



Ministry of Education, Youth and Sport

M-Learning in Cambodia's Public School Libraries

A GUIDE FOR LIBRARIANS



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M-learning in Cambodia's secondary resource schools

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ACRONYMS/ABBREVIATIONS

Abbreviation	Meaning
CoP	Community of Practice
KAPE	Kampuchea Action to Promote Education
M-learning	Mobile learning
SRS	Secondary Resource School
STEM	Science, Technology, Engineering, Mathematics
URL	Universal Resource Locator

GLOSSARY OF TERMS

community of practice: a group of people who come together to share information about a particular area of interest. Ongoing interaction facilitates the sharing of best practices and recent developments in that area.

curation: the action or process of choosing, organizing, and monitoring the items in a collection. For a tablet, this is the action by the school librarian, teachers, and/or administration to select and keep organized apps on a tablet.

M-learning: using electronic devices (e.g., tablets) to facilitate education through accessing digital content.

universal resource locator (URL): the address of a resource, in this case a website, on the Internet. A URL is entered into a web browser's address bar, e.g., www.moeys.gov.kh, and the user is taken to that website.

PURPOSE

The purpose of this manual is to provide a practical guide for librarians and other support staff to establish, sustain, and grow an M-learning program in Cambodian Secondary Resource School (SRS) libraries. This manual outlines:

- Performing tasks related to maintaining, monitoring, and reporting about tablet use in the library;
- Implementing processes for making tablet use safe and fruitful for students who require remediation, acceleration, and enhancement to grow in knowledge and motivation;
- Decision-making techniques for selecting appropriate applications for school library tablets;
- Working with teachers, students and counsellors to use the resources available on the tablet;
- Growing an M-learning program in the library and overcoming obstacles to tablet use in the library.

BACKGROUND

In the past decade, Cambodia has experienced significant economic growth, higher than any other country in the region. However, these economic achievements have not impacted educational achievement as expected. According to *Cambodia's Education 2030 Roadmap: Sustainable Development – Goal 4*¹, a large percentage of upper secondary students performed below the basic level. The reasons for this situation are complex; however, the solutions are available.

One part of the solution is to extend learning beyond the classroom and beyond the regular methods of teaching and learning. Successfully implementing a library M-learning program can do just that. Tablets offer the unique experience of self-driven learning. A student, properly guided, can engage in educational experiences that they initiate. This is the sort of learning that people do as adults. Developing this sort of habit is a significant benefit.

Second, Goal 4 of the *Roadmap* notes that the benefits of economic growth and poverty reduction are not equitable across geographic areas in Cambodia. The financial resources to obtain technology and internet connectivity are not available to all. Making these available at school, through the use of library tablets, promotes equity among all students in all provinces of Cambodia. Readiness for the digital economy, an emphasis of the *Roadmap*, is possible for all students who have the opportunity and the motivation.

Finally, the *Roadmap* shines a clear light on the need to move toward greater gender equality. Where some students, girls included, might be inhibited from asserting themselves in a traditional classroom setting, tablets allow these students to learn in a new, independent way.

¹ Ministry of Education, Youth and Sport, "Cambodia's Education 2030 Roadmap: Sustainable Development – Goal 4" (MoEYS, February 2019).

PROTECTING TABLETS

Processes

By following strict processes which include careful inspection and tracking, tablets are more likely to be used responsibly and their usage to be more clearly understood. The latter is critical for future planning when it comes to understanding how tablets are and should be used in the library.

Check-out

Utilize a tablet check-out process to ensure tablets are protected and to track which tablets are used, when, for how long and by who.

First, label all tablets with a unique identification number. Remember that over many years you will likely have more than one hundred tablets, so use a numbering scheme which will work as your number of tablets grows and which will allow numeric sorting, e.g. “0001”, “0002”. **A tablet’s identification number should never change. Identification numbers should never be reused.** The label should be affixed to the tablet in such a way that it cannot be torn or peeled off.

Second, create a *Tablet Asset Inventory* where you will record all of the tablets currently in the library and critical details about them. See Annex D for an example and template.

Finally, create a check-out sheet like the one shown in Annex C. This keeps a record of tablet usage—who uses it, when, for how long, and for what purpose. You will use these records to create a *Monthly Library Tablet Usage Report*. See Annex G for an example report.

Digital versions (i.e., Excel spreadsheets) of the *Tablet Asset Inventory*, *Check Out Sheet*, and an automated *Monthly Library Tablet Usage Report* are provided as part of the *M-Learning in Libraries* packet.

When a student comes to check out a tablet, first inspect the tablet to check for any damage or issues. If there is a problem, it is recommended that the student be issued a different tablet and the damaged one be set aside for repair. **Clean the tablet thoroughly with a sanitizing wipe that is appropriate for tablets. This is important to prevent the spread of germs and illnesses.**

Tablets that for use only in the library. Library tablets should not leave the library.² Neither students nor teachers are allowed to take a library tablet home. **If your school has library tablets and other tablets as well, please see Annex B to learn about management.**

Check-in

When the student returns the tablet, inspect the device to ensure that there is no damage to the tablet while it was in use. If the tablet has sustained damage while checked out to a student, determine if damage was due to negligence on the part of the student or was due to variables uncontrollable by the student. If the former, the student should be held responsible for costs associated with the repair. If the second, then use the library budget to repair or replace the tablet. All repairs should be recorded in the *Tablet Change Log*. See Annex F.

² Please note that in schools there may be tablets for other uses, e.g., tablets for STEM classes available through the “Tablets on Wheels” program. While those tablets are mobile and can be used in various classrooms, the library tablets are to remain in the library and serve a single purpose: individual use by students pursuing private study. Non-library tablets can use some of the management tools discussed in this manual. In fact, a single tablet inventory, change log, etc. is certainly prudent.

Physical maintenance

Tablet protection

Protective cases on each tablet are needed to ensure that a tablet can sustain being dropped. Many tablets come with cases. The ICT staff should research the procurement of tablets carefully to determine if the included case is sufficient.

It is recommended that tablet screens should also be protected with a thin, clear cover called a screen protector. This protects the tablet screen from scratches, fingerprints, smudges, and smears.

Tablet cabinet

Tablets should be stored in a secure storage cabinet to prevent theft and damage from something falling on the tablet or from dust buildup. The tablet cabinet must be kept away from direct sunlight. The cabinet must contain individual slots for tablets so that they are not stacked on top of each other. It should also provide enough power outlets to charge the tablets. It is critical for the cabinet to have proper ventilation, perhaps a fan, to keep the tablets sufficiently cool. Tablets generate less heat than computers; however, heat is still an issue. Tablets heat up when they are being used and when they are being charged. If tablets are not kept cool and ventilated, they will be damaged, e.g., the screen will separate away from the rest of the device. If the tablets appear to be getting too hot, the case can be folded back or taken off to allow the heat to dissipate.



A tablet cabinet (also called a “charging station”) should be well-ventilated, store tablets vertically, have enough outlets, and be lockable. Wheels allow the whole cabinet to be rolled into a closet and locked up.

Battery

A tablet’s battery is often the first component that stops working during the lifetime of the device. Doing whatever you can to keep the battery healthy is important. Tablets should ideally be stored in moderate temperatures (below 30 degrees Celsius) to ensure the health of the battery.

Batteries last for a certain number of cycles, or recharges. So, you do not want to recharge a device while there is still a lot of power remaining; any recharge uses up a cycle. Instead, recharge the tablet when the remaining power is around 30%.

Loss or theft

Library tablets should never be taken out of the library; however, if it happens that a tablet is lost or stolen, there are some steps you can take to recover it. Schools in Cambodia are most likely provisioned with Android tablets. Android has a strong tie with Google and its full suite of products. This includes Google’s “Find My Device” app. This built-in app allows you to take three actions on the lost tablet from a second device: (1) play a sound on the tablet; (2) lock the tablet with a pin number; (3) erase everything on the tablet.

Your IT department should have configured the library tablets to be associated with a Google account and the tablet should be logged into that account. If the tablet is turned on, connected to the internet, and has Location and Find My Device turned on, then those three actions described

above can be taken. If the tablet cannot be located by playing a sound, it is best to lock the tablet so the person who found it cannot use it for ill purposes. The Find My Device app allows you to post a message on the locked tablet, e.g., “If found, please contact Choun Nath School at 012 345 678. Thank you.” It is possible that the device was found and the finder will return it.

