7.1 Introduction

With the rapid rate of innovation and global dissemination of new technologies, many under-resourced education systems are able to take advantage of EdTech tools that were previously inaccessible. As tablets and smartphones become more affordable and internet access extends to more remote areas, schools can take advantage of digital device-based educational resources such as adaptive learning software, e-books, reading apps, and educational game apps. These tools can positively impact MLE learning outcomes.

MLE contexts can differ significantly in several important dimensions. In some contexts, there are formal literacy programs in the home languages of students, or there are formal bilingual programs or limited proficiency programs to help students transition from their home language to the dominant language of classroom instruction. In other contexts, all instruction in home language literacy is informal and supplemental to instruction in the language of education. In some contexts, funding and expert support services are allocated by school systems or the government for the development and distribution of digital education content. In other contexts, all the resources are being developed and distributed outside of formal systems by highly engaged community members or individual teachers.

The scope and organization of available digital content also varies. In some contexts, there is access to material that could comprise a significant part of the classroom reading curriculum over entire grade levels. In other contexts, material that could be incorporated into existing lessons is scarce. Educational
contexts also vary significantly in reliable access to internet and electricity, as well as prevalence of computers, tablets, and smartphones in the community, which affects the baseline technology skills that students, teachers, and parents can be expected to rely on.

In this chapter we will focus on educational resources that can be deployed to classrooms with access to tablets or smartphones, even in situations with limited or inconsistent access to internet or electricity. Such programs have already been successfully implemented using the following platforms:

- Chimple Learning’s Chimple Kids [India] (Global 2019)
- Curious Learning’s Feed the Monster [Syria] (Koval-Saifi and Plass 2018)
- GraphoGame’s GraphoGame [India, Zambia] (Patel et al. 2022, Jere-Folotiya et al. 2014)
- onebillion’s onetab [Brazil, Malawi] (Outhwaite et al. 2020, Levesque et al. 2020)
- SIL’s Bloom Reader [Guatemala, Papua New Guinea] (Maldonado 2022, Jones 2019)
- War Child Holland’s Can’t Wait to Learn [Sudan, Lebanon] (Brown et al. 2020, Turner et al. 2020)

We will also focus on the potential of incorporating reading and learning game apps into the MLE classroom as an aid to home language literacy instruction and improved educational outcomes in multilingual classrooms.

### 7.2 Theoretical issues

Many MLE contexts face significant challenges because some or many of the following factors are issues in the typical classroom:

- There is no full-fledged school-based literacy program in students’ home language(s).
- Students begin formal schooling with limited or no speaking proficiency in the dominant language of instruction.
- Students are introduced to foundational literacy skills in a language they lack vocabulary and speaking fluency in.
- There is a significant lack of age-appropriate, leveled reading material in home languages or in a minority language of instruction.
- Teachers are held accountable for literacy goals tied to the dominant language of education, not literacy goals in student’s home languages.

When teachers are trained to develop and utilize supplementary digital educational resources, some of these challenges can be mitigated, and obstacles to success in acquiring literacy skills in the dominant language of education can be minimized.
In addition, incorporating technology in the classroom provides the following benefits:

- In many places possession of digital devices is a status symbol and access to home language reading material or games on these status devices enhances language prestige and enforces a positive cultural self-image and identity. Using the home language to text friends, read books, and play games affirms the individual and the language.

- When teachers are not themselves speakers of students’ home language(s) or when students do not all speak the same home language(s), access to individualized, self-paced, or adaptive learning materials allows for acquisition of important foundational literacy skills in a familiar language. These skills can then be transferred to tasks in the classroom language.

- Whereas print media resources often require substantial investment to acquire and maintain (and many contexts are not hospitable to maintaining books due to high heat, humidity, dust, lack of secure storage space, or other environmental factors), digital resources can be reproduced and distributed without cost and used repeatedly once an initial investment in hardware has been made for the classroom.

- A single digital device can be loaded with a whole library of resources in multiple languages, allowing for maximum individualization to student learning needs and language preferences.

- Many digital resources have reporting capabilities that allow teachers to monitor the progress of users toward learning goals and provide documentation to administrators or funders who want to make outcome-based decisions.

**Recommendation # 1 – Digital books**

To begin creating digital tools for an L1-based MLE program, teachers can collect or create an ever-growing inventory of digital books in both the school and home language(s) of the classroom. The World Bank’s Loud and Clear policy paper recommends several software options, including SIL’s Bloom software. Importantly, these tools facilitate the creation of story apps that can highlight the text as the app plays an audio recording. This allows for three types of uses: (1) listening without reading along, (2) listening while reading along, and (3) reading without listening to the audio. With repeated exposure to the same story, students can progress toward independent reading. This is especially helpful for educators in contexts where multiple home languages are represented in a single classroom and when the teacher does not speak the home language(s) of the students.

