

ICT and the Education of Refugees:
A Stocktaking of Innovative Approaches in the MENA Region
Lessons of Experience and Guiding Principles

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ABSTRACT.....	1
ACRONYMS.....	2
INTRODUCTION.....	3
EDUCATION AND THE REFUGEE CRISIS IN MENA.....	3
THE POTENTIAL AND PROMISE OF ICT FOR REFUGEE EDUCATION	4
A CLOSER LOOK AT SPECIFIC NEEDS.....	6
<i>Digital Content</i>	6
<i>Content Delivery</i>	7
<i>Teacher Training and Mentoring</i>	9
<i>Facilitating Formal Schooling</i>	10
EVIDENCE OF EFFECTIVENESS AND GUIDELINES FOR ICT FOR REFUGEE EDUCATION.....	11
CONCLUSION	13
REFERENCES AND LITERATURE CONSULTED	14
ANNEX 1: PROJECTS UNDER DEVELOPMENT OR UNDERWAY.....	22
<i>Mobile Learning</i>	22
<i>Content Providers/Open Educational Resources</i>	24
<i>Platforms</i>	31
<i>Tablets/Connected Classroom Infrastructure</i>	35
<i>Innovation Labs</i>	37
<i>Learning Management Systems</i>	39
<i>Curricula</i>	40
ANNEX 2: DESIGN PRINCIPLES FOR EDUCATION TECHNOLOGY.....	42

Abstract

More than 10 million school-age children have been forced out of school in the Middle East and North Africa (MENA) due to armed conflict in Syria, Iraq, Yemen, Libya and other countries. Most are displaced internally but others have fled across borders to seek refuge. The numbers are staggering: an estimated 2 million Syrian children are out of school in Syria and 700,000 are out of school in host countries; 3 million Iraqi children are out of school, 2 million Libyan and 2.9 million Yemeni children remain out of school (UNICEF, 2015).

Displacement may have become a constant, perhaps permanent feature of the 21st century; if so, it is important to be prepared and develop a lasting capacity to deal with displacement wherever it occurs and enact policies that support and enable new ways to learn.

As governments and international agencies struggle to ensure these children a safe learning environment and a good quality education, many look to information and communications technology (ICT) to provide at least part of the solution. The use of smartphones and other mobile devices, ubiquitous even among impoverished refugees, can provide a platform that educators can leverage to reach marginalized children and youth.

The purpose of this note is to provide a clear and concise snapshot of the role ICT has played, the promise it holds, the projects that are currently under preparation, and what more might be done. This is in no way a comprehensive assessment but rather an attempt to promote dialogue and inform programs.

Among the main points are the following:

- The situation of refugees in MENA is highly diverse and ICT-supported interventions can be and must be correspondingly diverse: indeed, each intervention should be tailored to particular needs of particular groups and be integrated with an appropriate pedagogy.
- Technology can also aid parents and relief organizations, not only students and teachers.
- While UN agencies strive to integrate refugees into local school systems, the potential of small-scale private schooling, assisted by technology, should be explored.
- ICT can replace teachers and organized learning only in rare instances; but it can provide effective *support* to education, especially when supplemented with teacher training.

Many seek evidence that technology-assisted approaches are effective, but little has been gathered with respect to ICT in education generally, let alone in emergency situations. The current situation provides numerous opportunities to build the evidence base, even carry out randomized control trials, and thereby improve ICT interventions and bring them to scale. In the meantime, lacking a robust evidence base, researchers and practitioners have formulated design principles that can provide guidance. These are given in Annex 2, though the following main principles recur often:

- The purpose and context of each ICT-based intervention must be clearly understood.
- Technology is a toolset, not the solution: start with the problem, not the technology.
- Exploit open-source cost-free materials.
- Focus on teacher training and development.
- Evaluate interventions and build the evidence base.

Acronyms

DFID	U.K. Department for International Development
EMIS	education management information systems
ICT	Information and communications technology
INEE	Inter-Agency Network for Education in Emergencies
LMS	Learning management systems
MENA	Middle East and North Africa
MIT	Massachusetts Institute of Technology
MOOC	Massive open online courses
NGO	Nongovernmental organization
OER	Open educational resources
UN	United Nations
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East UNRWA
USAID	U.S. Agency for International Development