In the case that a tablet still cannot be found, first lock the tablet so that it cannot be used. Change the tablet status to “Lost” or “Stolen” as appropriate on the *Tablet Asset Inventory* and report the incident in your *Monthly Library Tablet Usage Report*.

PROTECTING STUDENTS

Students should not be permitted to install applications or view inappropriate web content on tablets. The MoEYS specifies in the *Policy on Child Protection in School* that schools must put into place services to protect children, mechanisms and systems to report incidents, and informational materials for all relevant stakeholders. This includes protection in an online, technological environment.

Tablets in libraries are different from tablets in classrooms. In the classroom, teachers can monitor tablet use closely and ensure that students are not using them improperly. Tablets in the library are used privately. This is both a benefit and a risk—a benefit because a students can have educational experiences tailored to their needs and a risk because they are vulnerable to inappropriate, even dangerous, content on the web. **NO LIBRARY TABLET SHOULD EVER BE DEPLOYED WITHOUT PROPER PROTECTIONS IN PLACE.** This implementation must be tested and guaranteed by your technology staff. See Annex A.

Depending on the level of IT support that your school has, preventing students seeing inappropriate content on the internet and installing inappropriate applications can be set up in several ways.

Centralized tablet management

It is recommended that library tablets be centrally managed. This gives an administrator the ability to control each tablet’s profile. A profile includes such things as the apps installed, system updates, what sort of web content is available, and a variety of other important elements of tablet setup. Your Information Technology support staff person(s) should manage the profile(s) for your school’s tablets. Typically, IT would have created several profiles appropriate to various users, e.g., a Student Profile, a Teacher Profile, an Administrator/ICT Profile. The Student Profile would be set up so that users are not allowed to download new applications and are prevented from viewing particular types of web content. Library tablets would then be set up to use the Student Profile which includes all of the associated protections.

If centralized tablet management is not an option, the following sections detail how tablets for library patrons would typically be secured.

Inappropriate apps

Students should not have the access to install new applications from the Google Play store. Teachers, staff and the MoEYS decide which applications reside on school library tablets.

Tablets typically use something called “Parental controls” to block and allow various sort of actions that can be taken by a user. These controls are available through the “Settings” on the tablet.

Optionally, Google Play can be configured to allow applications appropriate for particular age groups to be installed. This is not recommended as a tablet used by many persons quickly gets cluttered and difficult to navigate. And, it is best to have all library tablets configured the same way for management purposes.

Inappropriate content

Accessing content from the Internet is one of the best avenues for students to develop, enhance and expand their educational horizons. Unfortunately, content from the Internet can also be one of the best avenues for exploitation of young people and student exposure to inappropriate content. Every effort needs to be made to protect students from these risks.³

Your Information Technology support staff person(s) should have implemented a solution to protect students from the use of social media and other sites where predators reside. There should also be a “babysitter” application or similar installed on tablets to prevent students from navigating to websites which host pornography, violence, gambling and other inappropriate content. There are free and paid applications which accomplish these things. Some applications allow an administrator to view the websites that users have visited as a way to audit tablet use. This is recommended, especially if a librarian suspects inappropriate use of library tablets by a student or students.

If you suspect that your library’s patrons are not safeguarded in their use of tablets, you should discontinue the use of the tablet(s) affected and follow up immediately with your IT support staff.

³ This goal has been formally articulated in the Cambodian government’s *Action Plan to Prevent and Respond to Online Child Sexual Exploitation* (OCSE Action Plan 2021-2025) which was launched in July 2021.

SELECTING AND MANAGING LIBRARY TABLET APPS

One of the benefits of a library tablet over a student's personal smartphone is that the content installed on a library tablet has been carefully chosen by librarians and teachers to align with the secondary school curriculum and, generally, to be of educational value. Schools should make careful decisions about which apps to install and document justifications for those selections. Periodic meetings with librarians, teachers and student representatives to discuss new apps of interest would be a helpful way to keep the tablet offerings fresh and interesting. The app environment is ever-changing; new apps are being deployed continually.

Evaluating apps

In terms of evaluating which apps are appropriate for your school and students, there are many resources to help evaluate the content and experience of an educational app. Many of these websites which describe, rate, and review educational apps are free to use. In the Google Play Store there are ratings and reviews. There are also many app review websites that are run by professionals and which are specifically for education. For example: Teachers With Apps, Graphite by Common Sense Education (<https://www.commonsense.org/education/>), Children's Technology Review (<http://childrenstech.com/> - subscription-based), Ed Shelf (<https://edshelf.com/>), Education World (<https://edshelf.com/>).



There are many websites which provide ratings, reviews, and explanations of educational apps.

An additional step is to go to the official website for the app and read about it there. Also, as part of a review, watch a YouTube video demonstrating use of the app. Work with teachers and/or students to try it out to determine if it is worthy to include on a library tablet, especially if there is a cost associated with obtaining and using the app.

Apps for Cambodia

One limiting factor when it comes to choice and use of apps in Cambodia is language. Depending on the subject area, an English language app might be usable for a student with limited fluency, e.g., mathematics. For other subjects, that is not the case. Increasingly, apps are being built by the MoEYS, NGOs, and others specifically for Cambodia and using Khmer language. During Covid-19, there was an acceleration of content production by the MoEYS and much content, including archival lesson videos, exists in their "E-learning" Web Portal app. NGOs like Aide et Action, Kampuchea Action to Promote Education (KAPE), and World Education have already contributed to the app offerings for Cambodia. Most NGOs produce apps for primary school students and relate to reading; however, the app landscape is expanding. In addition, Khmer language apps are being built to aid educators in how to utilize other, widely-used English language apps, e.g., the computer programming app CODE and CODING CAMBODIA. To stay current on information, it is best to monitor the activities of education NGOs working in Cambodia, especially those with education technology projects.

Establishing a network of Cambodian librarians (a "community of practice", or CoP) would be helpful for sharing information about newly available apps. Setting up this community could be as simple as creating a private Facebook page.

See Annex J for apps developed for Cambodia, which are appropriate for secondary students.

App management

All library tablets should have the same apps installed. If schools utilized a centralized management system, this is guaranteed. Apps on library tablets should be tracked via an inventory system which tracks details about the app for historical and decision-making purposes. See Annex E for an example. A digital version (i.e., Excel spreadsheet) of the *Tablet App Inventory* is provided as part of the *M-Learning in Libraries* packet. New app installations should be recorded in the *Tablet Change Log*. See Annex F.

An annual review of apps on library tablets is recommended. Apps that are unused or ineffective should be removed from library tablets.

For new app requests, these should only come from teachers or administrators. Students who wish to use a new app on a library tablet should work through their teacher, if related to a particular class, or through the librarian. Requests should be clear about the related school subject, grade, and provide a justification for installation on a library tablet. See Annex I for an example request form. Newly added apps should be documented in the *Tablet App Inventory* (see Annex E).

From an administration point of view, it is recommended that apps be organized in a logical way on a tablet, so that the app's icon can be easily found. If there are many apps, it is best to create folders (categories of apps) and drag app icons into the appropriate folder, e.g., "Math", "Science", "Literature". Cluttering a tablet with too many apps will make use and administration difficult.

USE OF TABLETS

One challenge to teaching and learning in a classroom environment is that students learn differently, at different paces, and have different interests. Keeping students on track and motivated can be a challenge. Tablet technology allows individualized learning appropriate to what a student needs, what s/he is interested in, and can help the student grow. Given this, there are several ways that tablets in libraries can be used to enhance the learning experience of secondary school students.

Note that in the following case studies, two types of resources are discussed: apps and websites. Apps must be downloaded to a tablet through the Google Play store (for Android tablets) or the Apple Store (for iPads). An app appears as an icon on the tablet when downloaded. Websites are accessed by using the tablet's web browser, usually Google Chrome, in the same way that a website is accessed on a computer. The website's URL (like a home's address) must be typed into the top bar of Google Chrome to get to the website.

Remediation

Students learn at different paces and in different ways. Some students pick up concepts more slowly than other students, depending on the teaching methods used. Some students simply “miss” learning something the first time it is taught for a variety of reasons. The students who learn more slowly or do not keep up with the rest of the class are at risk of falling behind and becoming discouraged. Remediation is reteaching and/or reinforcing of previously taught concepts and/or skills to improve student performance in current or future coursework.

