate what they know and learned? How? (For example: demonstrating what they learned through writing, drawing, oral presentation, games)
- What are lessons learned through the implementation of this model?
- Did you stop doing some aspect of the original design? Or add in another aspect to the original design? Why? If not, is there something you would want to consider in a future iteration?
- What would you say are the essential ingredients to making this model work?

ANNEX C. LIST OF FIELD/REMOTE INTERVIEWS

Model	Field/Remote Interview Participants
Algeria: The Aures School	School Leader/Director
	Grade 1 Teacher
	Grade 2 Teacher
	Grade 4 Teacher
	Grade 5 Teacher
Jordan: EduApp4Syria	<i>Antura and the Letters</i> Digital Application Developer/Implementer
	<i>Antura and the Letters</i> Digital Application Developer/Implementer
	<i>Antura and the Letters</i> Digital Application Evaluator
	<i>Feed the Monster</i> Digital Application Developer/Implementer
Morocco: Improving Deaf Children's Reading through Technology	Program Implementer
	Program Implementer
	Educator/Deaf Association
	Educator/Deaf Association
	Educator/Deaf Association
	Parent
School Leader/Director	

ANNEX D. SUMMARY INFORMATION ON THE PROMISING UDL MODELS PER THEMATIC AREA

Thematic Area	Algeria: The Aures School	Jordan: EduApp4Syria <small>This model includes two digital applications: <i>Antura and the Letters</i> (ATL) and <i>Feed the Monster</i> (FTM).</small>	Morocco: Reading for Success-Improving Deaf Children's Reading through Technology
Introductory information	<ul style="list-style-type: none"> • A private K-12 school established to serve as a model for inclusive education in Algeria • Aims to develop inquisitive, knowledgeable, and caring young people able to contribute positively to their communities • Established by Leah Bitat in 2016; initial educator capacity building was supported by World Learning Algeria 	<ul style="list-style-type: none"> • An international competition funded by the Norwegian government to improve the Arabic literacy skills and psychosocial well-being of Syrian refugee children and ensure learning continuity • Implemented in partnership with the Norwegian Agency for Development Cooperation, Norwegian University of Science and Technology, All Children Reading: A Grand Challenge for Development, mobile operator Orange, and Inter-Agency Network for Education in Emergencies • The two winners, <i>Antura and the Letters</i> (ATL) and <i>Feed the Monster</i> (FTM), are digital game-based learning (DGBL) applications that may be downloaded using smartphones and played offline. • Piloted in the Azraq refugee camp in Jordan in 2017 	<ul style="list-style-type: none"> • A project that aimed to improve the reading skills of Grades 1-3 students who are deaf or hard of hearing by developing the Moroccan Sign Language (MSL) Clip and Create, an assistive technology software that enables teachers to create sign-language-supported educational materials • Part of the second phase of the Reading for Success program • Funded by All Children Reading: A Grand Challenge for Development • Implemented by the Institute for Disabilities Research and Training and École Nationale Supérieure des Mines de Rabat. • Implemented in 2015-2018 in 10 schools located in the provinces of Sale, Rabat, Tangier, Marrakech, Agadir, Fes, Meknes, and Casablanca in Morocco
Participant	<ul style="list-style-type: none"> • K-12 Algerian and international students between the ages of five and 19 • Approximately 12 percent of the students have disabilities 	<ul style="list-style-type: none"> • Syrian refugee children between the ages of five and 10 	<ul style="list-style-type: none"> • Grades 1-3 students who are deaf or hard of hearing
Modality	<ul style="list-style-type: none"> • Formal education setting • Classroom-based instruction • Private school 	<ul style="list-style-type: none"> • Non-formal education setting • Autonomous learning through digital games piloted • Refugee camp 	<ul style="list-style-type: none"> • Formal education setting • Classroom-based instruction • Nine private education centers catering specifically to students who are deaf or hard of hearing