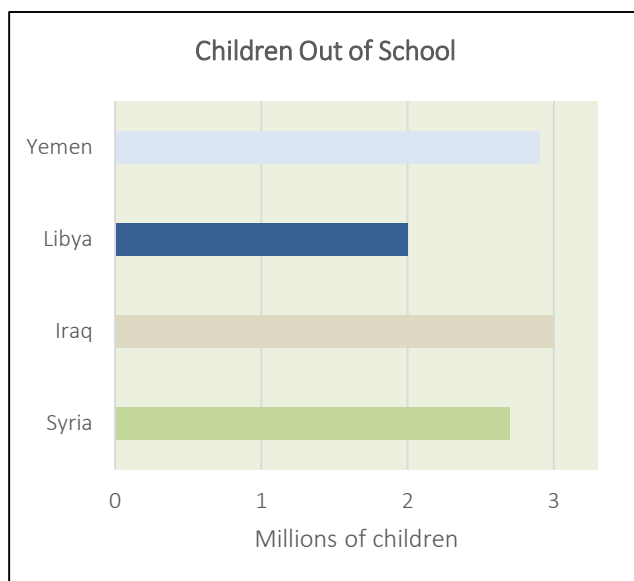
Introduction

This note aims to inform discussion on the role information and communications technology (ICT) can play in the educational response to the refugee crisis in the Middle East and North Africa (MENA). It provides a clear and concise snapshot of the role ICT has played, the promise it holds, the projects that are currently under preparation and what more might be done.

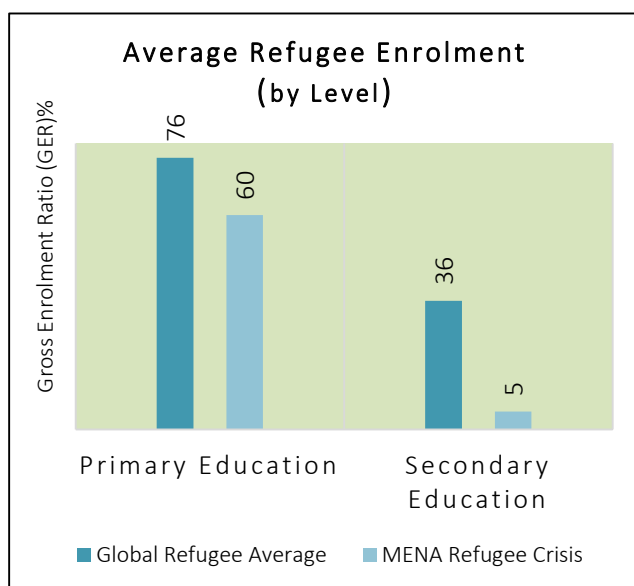
Education and the Refugee Crisis in MENA

The Middle East and North Africa as a region is currently beset by widespread instability and armed conflict, giving rise to ongoing humanitarian crises. The effect on education in MENA has been devastating: according to UNICEF (2015a), more than 13 million children have been forced from their schools due to conflict, and more than 8,850 schools can no longer be used at all.¹ Primary and secondary education, performing poorly under normal circumstances, has been severely disrupted for millions of children in the region due to the conflicts in Iraq, Syria, Yemen, Libya, and other countries. Education in neighboring countries has also fallen under severe strain as refugees pour across borders (Jalbout 2015a, 2015b, 2015c).

The situation of adolescents is particularly worrisome. It is hard to obtain enrollment data specific to adolescent refugees in MENA, but international averages indicate that globally 76 percent of registered refugees enroll in primary school but just 36 percent in secondary school (Dryden-Peterson 2011). Enrolment of adolescents in Lebanon, Jordan and Turkey is certainly much lower than this. Yet this is precisely the population that is most susceptible to the worst forms of exploitation (early marriage, human trafficking, political and religious radicalization, recruitment into terrorist and militant groups) and the population most capable of benefiting from computer-enabled learning.



Source: UNICEF, 2015



Source: Dryden-Peterson 2011

¹ The United Nations Children's Fund, unlike the World Bank, includes Sudan as part of the Middle East and North Africa region. Discounting Sudan would still leave 10.6 million out-of-school children in MENA.

With respect to primary and secondary education, refugee children and youth run the gamut of circumstances:

- Refugee children living in organized camps; refugee children living in cities and towns
- Children completely out of school due to displacement, employment, or for reasons of safety
- Children receiving non-formal education (classroom education in an organized setting that is not a school) and informal education (learning that takes place in the home, independently, or in any other informal setting)
- Children attempting to reenter school after a prolonged disruption
- Children enrolled in a foreign national system, facing
 - Language barriers
 - A different curriculum
 - Psychosocial trauma
 - Bullying, abuse, other social issues
- Children without adequate safety and security