Individualized use of a tablet for remediation can help such students catch up or fill “learning gaps”, if it is just practice that they need. A tablet can also allow a student to learn in a way that is more attuned to their learning style, if traditional classroom instruction is not working for them.

The following is one such example related to mathematics. Falling behind in mathematics is particularly dangerous because mathematical concepts build on one another. If a fundamental concept is not understood, future concepts which build upon that basic and fundamental concept will be difficult or impossible for a student to grasp.^{4,5}

⁴ There are many apps available for learning math, including games which can make learning seem like play. Simply search for “best algebra apps” or similar in the app store.

⁵ Khmer language apps are available for various STEM subject areas. See Annex J.

Case study: Student struggles with solving algebra equations

Panha's Algebra teacher notices that Panha, usually a strong, conscientious student, is not performing well on assessments. Increasingly, he is failing to do homework and is off-task during in-class practice time. The teacher is not certain what concepts Panha is actually missing because Panha tends to give up easily and not attempt to do any problems. The teacher wishes to have Panha assessed and give him an opportunity to fill his knowledge gaps; however, there is no time to do this during class. The teacher approaches the librarian to see if she can assist.

The librarian works with Panha to establish a (free) account on Khan Academy (www.khanacademy.org), a website with a deep repository of thousands of short video lessons, online practice questions, and assessments. She looks through the courses for Algebra classes that are a good match for Panha, a grade 9 student. The librarian finds that the best match is "Algebra I". The first task is "Course Challenge" which is a pre-test. Panha is given the chance to do this assessment in the library. The app provides Panha with immediate feedback if he answers correctly. If incorrect, Panha can try again (even get a hint) or skip and go to the next question. If students doing word problems cannot understand the English, they can use the Google Translate app installed on the tablet.

Upon completion, the app gives feedback about the student's performance. Then, when the student proceeds into the Algebra 1 course, the app uses the student's performance on the pre-test to set the mastery level for individual units. The student will need to do more work on units that s/he performed poorly on in the pre-test and less work on those where s/he performed well.

At this point, Panha has an individualized plan for moving through Algebra I content, unit by unit, and can proceed through lessons individually when logged into Khan Academy. He can use any library tablet or his own smartphone by simply logging into his Khan Academy account.

So far, these activities have been done via a web browser and require an internet connection. With the Khan Academy app, a student can access content offline. The student simply needs to bookmark videos and then go into their Bookmarks and click on the download button to download the videos. So, both the school tablet and the student's smartphone should have the Khan Academy app installed to allow this offline functionality.

The Khan Academy video explanations are in English and Khmer is not an available language for subtitles. However, when viewing a video, a student can control the playback speed by clicking on the gear icon and can turn subtitles on for English or whatever language is available and helpful.⁶

For Khan Academy, it is recommended that the teacher and/or librarian sets up a Teacher account. Students are assigned to teachers. This will allow the teacher to view student progress, create assignments, etc. These setups can be done at the beginning of the school year.



Khan Academy website
khanacademy.org



Google Translate app
Assist written and video
content comprehension



Khan Academy app

⁶ There is a Khmer language math app available through the Google Play store, *Khmer Math Grade 12* (Khem Puthea).

Case study: Student lacks motivation to study maths

In the case where a student has shut down entirely, sometimes using a different learning methodology can motivate them to want to study. This is one area where a digital device can excel: games.⁷ If a game is engaging enough, even secondary students can be lured into studying a topic that they would have otherwise been disinterested or too discouraged to study.

Sopheap says that she dislikes mathematics. She claims that she has never been good at it and says, “That’s the way it is and the way it will be.” As soon as Sopheap detects that something involves using mathematics, she will not engage.

The teacher/librarian recognizes that Sopheap’s issue is different from Panha’s. Sopheap may have the aptitude, but the traditional way that mathematics is taught turned her off some time ago. Sopheap has slipped behind because the teaching and learning style mismatch has made her disengage. The teacher is not a gamer. She goes to YouTube.com and searches on “math apps for high school”, “algebra app games”, “math game-based learning”, etc. The company Dragon Box continues to appear in searches, so the teacher watches YouTube walkthrough videos on what their apps are like. The teacher asks the librarian to take a look.

The librarian goes to the teacherswithapps.com website which reviews educational apps, searches for Dragon Box, and reads about the Algebra-related applications. She learns that Dragon Box has produced two game apps related to algebra. Algebraic concepts are introduced in a very non-traditional way; a player might not know they are learning algebra. Variables appear as avatars and other objects. Players do the same actions they perform when solving equations but in a game environment. With increasing levels, the play becomes more challenging, mimicking equations with more and more complex terms.

The librarian asks Sopheap if she would help review a game app for possible use at the school and give the librarian feedback about whether it is helpful, interesting, and fun. In so doing, Sopheap experiences mathematics in a visual, abstract way - entirely unlike how she has experienced math in the classroom. Sopheap asks if she can come “help” the librarian again tomorrow.



Highly praised Dragon Box algebra apps which train the players mind for algebra through playing a very addictive game.

⁷ There are Khmer language game-like apps that are appropriate, e.g., *Khmer Quiz Game : Genius Quiz* has a 4.1 rating in the Google Play store.

Acceleration

Students at the top of their class share a similar risk as students at the bottom: disengagement. If not given enough of a challenge, such achievers can lose interest in a subject area. Accelerating student learning means that a student moves at a faster pace than the rest of the class.

Tablets offer an excellent resource for students who are excelling in a particular class to go further, further than they have a chance to do during regular class time. At the same time, a tablet allows a way to do this while ensuring that the student continues to be fully engaged in the regular class.

Case study: Khmer literature enthusiast seeks advanced content

Makara has always excelled in Khmer Literature class, not just because he was a strong reader, excellent critical thinker, and had solid writing skills. Makara did so well because he loves Khmer literature—until recently. He had finished reading «ទំព័រ» before all of the other students and asked the

teacher if there is something else he could do. The teacher did not have time to make a separate lesson plan for Makara but at the same time she did not want Makara to get discouraged and lose interest in a subject he loved.

The librarian had recently been in a teacher training session about new Khmer language apps developed by MoEYS and education NGOs. The teacher contacted the librarian to discuss what app(s) might be appropriate in this situation. The librarian reminded the teacher of the many resources for Khmer language books in *Khmer Library*, the app which holds traditional Khmer legends, and, if the student is interested in the Khmer language generally, the *Choun Nath Digital Dictionary*.

In the end, the teacher created an extra credit project which she offered to the class. They were to read a traditional Cambodian legend on their own time using one of the available apps. Then, they were to write a modern-day version of the story and submit it to the *Khmer Writer* application for publication as well as for the annual Aide et Action Cambodia competition.

The teacher learned that students preferred to read on a bigger screen. The teacher filled out a request form for installing these apps on library tablets.

Students visited the library on their own time to choose a Khmer legend and spend time reading it. Students who were particularly interested chose to download the app(s) onto their own smartphone so they could read at home.

The librarian confirmed that, once downloaded, the Khmer legends apps could be used offline, e.g., *Khmer Legend* app, *Collection Khmer Language*

The librarian confirmed that, once downloaded, the Khmer legends apps could be used offline, e.g., *Khmer Legend* app, *Collection Khmer Language* app.

Makara was the first student to begin his extra credit assignment.



Khmer Library, a growing repository of Khmer language books



Khmer Legend



Collect Khmer Legend, Khmer legends



Khmer Writer, Khmer content creation and publication app



Choun Nath Digital Dictionary, 5th edition of 1967 Khmer-Khmer dictionary

Enhancement

The standard curriculum cannot include all of the content that is important for students to learn. It also cannot contain niche areas that might be of interest to a student who wishes to dig deeper into a particular topic. Learning “enhancement” is about widening the domain of topics learned, not changing the pace of learning. Tablets offer a way to find resources beyond those offered in the standard curriculum. A self-motivated student, guided by a librarian, can find resources using a library tablet which excite and motivate them in an area of interest to them.

Case study: Student wishes to learn how to do computer coding

Sreythom has very much enjoyed her ICT courses at her high school; however, she wishes to go beyond learning how to use software like Microsoft Word, Excel and PowerPoint. She wants to create something new—websites, games. Sreythom approaches her teacher and asks about learning computer programming. The teacher knows that Sreythom, an average student, will likely have an excellent educational experience pursuing something that is exciting to her. And, the teacher knows that computer coding skills are in high demand.