			<ul style="list-style-type: none"> • One public general education school with an integrated classroom
Sustainability	<ul style="list-style-type: none"> • Teachers apply best practices in international teaching methods within the framework of the Algerian national curriculum to demonstrate replicability in other schools in Algeria. • The education ministry has started looking into the school's practices, particularly the more flexible, learner-centered teaching strategies and the employment of competency-based, choice-based assessment. 	<ul style="list-style-type: none"> • Application developers are committed to maintaining, updating, and troubleshooting the applications despite limited resources allocated for continuing support. • DGBL applications have been adapted to support literacy learning in other languages (ATL is supporting 12 languages, while FTM has been translated to 50 languages.) • Application developers are partnering with other organizations to explore how the DGBL applications may be integrated into classroom instruction. • ATL is also considering how the application can be used to teach numeracy skills 	<ul style="list-style-type: none"> • Implementers collaborated with the education ministry to facilitate the approval and rollout of project interventions and the involvement of personnel at various levels. • During implementation training materials were developed, packaged, and disseminated to the education ministry and other stakeholders. • Implementers ensured that the education ministry and other stakeholders would have continued access to the technology and could replicate the intervention in other areas.
Evidence base	<ul style="list-style-type: none"> • Teachers reported higher levels of student engagement and mastery of grade-level competencies. • With the recent move toward choice-based exams, teachers observed increased confidence among students in their ability to progress and acquire new skills. 	<ul style="list-style-type: none"> • Early Grade Reading and Sign Language Assessment results showed that students' reading skills improved over time. • However, data indicated that improvements were uneven across schools and that the project design did not adequately address the most immediate literacy and MSL needs of students, much of which was outside the scope of the project and deal with fundamental issues in hearing impaired and deaf education services. • The project evaluation concluded that assistive technologies have 	<ul style="list-style-type: none"> • Early Grade Reading Assessment results indicated positive literacy learning outcomes across all age groups and genders. While the Difference in Difference analyses did not demonstrate statistical significance, the learning gains and positive trends in learning outcomes as a result of gameplay show promise. • Strengths and Difficulties Questionnaire results indicated positive emotional and social outcomes, contributing to children feeling happy and increased peer interaction.

		<p>the potential to improve the teaching and learning process but more needs to be done to adequately support effective learning with students with hearing impairments.</p>	
Effectiveness	<ul style="list-style-type: none"> Optimized learning opportunities by creating an inclusive learning environment, increasing student engagement, adopting flexible, learner-centered teaching strategies, and employing choice-based assessment 	<ul style="list-style-type: none"> Provided learning opportunities to Syrian refugee children in a non-formal education setting by incorporating literacy lessons into digital games and facilitating children's access and engagement with educational content 	<ul style="list-style-type: none"> Improved learning opportunities for students who are deaf or hard of hearing by providing access to MSL-supported educational materials, promoting appropriate reading instruction techniques, and designing a reading and sign language assessment tool