Digital books have certain advantages over print counterparts. First, digital books can incorporate full color pictures, sound effects, simple animations, and even interactive elements such as comprehension quizzes or games. Second, because digital books can be edited and revised without a materials cost, teachers are free to pilot new material and make changes based on feedback. This is especially important where orthographies are still being standardized and where physical reprints are infrequent. Third, in multilingual contexts, each teacher can load content for their classroom specifically
tailored to the language needs of the students in their classroom. Fourth, students who manipulate digital devices in the classroom build practical skills which transfer to an increasingly digital world. Finally, unlike physical books, the owner of a digital book can easily share copies, allowing for distribution of books beyond the classroom into the wider community.

Teachers with access to digital devices who want to begin amassing a collection of digital books can take the following practical steps. First, investigate what content is already available in classroom languages in the Google Play Store or in repositories such as the Bloom Library. Where there is a shortage of digital reading material, teachers and community members who read and write the local language(s) may need training on how to produce new content or convert existing print material to digital books using tools such as Bloom. They should start with reasonable goals of converting or creating a small sampling of books for each grade level. Often digital books are initially used for extra-curricular and other enhancement activities, and then over time the digital books are integrated into the curriculum.

**Recommendation # 2 – Gamified learning**

There are a growing number of apps that gamify literacy skill building. For example, SIL’s Alpha Tiles and Curious Learning’s Feed the Monster are apps that teach sound/symbol relationships and spelling. SIL’s Bloom Reader app now supports embedded HTML5 activities, known popularly as “widgets,” which allow the incorporation of simple activities including multiple choice, true/false, and sequencing the letters of a scrambled word. These apps are fully functional offline and do not require updates, meaning they can be accessed and shared without internet access. When literacy game apps for a particular language incorporate high-frequency words or phrases from a primer series or leveled book collection, the game experience motivates and rewards students for practicing skills needed for success in the classroom.

In addition to supporting literacy skill building in the language of the classroom, literacy game apps can be used to build beginning literacy skills in students’ home languages. Some may question whether there is value in creating or promoting literacy games for languages that do not have significant inventories of print or digital books for students to read, or in contexts where no formal literacy instruction happens in home languages in the schools. In these situations, literacy skill building in the home language often improves the student’s attitude toward reading, because they master learning tasks more quickly when working in a language they already know well. Students then take these skills and positive attitudes toward literacy with them into their interactions with the dominant language of instruction in the classroom.

An illiterate person needs a significant amount of help from an expert reader to engage with a print book or primer. In contrast, an illiterate person can begin using an app at a very basic level and progress independently with very little help, guided by the app’s interactive audio-visual elements and immediate
feedback. This allows students in multilingual contexts to learn skills even when the teacher does not speak the language that the app is teaching.

**Recommendation # 3 – Teacher training**

One key component of successfully integrating educational technology is teacher training and buy-in. In most MLE contexts, teachers will be involved in creating and curating the content that gets loaded onto digital devices. They will also make decisions about how digital material is incorporated into classroom lessons.

Successful integration of educational technology into the classroom requires training on the particular software (e.g. SIL’s Bloom software). Teachers also require training on basic image and audio editing, permissions (e.g. Creative Commons), and story writing. Once digital content has been developed and necessary equipment has been procured for classrooms, teachers require training on incorporating this digital content into their lessons. Teachers must see models of effective integration of technology into the existing curricula. While students can independently use apps to learn, it is the teacher who knows best which activities fit at a given point in the sequence of the course.

Where there is adequate access to devices, classes may complete learning activities that depend exclusively on digital content. However, more often a limited number of digital devices are integrated with traditional tools (paper, pencil, chalkboard) in “hybrid lessons.” For example, each student might take a turn playing a round of a learning game on a tablet as the screen is projected onto a wall, while classmates write down the word in focus. Before integrating educational technology into the classroom, teachers should have a clear plan for the use of devices and should be confident about their ability to use the technology. Otherwise, devices are more likely to be used as toys or extra-curricular entertainment instead of an important resource in meeting defined course objectives.

### 7.3 Conclusion

As more schools embrace the potential of digital devices and more local teachers take on the companion task of preparing digital content and incorporating it into their lessons, important research questions arise that merit investigation. How effective are literacy game apps for pre-primary and early primary students in the home language for improving literacy outcomes in the primary classroom language of instruction? Also, which literacy skills (e.g. sound/symbol relationships, vocabulary development, decoding/spelling, reading comprehension) do literacy game apps independently teach most effectively or least effectively? More investigation is needed to understand what skills are best taught by in-person interactions with expert teachers and what skills can be developed through relatively independent use of devices.
References