Sreythom does not have a computer at home. Computers in the ICT lab are generally not available during non-class times. The teacher writes an email to the librarian about Sreythom’s interest and asks if the librarian can look for resources, which Sreythom could use to independently learn computer coding.

The librarian recommends that Sreythom starts with Grasshopper, a coding app for beginners developed by Google. It uses games to teach JavaScript in a fun way.

After that, the librarian recommends that Sreythom try SoloLearn. This app allows a user to get into the details of computer programming languages—languages used on the web (HTML, CSS, Javascript) and more sophisticated languages used for building apps (Java, C#, Swift). Users deal directly with computer code, learning syntax and dynamically seeing the results of their inputs.

Two websites might also be recommended to Sreythom after she has started down the coding path. freeCodeCamp.org has an interactive panel design which allows a user to type HTML, CSS, and JavaScript and dynamically see the results of their code. Users are given increasingly challenging tasks; they can get hints or watch videos to help learn more. The website codecademy.com is a course-based education tool which allows a user to go through online courses, do assignments, test knowledge, and try projects.

The librarian also recommends that Sreythom’s teacher take a look at Code.org and CODING CAMBODIA. Code.org is a popular website designed to encourage students to learn computer programming. It has free coding lessons on the website. Supported by Code.org and the InSTEDD iLab Southeast Asia, codingcambodia.org is a Khmer language website aimed at helping Cambodian teachers learn how to use the activities in the Code.org website.



Grasshopper, fun, game-like app for learning JavaScript



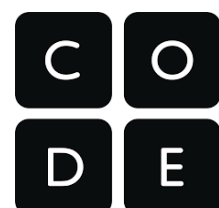
SoloLearn, coding app offering different types of languages



freeCodeCamp, interactive coding website



codecademy, formal online coding courses



Administration and tools

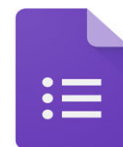
There are an increasing number of tools available to help people manage their lives, including teachers and students. There are apps to manage to-do lists, schedules, calendars, group projects, job searches, and so forth. These tools are available through websites and some have a corresponding app with the same functionality or nearly so. Because of their visual complexity and sophistication, sometimes both the web and app versions are difficult to use on a smartphone. With a tablet, however, there is more screen space to make the tool usable—via the website or the app. Librarians and/or ICT teachers can train teachers and/or students about how to use these tools and how library tablets would help students.

Case study: Teacher gives students practice assessments

A teacher wishes to give her students practice assessments to prepare for their upcoming exam. The teacher does not have time to grade the practice assessments but she does want the students to receive timely feedback about what they answer correctly and incorrectly. She does not wish to distribute an answer key and explanations as that wastes paper and exposes the security of her question bank, which she uses every year.

The teacher develops her question bank in the Google Forms tool. She creates multiple Google Forms Quizzes using closed questions. She puts text explanations in the answer key so students who answer incorrectly are given feedback about how a question/problem is solved.

The students who do not have smartphones and/or internet access are able to use the library tablets to take the practice assessments. They can work together in small groups of 2-3 students and all can see the screen adequately. This social aspect of the activity motivates the students to stay on task and work together. Upon submitting their quiz, the students are given immediate feedback on their performance and see the teacher's explanations about how to do questions they answered incorrectly.



Google Forms

Google Forms,
website and app
for creating online
forms and quizzes

Case study: Teacher saves paper and time via digital document management

A teacher wishes to provide supplementary materials for class, give students the opportunity to read articles not in their textbook, and to share photos and PowerPoint presentations used in class with students. The School Director generally does not allow teachers to make use of photocopying for day-to-day work. And, the teacher is averse to using paper due to concerns about waste and the environment.

The teacher utilizes his Google account to set up folders and files in Google Drive which are used for class. He uses folder hierarchies to store content by date and document tagging to indicate the related topic(s) for a piece of content.

As for the students, the computer lab is not always open and does not have enough computers. Students use a library tablet for reading large amounts of text, viewing detailed photos or diagrams, and organizing their own content through dragging-and-dropping. If the tablet includes a stylus (digital pen), students can make notes (annotations) as they read or collaborate with others.

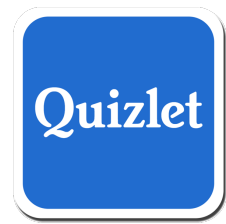


Google Drive

Google Drive,
website and app
for organizing and
sharing files

Case study: Students collaborate to make study flashcards

In their English class, students are required to memorize many English vocabulary words. Panha, Vattey, and Ratanak decide to collaborate to make flashcards that they can use to study. They use the Quizlet app on their smartphones to create flashcards with English on one side and Khmer on the other. Sometimes they incorporate photos to help them to remember the words. Their flashcard set continues to grow and it also draws the attention of other students who want to benefit from the study resource. Panha, Vattey, and Ratanak share the flashcard set with other students only if they agree to contribute new cards as the semester progresses. Pisey is a visually impaired student. When using a tablet, the fonts and app controls are large enough for Pisey to see easily. So she is able to both use and contribute to the class Quizlet flashcards by using a library tablet. As a class, performance on assessments improves thanks to the use of the Quizlet app, which makes studying and memorizing facts fun and easy. For Pisey, it is a chance to fully engage with fellow students, something that can be difficult in a regular class setting.



Quizlet, flashcard app to help memorize content quickly

Case study: Student explores career opportunities

Channich is a grade 12 student who is excited about her future but unsure of what that might look like. She lives in a rural area and is a child of farmers. Her family and other villagers are not able to talk to her about her career aspirations as those differ from their own life experience.

At Channich's school, she is fortunate to have a school counselor, Ms. Chanty. Channich meets with her and the counselor directs Channich to the *Trey Visay* app. The counselor explains that this is an app through which Channich can explore her interests and careers that match her abilities and interests.

Channich takes time during her breaks and other free time to visit the library and use a tablet to explore this app. When she encounters a new concept, she goes to the internet to learn more about that concept using various websites she learned about from the school counsellor.

When she gets excited learning about a particular career, Channich explores the *Bong Thom* job posting app to see if there are positions in Cambodia in that area. She looks at the job qualifications to see what additional skills and education she must get to be able to qualify for a position in her area of interest.

Through this research, Channich is able to have fruitful conversations with Ms. Chanty, the school counsellor, about her future. Ms. Chanty is impressed with Channich's initiative and gives her encouragement to continue her research and returns to visit her to discuss further her ideas and hopes.



Trey Visay, career counseling app for Cambodian students



Bong Thom, job posting website for job seekers

SCHALLENGES AND MISCONCEPTIONS

Introducing anything new is always challenging. In the case of technology, someone attempting to bring technology to a school faces some challenges and common misconceptions—among administrators, teachers, and within themselves.

General

A tablet is just a big smartphone. What is the benefit?

One challenge to tablet investment is the observation that students already have smartphones and tablets are just “big smartphones”. For primary school students, a big surface is necessary because students might not yet have the dexterity to operate a smartphone. In the case of secondary students, reading books and web articles is certainly easier on a bigger surface. Still, the most significant benefit of a library tablet is curation. Careful thought is put into what sort of apps are installed on a library tablet. What the student sees is what librarians and teachers have determined is good for them educationally. Making tablets available to all students also levels the “playing field”. Not all families can afford to provide their child a smartphone; not all families can afford the \$5/month it costs to keep their child’s smartphone topped up and able to access the internet. Students in these situations have the opportunity to reap the same benefits as their more wealthy peers thanks to library tablets.

We don’t have enough tablets for everyone, so how can we do it?

No library will be provisioned well enough to support every student who would benefit from using a tablet. If a school is fortunate enough to grow student interest to the point where there are not enough school tablets to accommodate them, this is success. This success should inform the next budget cycle so that greater investment is made in tablet technology. Also, students who have smartphones can install on their phone any of the apps they find on the library tablets. Truly motivated students will do that.

Students don’t have time built into their schedule for library visits.

A fundamental assumption of a library M-learning program is that the *library must be reliably open*, especially during the times students are most likely to use them. Such requirements mean that schools should manage staff schedules so that libraries remain open both morning and afternoon. In addition, it might also be possible for schools to use student council members to take responsibility for libraries during the lunch break when librarians go home for lunch. Schools may consider rewarding these students with a free lunch or other in-kind payments that would enable them to watch over the library during the lunch period, thereby ensuring that the library is open continuously from morning to the end of the day.