ANNEX E. OVERVIEW OF THE UDL MODELS IDENTIFIED DURING THE DESK REVIEW

Model	Goal and Context	Approach and Strategy	Progress and Outcome
<p>1. Algeria: The Grand Atlas Primary School</p>	<ul style="list-style-type: none"> A private K-5 school established as a laboratory of inclusive education design Aims to ensure the participation of a diverse group of students and success in mastering grade-level vocabulary in Arabic, English, and French Established in 2014 with support from the World Learning Algeria 	<ul style="list-style-type: none"> Building a culture of inclusive, student-centered practices Educator capacity-building in UDL principles and practices Educator and parent engagement across the continuum of school activities Recruitment of local teachers and adoption of the national curriculum to demonstrate replicability and scalability 	<ul style="list-style-type: none"> The school has attracted a diverse student body. Teachers and parents observed improvements in students' mastery of Arabic and enthusiasm for English and French. Parents reported a positive change in children's attitude toward school.
<p>2. Algeria: The Aures School</p>	<ul style="list-style-type: none"> A private K-12 school catering to Algerian and international students established a model for inclusive education in Algeria; approximately 7 to 12 percent of students have disabilities Aims to develop inquisitive, knowledgeable, and caring young people able to contribute positively to their communities Established in 2016; educator training supported by the World Learning Algeria 	<ul style="list-style-type: none"> Creating an inclusive learning environment Increasing student engagement Adopting more flexible, learner-centered teaching strategies within the national curriculum framework Employing choice-based assessment Educator capacity-building Parent engagement 	<ul style="list-style-type: none"> Teachers reported higher levels of student engagement and mastery of grade-level competencies. With the recent move toward choice-based exams, teachers observed increased confidence among students in their ability to progress and acquire new skills.
<p>3. Jordan: EduApp4Syria</p> <p>This model includes two digital applications: <i>Antura and the Letters (ATL)</i> and <i>Feed the Monster (FTM)</i>.</p>	<ul style="list-style-type: none"> Digital game-based learning applications that may be downloaded using smartphones and played offline Aimed to improve the Arabic literacy skills and psychosocial well-being of Syrian refugee children and ensure learning continuity through autonomous 	<ul style="list-style-type: none"> Incorporating literacy lessons into digital games Engaging an interdisciplinary team in developing the digital applications Facilitating children's access and engagement with educational content 	<ul style="list-style-type: none"> Early Grade Reading Assessment results indicated positive literacy learning outcomes across all age groups and genders. While the Difference in Difference analyses did not demonstrate statistical significance, the learning gains and positive trends in learning

	<p>learning in a non-formal education setting</p> <ul style="list-style-type: none"> EduApp4Syria international competition was funded by the Norwegian government; ATL and FTM were piloted and evaluated by Integrated Services-Indigenous Solutions in the Azraq refugee camp in 2017 		<p>outcomes as a result of gameplay show promise.</p> <ul style="list-style-type: none"> Strengths and Difficulties Questionnaire results indicated positive emotional and social outcomes, contributing to children feeling happy and increased peer interaction.
4. Jordan: Education programming of the Norwegian Refugee Council	<ul style="list-style-type: none"> Informal education programming offered in dedicated learning centers for in-school and out-of-school refugee children residing in refugee camps in Jordan Aimed to improved learning outcomes, in terms of academic knowledge and skills in core curriculum areas and academic self-efficacy and school enjoyment Funded and implemented by the Norwegian Refugee Council; started in 2013 and evaluated in 2017 	<ul style="list-style-type: none"> Providing learning support services, remedial education, and catch-up education Employing Syrian teachers and providing them with ongoing professional development opportunities Offering a more holistic curriculum inclusive of psychosocial support and socio-emotional learning Engaging parents and caregivers in the learning process through outreach programs 	<ul style="list-style-type: none"> Program evaluation showed improved academic confidence and achievement amongst participants. Program evaluation reported that students with disabilities attended educational activities with equal or higher regularity compared to their peers and demonstrated the same types of improvements in learning and well-being.
5. Jordan: Let's Live in Harmony	<ul style="list-style-type: none"> An offline digital levelled library of locally sourced stories teaching concepts of self, family, community, and others, as well as positive behaviors, that may be accessed through tablets Aimed to fill the educational gaps for Syrian and Jordanian Kindergarten 2-Grade 3 students and support socio-emotional learning, literacy learning, and social cohesion in 100 public schools Piloted in 2018 and implemented in 2019 by Integrated Services- 	<ul style="list-style-type: none"> Developing a comprehensive set of edtech multimedia education materials and teaching aids Co-creating the stories with the education ministry and aligning with the Jordanian early grade curriculum Supplementing the digital levelled library with teacher-led activities in the classroom 	<ul style="list-style-type: none"> Results of the Rapid Assessment for Reading Skills showed improved reading outcomes. Results of the International Social and Emotional Learning Assessment showed increased social and emotional learning scores. Program evaluation reported increased peer-to-peer interaction, perseverance in comprehension tasks, and motivation to learn.