Syria. More than 4.8 million Syrian refugees have registered with UNHCR in five host countries (Turkey, Lebanon, Jordan, Iraq, and Egypt), and these reported figures may well be below the actual numbers (UNICEF 2015b). More than half of the refugees are under age 18, including more than 1.6 million school-age children and youth. Of these, as many as 53 percent are out of school completely, while 38 percent are in school, and 9 percent are receiving non-formal education (UNICEF 2015a). Local schools that have accepted Syrian children are severely overcrowded and under very serious strain, which may have led to higher out-of-school rates among local children as well (No Lost Generation Initiative 2016b). In Lebanon, Syrian children of school age actually outnumber Lebanese public school students: 475,000 Syrian children of school age are registered with UNHCR, while about 300,000 Lebanese children are enrolled in public schools (about 30 percent of all Lebanese school-age children). In Syria itself, over two million additional school-age children are out of school: at least 1.3 million primary school children (ages 5–14) and another 800,000 secondary school youth (UNICEF 2015b). Hundreds of thousands more are at risk.

The context of the refugee crisis in MENA is thus highly complex—requiring a response that recognizes that complexity and that does not turn solely to conventional approaches. With many refugees living outside of organized refugee camps, it is very difficult for aid providers, whether governments, United Nations (UN) organizations, or NGOs, to reach families and children in need. Many educators, technologists, and others hope that ICT may be a way to provide help to widely dispersed families and that smart innovations and investments might provide rapid, effective solutions for education. Not one approach is needed, but many, corresponding to the widely varying situations and circumstances of displaced learners. If ICT is to benefit displaced children and youth, it must be tailored to the needs and circumstances of specific groups of refugees. Above all, it must serve as a set of tools for teachers.

The Potential and Promise of ICT for Refugee Education

As with all children, the goal with respect to educating displaced children is to provide access to a good education in a safe, healthy, and effective learning environment, with instruction delivered in accordance with good pedagogical practice and progress and achievement documented and reliably certified. The nature of displacement and conflict requires that special attention also be paid to psychosocial and health needs and the effects of prolonged interruption of schooling.

Currently, refugees face many barriers to schooling, including shortages of available space at school, language barriers, registration requirements, the direct and associated costs, discrimination at school,

inability to travel to school (Culbertson and Constant 2015). Other barriers include the need to work and early marriage.²

On the face of it, ICT would seem to hold great promise for responding to unmet education needs within the broader humanitarian crises in MENA. Given basic infrastructure, technology has the potential to deliver educational content at very low cost virtually anywhere, provide a curriculum and records system that can follow children on the move, reach those unable to attend school, link digital content to the national curricula of students' home country or their country of refuge, and certify educational achievement. Technology can also provide a means for teachers and other adults to receive pedagogical training, share materials and advice, and assess and document learning. It can even provide a means for relief organizations to rapidly assess and map the educational situation and provide basic educational information to parents in real time.

One important reason ICT stands as an alluring solution is its penetration. In the Arab countries as a whole, digital penetration, standing at 52.2%, exceeds the world average of 46.4%, and only six countries (Iran, Syria, Libya, Yemen, Algeria, and Iraq) currently fall below that average.³ Internet penetration extends to refugees as well, in spite of their loss of wealth and income. Mobile phones are now seen as a basic survival tool (Janbek 2015) and the chief way in which the displaced can remain connected to their families and home communities. In the Za'atari Refugee Camp in Jordan, for example, a survey conducted in January 2015 found that 86 percent of youth own mobile handsets and 83 percent own SIM cards (Maitland and Xu 2015). Most of the mobile handsets in Za'atari are smartphones (Creative Associates International 2016). In other words, there is a relatively extensive digital infrastructure already in place, which educators could leverage to support new ways of learning.

The international community has taken note and is beginning to take action and coordinate efforts. One indicator of current interest in ICT for the education of displaced children and youth—as well as the urgency of the Syrian crisis in particular—is the large number of recent high-level meetings on the topic. Moreover, several organizations have established “innovation labs”—physical or virtual spaces dedicated to identifying and applying new technologies to address existing problems or serve unmet needs. As shown in Annex 1, not only have the not-for-profit and tech communities organized innovation labs to address the MENA refugee crisis, but also large public international organizations, such as UNHCR and UNICEF.

The Peril and Pitfalls.

Education technology, even in stable and secure environments, has often fallen short of its promise. A recent report taking stock of current practice in countries of the OECD (Avvisati, 2015), documents that technology is increasingly present in schools. However, it may not be used much (certainly less than outside of school), it may not be used effectively, and it is difficult to discern its impact. For one, this is because the use of computers by students often correlates with many different things -- distraction, lower performance, increased absenteeism – out of which it is difficult to disentangle actual learning. On balance, the technology is not making a difference on student learning (at least as we measure learning today). This should not be surprising: simple access to technology makes little impact. Education technology in and of itself does not teach students, teachers do (of course, others do as well, including peers, students themselves, parents; etc.). So one key challenge highlighted by the report is how education systems must

² Another significant barrier is the motivation needed to study in such troubling times and context.