Challenges from school leaders

There are other technologies that are a higher priority.

Investments in technologies with a direct educational benefit to students should be prioritized over technology that makes work easier or more efficient for staff. It is difficult to imagine an investment more worthy than a device which can open up the world to a student through the internet. While this is possible via a tablet *and* a computer, a tablet is significantly cheaper than a computer, more mobile, easier to store, and more user-friendly than a computer because of its

similarity to a smartphone. Further, there are tools that are available only as apps, not through the internet or as downloadable software; tablets can have tools that computers cannot.

One might suggest that *classroom* tablets versus *library* tablets are a better way to implement tablets in schools. The challenge with classroom-based tablets is that they are a shared resource across the school. In no school is it currently possible to have a set of tablets for that classroom alone. So, an organized, systematized system must be put into place to maximize the use of tablets and ensure tablets are not promised to multiple teachers for the same time. If tablet use cannot be guaranteed, a teacher might be reticent to plan lessons which require tablets. The danger is that classroom tablets go unused, even if stored in a mobile trolley. Library tablets are unique in that a steady stream of library traffic will produce more use than a tablet trolley which is used by teachers only when they plan a lesson that requires them.

There is not budget for technology.

First, from the highest reaches of government and through all levels below, the importance of technology is echoed. A school's budget should align with MoEYS priorities. Budget allocations should be made such that the educational return of investment is highest. Investments in tools that students can use to continue their education outside the classroom are clearly good investments. Second, administrators should work closely with ICT staff to determine a tablet refresh plan and to understand, based on the cost of a tablet, exactly how much money is required annually. Thirty library tablets on a 5-year refresh plan cost \$1200/year to maintain.

Challenges and misconceptions about teachers

A library M-learning program is most successful if it engages teachers to connect students with the resources of the library. There are many ideas, both true and false, which suggest that teachers will not cooperate.

Teachers are lazy.

There may be a perception among librarians trying to integrate technology into the curriculum via library tablets that teachers do not wish to cooperate because teachers are lazy. Teachers believe that any change to their current way of working will add more work for them. Librarians are encouraged to seek out technology champions among teachers, teachers who are open to and excited about what tablet use can do for their students. Help those teachers to succeed! Teachers do "look over their shoulders" at their colleagues; they wish to be perceived as "good teachers". This "healthy competition" could conceivably motivate an otherwise "lazy" teacher to try new things. Second, one advantage of library tablets is that the librarian can engage a student directly, without the involvement of the teacher, if the librarian and the student are proactive.

Teachers cling to traditional teaching techniques.

While this may be true, librarians must understand what is behind this tendency and look to address it. Is it the perception that using technology will take more work? Is it fear of seeming behind the times? Is it a philosophical stance against using technology? A teacher who is reticent for any one of these reasons must face a single fact: the direction of education is toward using technology to enhance the educational experience.

Teachers are not trained in technology.

Some may believe that teachers cannot integrate technology into the curriculum because they do not have the skills and they do not have interest to acquire such skills. The reality is that students

born since the advent of the internet will likely have better technology skills than teachers (and librarians) of older generations, unless those teachers and librarians are trained about technology.

However, it is not primarily technology skills that a teacher needs. It is knowledge of what technologies exist and how those technologies can be used to help students who require remediation, acceleration, and enhancement. Teachers need to be taught about how to *find* technology resources. They need to know how to *judge* which apps and websites are appropriate and for who.

Generally, any educator needs to gain experience using the internet to know how to distinguish truth from falsehood; a reliable source from an unreliable one; content produced by an expert and content produced by an advertiser. This knowledge is not unique to the internet; it is the sort of knowledge that comes from experience.

LIBRARY M-LEARNING DEPLOYMENT AND MATURATION

An M-learning solution for secondary school libraries need not be a once-for-all process. It is recommended that schools take a step-by-step approach to implementing M-learning in the library. For one, integrating technology into the learning experience represents a cultural shift in a school. Teachers, students, and staff need to be made ready for these changes—and carefully. In addition, there is the reality that schools have varying levels of technical and staff capacity. It is simply not possible that full-scale M-learning services be implemented equally in all Cambodian secondary schools. Thus, school managers should assess their school’s capacity and staffing and determine to what degree they can introduce an M-learning program in their school.

ICT and tablet environment in SRS schools

These things considered, the following table lays out the environment of an M-learning program in an SRS library. The first column of the table indicates important components of a successful M-learning program. The other columns detail how schools, at three different levels of resource capacity, address those components. Improvements/ enhancements for each component can be pursued step by step, depending on school budget, staffing, and environmental factors.

Component	Under resourced school	Moderately resourced school	Highly resourced school
Tablet use	Library tablets are not used as intended; few if any teachers utilize tablets or have a vision for their use; tablet use is not integrated into the curriculum	Some teachers integrate library tablet use in a limited way, e.g., administration, remediation	Teachers utilize library tablets for all types of possible uses, e.g., remediation, acceleration, enhancement, administration
Tablet availability in library (student : tablet ratio)	50:1	30:1	15:1
Tablet refresh rate	None; tablets are used until they break	Every 8-10 years	Every 3-7 years

Component	Under resourced school	Moderately resourced school	Highly resourced school
	and cannot be repaired		
Tablet management	None; tablets are managed individually and manually but there is little attempt to keep tablets set up the same	Tablets are managed manually; apps and updates are installed on tablets one by one by technical staff	Centralized management of tablets, i.e., tablet updates and app installs
Child protection	Little or no protection of student access to inappropriate apps/content	Minimally effective proactive technical app/system in place to prevent students from accessing inappropriate apps/content and/or reactive method in place to identify students who do such things; protection mechanism must be put into place manually upon tablet setup	Proactive technical app/system in place to prevent students from accessing inappropriate apps/content; auditing and usage reports available to identify offending students if needed; protection mechanism is built into tablet setup procedure
Internet access	No access or very limited/unreliable access	Wifi available but not school-wide, not 100% reliable; negatively affected by environmental conditions	Consistent, reliable internet access throughout the school campus; resistant to environmental changes
Content/app availability	Requires persistent internet connection, else content/apps are not available	Some content is available when offline (e.g., eBooks) but most content/apps cannot function offline	To the extent possible, content/apps are available offline
Librarian capacity	Untrained in library management including technical functions	Trained in library management; little or informal training in technical functions	Formally trained in library management and technical functions
Librarian-Teacher linkages & outreach	Little or no communication/outreach between librarian(s) and teachers.	Librarians communicate with teachers on a case-by-case basis but not through a systematic outreach program.	Librarians have a systematic outreach program to engage teachers in high utilization of library's M-learning program.
Budget for ICT in library	Limited or no budget available	Maintenance budget only; no opportunity for growth	Budget created to align with MoEYS strategic priorities; takes a growth, long-term view

Library M-learning actuation opportunities

Enhancing the technology provision and success of tablet use in the library can be accomplished via actionable steps that a librarian can take together with teachers, ICT staff, and school leaders. Further, these actions can be taken as time and resources permit; however, they can and must be continually pursued to ensure that tablets are used to their maximum effect and the investment is made in technology from one year to the next, from one person to the next.

The following are steps that school faculty and staff should take in order to ensure the ongoing success of an M-learning program in a school library.

Action Item 1: Engage proactively with teachers

Goal: Enhance appropriate use of library tablets; motivate teachers to have a vision for effective use of library tablets

Teachers are the main point of contact for a student. One clear path to fruitful tablet use is through engaging teachers who will refer students to the library to use a tablet for educational purposes. A librarian needs to *actively* pursue teachers; s/he should not wait for a teacher to approach them. Active engagement could take many forms:

- Conduct in-service training for teachers about how to use tablet apps and internet offerings to help students who need remediation, acceleration and enhancement;
- Distribute a how-to guide for using apps to aid in various administrative tasks;
- Notify teachers through social media (e.g., Facebook) or chat group (e.g., Telegram) when a new app is available;
- Send the *Library Tablet Usage Report* to teachers via email.