	Indigenous Solutions; funded by UNICEF and UKAID		
6. Jordan: Qysas (Stories): An Arabic Levelled Digital Library for Every Classroom	<ul style="list-style-type: none"> • A learning platform with self-paced, interactive, electronic reading materials for Grades 1 to 3 accessed through tablets • Aimed to develop and strengthen foundational Arabic reading skills • Implemented by Little Thinking Minds in 10 public schools in 2015-2017; funded by All Children Reading: A Grand Challenge for Development 	<ul style="list-style-type: none"> • Providing access to a library of 126 interactive e-books and 19 basic e-books, with a range of reading levels and topics • Providing e-books with corresponding audio voice-overs to allow students to listen as they read • Allowing learners to complete each level of the Qysas app at their own pace 	<ul style="list-style-type: none"> • Early Grade Reading Assessment results showed that Qysas advances literacy outcomes with statistical significance. • Teachers and parents reported that children were motivated to come to school on days when the tablets
7. Lebanon: Inclusive Education Pilot Project	<ul style="list-style-type: none"> • Based on the Multi-Tiered Systems of Support model across academic and behavioral dimensions • Aimed to ensure accessible and quality education for all learners, regardless of their nationality, gender, race, ethnicity, social class, and disability • Implemented in 30 public schools in 2018-2021; funded by UNICEF 	<ul style="list-style-type: none"> • Providing support for children with disabilities, including assistive technologies • Providing methodological support to teachers on curriculum adjustment and teaching techniques and strategies 	<ul style="list-style-type: none"> • The case study reported some progress in building a more inclusive school culture and policy and presented recommendations for a national policy on inclusive education in Lebanon.
8. Morocco: Reading for Success-Improving Deaf Children's Reading through Technology	<ul style="list-style-type: none"> • Developed the Moroccan Sign Language Clip and Create, an assistive technology software that enables teachers to create sign language-supported educational materials • Aimed to improve the reading skills of Grades 1-3 students who are deaf or hard of hearing • Implemented by the Institute for Disabilities Research and Training and École Nationale Supérieure des Mines de Rabat in 10 schools—nine private education centers catering specifically to 	<ul style="list-style-type: none"> • Providing access to Moroccan Sign Language-supported educational materials • Promoting appropriate reading instruction techniques • Designing a reading and sign language assessment tool • Building the capacity of educators and parents • Establishing mechanisms for stakeholder engagement • Integrating the intervention into the education ministry 	<ul style="list-style-type: none"> • Early Grade Reading and Sign Language Assessment results showed that students' reading skills improved over time. However, data indicated that improvements were uneven across schools and that the project design did not adequately address the most immediate literacy and MSL needs of students, much of which was outside the scope of the project and deal with fundamental issues in hearing impaired and deaf education services.

	students who are deaf or hard of hearing and one public general education school with an integrated classroom— in 2015-2018; funded by All Children Reading: A Grand Challenge for Development		<ul style="list-style-type: none"> The project evaluation concluded that assistive technologies have the potential to improve the teaching and learning process but more needs to be done to adequately support effective learning with students with hearing impairments.
9. Morocco: Reading for Success-National Program for Reading	<ul style="list-style-type: none"> Developed new curricula based on early grade reading principles, replacing the whole-word approach with synthetic phonics and a balanced literacy method Aimed to improve the Arabic literacy skills of Grades 1-4 students Implemented by Creative Associates International, Management Systems International, and the University of Oregon with host-country partners, Ministry of National Education, Vocational Training, Higher Education, and Scientific Research and Al Akhawayn University in all 12 regions across the country in 2017-2022 	<ul style="list-style-type: none"> Redesigning the Arabic language curricula Developing Morocco’s first digital platform for primary school learners Providing MSL interpretation to online and TV-based educational resources Integrating into the education ministry Utilizing digital platforms to build educator capacity Engaging of stakeholders 	<ul style="list-style-type: none"> With the new curricula and a more learner-centered approach, stakeholders reported that students enjoyed reading more and improved in other aspects of Arabic, including speaking, writing, and listening. Early Grade Reading Assessment results showed that grade 4 students’ oral reading fluency scores increased. However, grade 1–3 students’ scores generally peaked at baseline, declined at midline, and only partially recovered at endline.