³ Source: www.internetworldstats.com

learn to use technology effectively, safely and equitably.

These challenges are all the greater in the context of the widely varying and typically unstable situations in which refugee children find themselves.

Education technology is certainly not a complete answer to the education crisis arising from conflict in the MENA region, but it has promise. There is a swirl of new activity among humanitarian and development agencies, NGOs, and the tech sector, searching for ways to apply ICT to the educational needs of displaced persons in the MENA region. It would be wrong to think of education technology as a single answer to a single problem, or even as a ready intervention. Rather, critical to each intervention is putting the right tools in the hands of the right people to meet the specific needs in a given environment. While this note emphasizes how important specific contexts are, there are also cross-cutting or foundational issues to which ICT could be applied, notably, mapping of populations and needs, training and collaboration of teachers, certification of student learning, and cost and availability of teaching materials (textbooks, lesson plans, and so on).

A Closer Look at Specific Needs

There are five main ways in which technology can provide educational solutions: 1) providing digital learning content; 2) delivering such content; 3) training and mentoring teachers; 4) facilitating school reentry; and, 5) improving management of education information.

Annex 1 contains an extensive, though not exhaustive, catalogue of initiatives currently underway or in preparation. It reveals that, on the one hand, there are many organizations involved—UN organizations, governments, NGOs large and small, and the technology sector -- though, on the other, that most of these projects are pilots or even mere ideas at very early stages of realization. The plethora of projects addresses a wide range of educational issues relevant to displaced children and youth—basic literacy and numeracy, including online games and readers; digital content for all levels of learning; life skills and vocational training; even psychosocial interventions. Yet, so far, with the exception of a few platforms such as Nafham that were created for learners in general, rather than displaced children, none have been implemented at scale. In some cases, resource repositories have already been created to house digital content at scale, for example, the Edraak massive open online courses (MOOC) platform and the OER Commons Arabic and Rumie LearnCloud repositories. However, these remain for the moment underutilized

Digital Content

There exists a growing cache of online educational resources in Arabic, from such sources as Nafham, Tahrir Academy, and the UNICEF-UNRWA Joint Education Program. In addition, some materials originally produced in English in North America and Europe, like the Khan Academy, have been translated and contextualized for use by Arabic speakers. Alternatively, MENA content providers, such as Nafham, have followed the Khan model in both format and pedagogical style, while others⁴ have created materials in English and French for general educational purposes. All these are for general use rather than in response to the needs of displaced persons.

⁴ such as the Talal Abu-Ghazaleh International University (Lebanon), the Education Media Company (Morocco), and Bibliotheca Alexandrina (Egypt)

Building from existing resources

Key to the low cost of ICT for education is the ease of replicating or repurposing existing resources and technology as well as exploiting unused capacities.

One example is UNRWA learning resources, which have now begun to be used in UNICEF's Home Learning Programme for grades 1–9.

Computer-aided language learning is another example where existing resources can provide a basis for assisting displaced learners, whether as a support for classroom instruction or for independent study.

An example is Duolingo, the popular language-learning app with several million subscribers. It has published findings from the City University of New York, documenting that beginning students of Spanish learned the equivalent of a semester-long college course in just 34 hours, using the app.

For Arabic speakers, however, so far Duolingo offers English and (in beta) French, German, and Swedish. The English and French apps for Arabic speakers could help young refugees in Lebanon succeed in public school, where the science curriculum, including the state exams, are in English or French. *Providing free Turkish instruction through an app like Duolingo could make it easier for Syrian refugees to enter school in Turkey.*

(Note: the World Bank does not endorse Duolingo)

As part of the worldwide 'open content' movement, many are licensed under Creative Commons, a system of copyright licenses which allows freely available educational content and tools to be revised, remixed, and redistributed at virtually no cost and without concern for copyright, other than acknowledging the original source. For example, materials may be translated into other languages, adjusted for use at different grade levels, sequenced differently, and so on.

The advantage of such Open Education Resources (OER) in crisis and conflict situations is that learning materials can be made available rapidly, at low cost, and adapted locally to specific target group needs. Moreover, this content could be distributed on memory sticks or through other offline methods as well as distributed virtually via cellular networks and the Internet.

Precisely because they are 'open', Arabic-language OERs could be incorporated into any learning platform, whether open or proprietary.