Action Item 2: Utilize ICT staff effectively

Goal: Streamline tablet management methodology, child protection mechanisms, internet and content/app availability

ICT staff are a critical part of the success of any M-learning program. Develop a positive relationship with ICT teachers and stress to them that they are your partners in the library M-learning program. Work with ICT staff to do the following:

- Develop a tablet installation guide to ensure that library tablets are all set up the same way, use the same configurations, have the same apps, and protect students from inappropriate content and apps.
- Ask ICT staff about how tablet management can be streamlined and what it would cost to build a system to do that.
- Discuss with ICT staff on a regular basis the best practices for child protection when it comes to tablets and what it would take to implement those practices.
- Work with ICT staff to make sure that existing and new apps are set up so that they can be used to the fullest extent when the internet is not available.
- When an internet outage happens, request from ICT staff an explanation for the outage. Keep a log of when it happened, how long it lasted, and the reason for the outage. If outages are affecting the library M-learning program, this log will be helpful to present to

school leadership to justify an investment in improving the internet infrastructure at the school.

When tablets need to be replaced, the librarian does not need to replace the tablet with the same model. Tablets change and improve. Also, based on the *Tablet Change Log* (see Annex F), the librarian will be aware of tablets that have needed frequent repairs and those that have not. Therefore,

- Consult with ICT to decide on the best tablets to purchase. This should be based on reliability, functionality, and cost as well as the learnings from use of existing library tablets as documented in the *Tablet Change Log*.

Action Item 3: Advocate for growth mindset regarding library budget

Goal: Improve tablet availability, refresh rate, and tablet management software

A librarian can do several things to educate school leadership about the library M-learning program and motivate them to support the program financially.

- Educate leadership about the value of the library M-learning program. Look for ways to bring public attention to the program's success, beyond information presented in the *Library Tablet Usage Report*. For instance,
 - Get feedback from teachers and students through face-to-face communication about how the library M-learning program has enhanced learning.
 - Provide a "M-learning Program Feedback Form" for use by students and teachers.
 - Learn about other schools' successes and how those have affected students' education and performance.

Gather these positive experiences to present to leadership. "Success stories" can be a powerful way to change the mindset of leadership who may otherwise be hesitant to support the program financially.

- Ensure that the School Annual Budget includes money for tablets and other elements of the school's M-learning program.
 - Get leadership support for the policy regarding tablet refresh and communicate clearly the financial costs associated with that. Emphasise the need to replace tablets *before* they begin to malfunction and require repairs.
 - Keep a clear record of the average annual cost of maintaining a tablet using the *Tablet Change Log*. This cost should be factored into budgeting for the library M-learning program.
- Work with leadership to incorporate the library M-learning program into long-term strategic planning for the school.
- Engage with librarians in other schools who have successfully grown the M-learning program at their school's library and who have gotten school leadership "on board". How have they made this happen?

Action Item 4: Pursue ICT professional development

Goal: Enhance librarian capacity to engage with teachers about how to use tablets, proactively research apps and communicate these to teachers, and do basic tablet maintenance/troubleshooting

An important part of the success of a library M-learning program is having a librarian who is well-trained in relevant technologies, proactive about development of apps and educational websites, and engaged in what happens in the classroom. To this end, librarians can consider the following:

- Join or initiate a CoP among educators and/or Cambodian librarians to share about their use of technology in the school classroom/library;
- Take courses in topics related to the internet.
 - Background course about the power of the internet and how it can be used, e.g., “Internet History, Technology, and Security” (University of Michigan)
 - Digital literacy, navigating the digital world, e.g., “Digital Literacy in the Classroom” (ISTE), Microsoft Digital Literacy, Google’s Applied Digital Skills
 - Digital Humanities, using modern digital tools to explore the humanities, e.g., “Introduction to Digital Humanities” (Harvard University)
- Take a course on Android technology, e.g., “How To Use Android: Beginners Guide for Smartphones, Tablets” (Udemy);
- Learn about Digital Citizenship, responsible use of technology, and create a training session or workshop to teach others, e.g., “Everything You Need to Teach Digital Citizenship” (Common Sense Education), “Digital citizenship: Prepare today’s learners for online success” (Microsoft), educator course on Digital Citizenship (Cyber Civics).

CONCLUSION

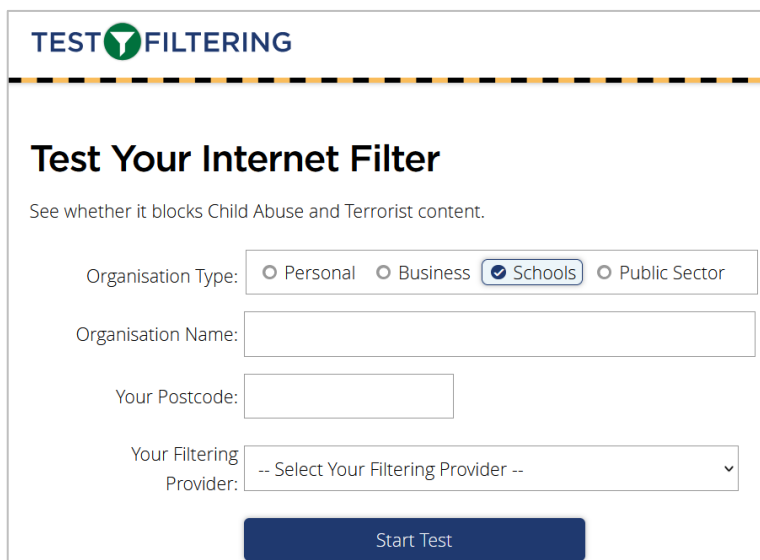
Use of tablets in the school library opens up a world of knowledge to students and the opportunity to obtain that knowledge in unique ways. However, an M-learning program in Cambodia’s SRS must be accomplished in ways that are sustainable, promote self-directed learning, and protect students. M-learning is an integral part of Cambodia’s progress toward embracing the digital future.

ANNEX A: VERIFICATION OF CHILD PROTECTION

Confirming that proper child protection measures have been taken is prudent, especially at the beginning of the school year and when a new tablet is received. As stated above, no tablet should be deployed without confirming that (1) inappropriate web content is blocked and that (2) a student cannot download apps (or, at least, download inappropriate apps).

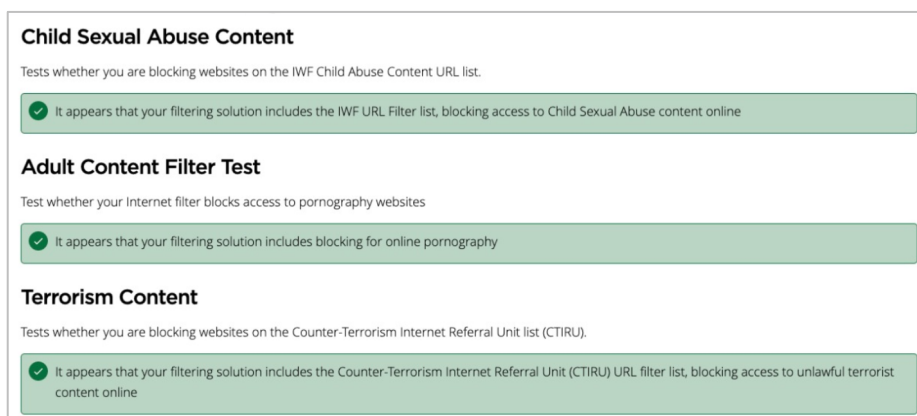
One way to confirm the first is to simply attempt to get to a website that should be blocked. For instance, gambling websites should be blocked (as well sites associated with child sexual exploitation, pornography, etc.). At the time of writing, the Fortinet firewall website gives these example gambling websites as examples of websites that should be blocked: bet365.com, freelotto.com, williamhill.com, betfair.com.

Another option is to utilize an online tool which tests known URLs that should be blocked via a URL list that are maintained on a regular basis. One such organization is TestMyFiltering which does just this. Go to <http://testfiltering.com/> to perform the test.⁸



The screenshot shows the 'Test Your Internet Filter' page on the Test My Filtering website. The page has a header with the logo and the title 'Test Your Internet Filter'. Below the title, it says 'See whether it blocks Child Abuse and Terrorist content.' There are four radio buttons for 'Organisation Type': Personal, Business, Schools (which is selected), and Public Sector. Below that are three text input fields for 'Organisation Name', 'Your Postcode', and 'Your Filtering Provider' (with a dropdown menu). At the bottom is a blue 'Start Test' button.

If a tablet is set up properly, the following should be the result of the test.



The screenshot shows the results of the test on the Test My Filtering website. It is divided into three sections, each with a green checkmark and a green background for the result message:

- Child Sexual Abuse Content**: Tests whether you are blocking websites on the IWF Child Abuse Content URL list. It appears that your filtering solution includes the IWF URL Filter list, blocking access to Child Sexual Abuse content online.
- Adult Content Filter Test**: Test whether your Internet filter blocks access to pornography websites. It appears that your filtering solution includes blocking for online pornography.
- Terrorism Content**: Tests whether you are blocking websites on the Counter-Terrorism Internet Referral Unit list (CTIRU). It appears that your filtering solution includes the Counter-Terrorism Internet Referral Unit (CTIRU) URL filter list, blocking access to unlawful terrorist content online.

⁸ Note that internet content and websites are constantly moving target. As soon as one website is blocked, another is created. It is for this reason that schools make significant (financial) investments in using a service that guarantees vigilance.

If the filter is not set up or not set up properly, red warnings will appear as below.

The screenshot shows three distinct red warning boxes, each with a white 'x' icon in a red circle at the top left. The first box is titled 'Child Sexual Abuse Content' and contains text about the IWF Child Abuse Content URL list, a warning message, and a link to 'Appropriate Filtering Guidance for Schools'. The second box is titled 'Adult Content Filter Test' and contains a warning message about pornography access. The third box is titled 'Terrorism Content' and contains a warning message about the CTIRU list.

Child Sexual Abuse Content
Tests whether you are blocking websites on the IWF Child Abuse Content URL list.

It appears that your connection is not protected by the IWF URL filter list. Please contact your provider and inform them that you wish to be filtered by the IWF filter list.

Further guidance on appropriate filtering can be found on the UK Safer Internet Centre website.

[Appropriate Filtering Guidance for Schools](#)

Adult Content Filter Test
Test whether your Internet filter blocks access to pornography websites

It appears that your filtering solution is not blocking access to pornographic content

Terrorism Content
Tests whether you are blocking websites on the Counter-Terrorism Internet Referral Unit list (CTIRU).

It appears that you are not covered by the filter list of unlawful terrorist content:

Blocking of inappropriate content can be done in several ways. If there are resources, many paid services are available. There are also add-ons to web browsers, e.g., Google Chrome, which do some filtering. Your ICT staff person(s) should take responsibility for this task.

As regards the downloading of apps, confirm the following set up. Blocking of all downloading of all apps is done as follows. Open the menu in the left-hand corner, select “Settings”, then “User Controls”. It should be set so that a user must have a password to download an app. Blocking only apps with “mature content” is done by using “parental controls” available in the settings. Confirm that one or the other of these is enabled. Detailed instructions for more granular control are documented here: <https://support.google.com/families/answer/7103028?hl=en>. Again, your ICT staff person(s) should take responsibility for this task.

There are also ways to audit activities that are performed by a user after the fact—auditing of websites visited and apps downloaded. This sort of audit is needed if you suspect improper use of a tablet. If a tablet is set up properly, this is not likely needed.

ANNEX B: MANAGING DIFFERENT TYPES OF TABLETS

There are two categories of tablets that may be available in schools which are used in different ways: (1) tablets that are used in a specific location and stay in that location and (2) tablets that can be moved to and used in different places in the school.

Library tablets are tablets that are only used in the library. They are used for the purpose of independent study as is described in this Manual. It is critical that library tablets remain in the library and that their presence is guaranteed. Students and teachers need to be sure that library tablets are available.

Your school might be fortunate enough to also have tablets allocated for other purposes. For instance, participants in the MoEYS Tablets on Wheels program have tablets that can be used in science, technology, engineering, and mathematics (STEM) classes. Those tablets are stored in a mobile tablet case. Teachers of STEM classes reserve the tablets for use on a particular day and at a particular time. At that time, the mobile tablet case is rolled into the classroom and the tablets are used by students.

Tracking tablet use for non-library tablets is important. The person or department who manages the non-library tablets should develop an organized system. S/he could create a *Tablet Asset Inventory* (see example in Annex D) and a *Tablet Change Log* (see example in Annex F) for non-library tablets. Also, s/he can use the library tablet *Check-out Sheet* (Annex C) as an example. The non-library tablet manager should also build a system for teachers to reserve tablets ahead of time. There is no system for reservations presented in this Manual as library tablets are not reservable.

At the time that the school wishes to purchase new tablets, purchases should be based on past experience with *all* tablets in the school. So, all persons who manage tablets (librarians and others) should work together to discuss the tablets they manage to determine which tablets have and have not needed to be repaired because of malfunctioning of hardware or software. Together they can determine which tablets have been the easiest to use or best for students. This information should be used to inform future tablet purchases for the library and for other purposes.

In the case of an emergency like Covid-19 which caused schools to be closed, the policy for library tablets can be temporarily changed. In a case like that, the library tablets could be redeployed for another purpose and could be allowed to be used outside of the library. For instance, students could check out tablets and take them home.

ANNEX C: TABLET CHECK-OUT SHEET

Tablet ID	Student name	Date and time checked out	Time returned	What is the main purpose of your use of the tablet in the library today? (Write a √.)
				<input type="checkbox"/> Educational game <input type="checkbox"/> Read book <input type="checkbox"/> Take exam <input type="checkbox"/> Internet research <input type="checkbox"/> Watch video <input type="checkbox"/> Relax <input type="checkbox"/> Other _____
				<input type="checkbox"/> Educational game <input type="checkbox"/> Read book <input type="checkbox"/> Take exam <input type="checkbox"/> Internet research <input type="checkbox"/> Watch video <input type="checkbox"/> Relax <input type="checkbox"/> Other _____
				<input type="checkbox"/> Educational game <input type="checkbox"/> Read book <input type="checkbox"/> Take exam <input type="checkbox"/> Internet research <input type="checkbox"/> Watch video <input type="checkbox"/> Relax <input type="checkbox"/> Other _____
				<input type="checkbox"/> Educational game <input type="checkbox"/> Read book <input type="checkbox"/> Take exam <input type="checkbox"/> Internet research <input type="checkbox"/> Watch video <input type="checkbox"/> Relax <input type="checkbox"/> Other _____
				<input type="checkbox"/> Educational game <input type="checkbox"/> Read book <input type="checkbox"/> Take exam <input type="checkbox"/> Internet research <input type="checkbox"/> Watch video <input type="checkbox"/> Relax <input type="checkbox"/> Other _____
				<input type="checkbox"/> Educational game <input type="checkbox"/> Read book <input type="checkbox"/> Take exam <input type="checkbox"/> Internet research <input type="checkbox"/> Watch video <input type="checkbox"/> Relax <input type="checkbox"/> Other _____

ANNEX D: EXAMPLE TABLET ASSET INVENTORY: CHOUN NATH SCHOOL

Tablet ID	Status	Manufacturer	Model	Year of manufacture	Operating system	Protective case	Warranty	Date of purchase	Purchased from	Price
0001	Broken	Asus	ZenPad Z8	2016	Android 6	Yes	None	08/01/2017	PTC Computer Tech.	\$220
0002	Active	Asus	ZenPad Z8	2016	Android 6	Yes	None	08/01/2017	PTC Computer Tech.	\$220
0003	Active	Asus	ZenPad Z8	2016	Android 6	Yes	None	08/01/2017	PTC Computer Tech.	\$220
0004	Active	Samsung	Galaxy Tab S2	2018	Android 6	No	1 year	20/12/2018	ICE Electronics	\$310
0005	Active	Samsung	Galaxy Tab S2	2018	Android 6	No	1 year	20/12/2018	ICE Electronics	\$310
0006	Lost	Huwei	MediaPad M5 8.4	2018	Android 8	No	6 months	15/01/2019	Chhay Hok Computer	\$250
0007	Active	Huwei	MediaPad M5 8.4	2018	Android 8	No	6 months	15/01/2019	Chhay Hok Computer	\$250
0008	Active	Huwei	MediaPad M5 8.4	2018	Android 8	No	6 months	15/01/2019	Chhay Hok Computer	\$250
0009	Active	Lenovo	Tab P11 Plus	2021	Android 11	Yes	1 year	11/07/2022	ICE Electronics	\$260
0010	Active	Lenovo	Tab P11 Plus	2021	Android 11	Yes	1 year	11/07/2022	ICE Electronics	\$260
0011	Active	Lenovo	Tab P11 Plus	2021	Android 11	Yes	1 year	11/07/2022	ICE Electronics	\$260
0012	Active	Lenovo	Tab P11 Plus	2021	Android 11	Yes	1 year	11/07/2022	ICE Electronics	\$260
0013	Active	Lenovo	Tab P11 Plus	2021	Android 11	Yes	1 year	11/07/2022	ICE Electronics	\$260

TABLET ASSET INVENTORY

Tablet ID	Status	Manufacturer	Model	Year of manufacture	Operating system	Protective case	Warranty	Date of purchase	Purchased from	Price

ANNEX E: EXAMPLE TABLET APP INVENTORY: CHOUN NATH SCHOOL

App name	Status	Start date	Cost	Related school subject(s)	Requestor	Appropriate for grade(s)	Description/justification
Algebra 12+	Awaiting approval		\$10/mo	Mathematics	Ms. El	10, 11, 12	Mathematics game app for learning algebra concepts
Trey Visay	Active	05/01/2022	Free	-	Mr. Khon	11, 12	Tool to aid in career exploration
Khmer Library	Active	05/01/2022	Free	Khmer Literature	Mr. Choun	10, 11, 12	Repository of Khmer language books
Choun Nath Digital Dictionary	Active	01/01/2021	Free	Khmer Literature	Mr. Choun	11, 12	5th edition of 1967 Khmer-Khmer dictionary
SoloLearn	Active	08/01/2020	Free	IT	Ms. Sopheak	12	Computer coding app offering different types of computer languages
Khan Academy	Active	03/11/2020	Free	Mathematics	Ms. Chang	10, 11, 12	App with mathematics and other courses
E-learning	Active	03/11/2018	Free	All	MoEYS	10, 11, 12	Video lectures for Cambodian school curriculum
Minecraft	Discontinued 06/01/2020	01/01/2019	\$24/mo	Math, Science, IT	Ms. Vuthy	10	Sandcastle game which teaches creativity and problem-solving

TABLET APP INVENTORY

App name	Status	Start date	Cost	Related school subject(s)	Requestor	Appropriate for grade(s)	Description/justification

ANNEX F: EXAMPLE TABLET CHANGE LOG: CHOUN NATH SCHOOL

Date	Tablet ID	Activity	Reason	Performed by	Cost
12/03/2019	0002	Replaced charging cord	Student broke cord while charging	ICT teacher	\$2
03/11/2020	0003	Installed a new screen	Tablet dropped & screen cracked	ICE	\$8
20/02/2021	0005	Replaced port harness	Port damaged – details unknown	Chantra	\$5.50
18/09/2021	0006	Implement security patch 12.B.22.008	Company found security issue w/ this Huawei model	Teacher Panha	
18/09/2021	0007	Implement security patch 12.B.22.008	Company found security issue w/ this Huawei model	Teacher Panha	
19/09/2021	0008	Implement security patch 12.B.22.008	Company found security issue w/ this Huawei model	Teacher Panha	
21/11/2021	0007	Replaced screen	Tablet no longer responds to touching	Chantra	\$12
02/07/2022	-	Fixed fan mechanism in tablet storage cabinet	Power was not getting to the fan	Vichika (maintenance)	\$18
21/07/2022	0012	Bought new protective case	Case disappeared	ICE	\$8

TABLET CHANGE LOG

Date	Tablet ID	Activity	Reason	Performed by

ANNEX G: EXAMPLE TABLET USAGE REPORT

MONTHLY LIBRARY TABLET USAGE REPORT: CHOUN NATH SCHOOL

JULY 2022

Number of unique students using tablets: **117**

Average time spent using tablet: **18 minutes**

Expenses for tablets this month: **\$26**

Purpose of use

Purpose	Count
Educational game	25
Read book	12
Take exam	8
Internet research	31
Watch video	41
Relax	11
Other	8

Tablet changes

Type of change	Count
Repair	2
Software change/update	4
App installation	10
Other	1

Significant events

- Accelerated student assessment for eight year 11 students using tablets
- Hosted and supplied tablets for Coding Challenge 2022
- Repaired tablet storage container fan

ANNEX H: STUDENT REFERRAL FOR LIBRARY TABLET USE

In some scenarios, a teacher may send a student to the library during class time to utilize a tablet in order for the student to complete a particular assignment, project, research task, assessment, etc. In this case, the teacher fills out a form to give permission to the student to do this. The student brings the form and presents it to the librarian. The librarian has the student fill out their information in the *Tablet Check-Out Sheet* as usual and allocates the tablet.

STUDENT LIBRARY REFERRAL

Student _____ has my permission to use a library tablet
student name

for the purpose of _____
purpose of tablet use in the library

on _____ at _____ and for _____ minutes.
date time #

teacher name

teacher signature

ANNEX I: NEW APP REQUEST FORM FOR LIBRARY TABLETS

Teachers will become engaged in and enthusiastic about using tablet technology to enhance the educational experience for their students. They may find apps that are appropriate for their class(es) and request to have the app(s) installed on the library tablets. Below is a request form for this purpose.

APP REQUEST FORM

Teacher _____

Application name _____
Use exact name from Google Play so it can be found easily

Grade(s) this app is appropriate for (check all that apply):

Grade 10 Grade 11 Grade 12

Related subject (check all that apply):

<input type="checkbox"/> Earth Science	<input type="checkbox"/> Khmer Literature	<input type="checkbox"/> Geography
<input type="checkbox"/> Biology	<input type="checkbox"/> Foreign language	<input type="checkbox"/> Information Technology
<input type="checkbox"/> Chemistry	<input type="checkbox"/> History	<input type="checkbox"/> Home economics
<input type="checkbox"/> Physics	<input type="checkbox"/> Morality - Civics	<input type="checkbox"/> Other _____

Please explain how this app will be used to enhance your curriculum.

Note that this form could be made into a digital form via Google Forms, Microsoft Forms, or similar. The advantage of using digital forms would be storage of requests in spreadsheet format for archival purposes and possible tracking of librarian notes for each request.

ANNEX J: SAMPLE OF POSSIBLE APPS FOR LIBRARY TABLETS

Khmer literature and language



Chuon Nath Digital Dictionary
Rating: 4.5; Downloads: 1M+
5th edition of 1967 Khmer-Khmer dictionary



Khmer Legend
Rating: 4.5; Downloads: 10K+
Khmer legends



Khmer Library
Rating: 4.5; Downloads: 100K+
Repository of Khmer language books



Kh Legends Story
Rating: 4.6; Downloads: 10K+
Khmer legends



Collect Khmer Legend
Not on Google Play
Popular Khmer legends and fairy tales with search, share, save



Khmer Literature SK
Rating: 4.2; Downloads: 10K+
Short stories, search feature



សង្ខេបអក្សរសិល្ប៍ខ្មែរ
Not on Google Play
Proverbs, riddles, Khmer stories



រឿងប្រេងខ្មែរទាក់ទងនឹងប្រាសាទ
Not on Google Play
Khmer legends related to the temples identified by the Ministry of Culture and Fine Arts



Khmer Grade 12
Rating: 4.3; Downloads: 10K+
Compilation of brief exercises and summary lessons in history; Khmer essay writing

STEM



Biology Grade 12
Rating: 3.9; Downloads: 10K+
Audio lesson summaries; game to remember facts; compete with friends



Khmer Biology Grade 12
Rating: 4.6; Downloads: 50K+
Summary lessons; questions and answers



Khmer Math Grade 12
Downloads: 2.5K+
A mathematics reference guide for secondary students



Khmer Chemistry Grade 12
Downloads: 500+
Summary lessons, previous exams and chemistry formulas.



Khmer Computer Dictionary
Rating: 4.6*; Downloads: 50K+
Definitions of computer terms with images



Tesdopi តេស្ត ១២
Rating: 4.5; Downloads: 100K+
Learn physics concepts



Khmer Academy
Rating: 3.9; Downloads: 100K+
Knowledge sharing about IT concepts



Khmer Grade 12
Rating: 4.3; Downloads: 10K+
Compilation of brief exercises and summary lessons for Mathematics, Physics, Chemistry, Biology