The creation of additional materials by Arab educators should be strongly encouraged. The most appropriate existing materials, in English or any other language could be translated or subtitled *with some effort* by a dedicated team or through such low-cost service providers as Amara (amara.org) or Taghreedat (taghreedat.com). These materials would be available not only for immediate use but also as a model for Arab educators.

Annex 1, in the section devoted to Digital Content, catalogues Arabic-language materials that are already available, whether produced by regional content providers or translated and adapted from other sources. It reveals, however, that, generally speaking, Arabic-language materials have not been curated, catalogued, and aligned to national curricula or teaching standards. A very small number of large collections exist (notably, Nafham and Arabic versions of Khan Academy), but teachers do not have simple, comprehensive access to available materials. Repositories of open educational resources would be invaluable, as such sites have the capacity to collect and curate content that is in the public domain or released under an intellectual property license that permits their free use and re-purposing. Open-access repositories have been built to accommodate Arabic-language materials (two in North America, one under development in Saudi Arabia); however, the amount of content housed in these sites so far is quite limited.

Content Delivery

Digital content can be delivered in many formats and in many educational contexts, whether formal, non-formal, or informal. Given the range and complexity of displacement in MENA, content delivery via ICT may make great sense. Two main avenues for the delivery of digital educational content are personal handheld electronic devices, such as smartphones, and "connected classrooms." Some believe that combining some form of connected classroom with basic teacher training and scripted lessons could greatly expand

the supply of credible private and non-formal education.

Mobile learning “Mobile learning” is learning of any type designed to take place via a personal handheld electronic device, such as a smartphone. Such learning is mobile because it is not confined to the classroom or home but can take place anywhere. Since it is not school-based, it can also take place at any time. In many cases, mobile learning also permits synchronous or asynchronous interaction with teachers and other learners. Mobile learning may be the preferred technology for informal and non-formal learning, which might take place individually, through social media, or in community centers.

Smartphones are widespread in the MENA region, even among refugees who have lost their homes and possessions. Mobile learning is, that said, constrained by the cost of cell phone subscriptions and mobile Internet. For that reason, many providers emphasize content that can be downloaded for offline use.

The “anytime, anywhere” capability of mobile learning is especially important for young people who are not able to leave home for safety or other reasons or who may be working. Moreover, access is easy and does not require much parental effort. This is important, because parents suffering from depression and post-traumatic apathy may not do much to advance their children’s education, even if they are convinced of its importance. In many cases, refugee households comprise a single adult (usually the mother) and many children. In Turkey, for example, where the largest number of Syrians have sought refuge, 70 percent of refugee households are headed by the mother alone (Liv Nordhaug, Norad, telephone interview). This makes it difficult for the mother to attend to any but the most basic needs. Interestingly, for this very reason, the Norwegian Agency for Development Cooperation (Norad) has directly aimed at households rather than schools in its recent ‘EduApp4Syria’ tender, which emphasizes an engaging ‘gamified’ approach to teaching children ages 5–10 to read.

As shown in the mobile learning section of Annex 1, the promise of mobile learning has attracted a wide range of actors: from large-scale public and private funders, such as Norad and the Maktoum Foundation, to very small NGOs, such as Aliim. Other NGOs with existing ICT resources and capacities originally developed for other parts of the world are also putting themselves forward as potential partners for the region. Though mobile learning holds much promise, the mobile learning projects identified in Annex 1 are very early in their development, typically in the planning or pilot stage. Moreover, little of the Arabic-language educational content mentioned in the previous section has yet been adapted for mobile use.

Connected Classroom Infrastructure ICT can of course be used for educational purposes within classrooms as well. In the refugee context, that may require special infrastructure, such as rapidly-deployable packaged hardware for education in emergencies. Such hardware generally features pre-loaded academic content, and sometimes connectivity solutions.

As described in Annex 1, UNHCR and UNICEF have developed kits, such as UNICEF’s “Digital School in a Box,” to respond to emergency situations in various world regions, including MENA. In addition, the not-for-profit education sector is developing connected classroom infrastructure specifically for MENA. Approaches such as that of the LearnSyria project, which provides low-cost computer tablets with pre-loaded academic content, hold promise as an efficient and flexible content-delivery mechanism.

Other technology solutions, such as the Open Learning Exchange’s Open Learning Kit (see: <http://ole.org/mena/>) and Ushahidi’s BRCK technology and Kio Kit (see: <http://education.brck.com/>) have been deployed in other regions but not yet in MENA.

Expanded private and non-formal education Another modality of computer-assisted learning that has been suggested is hyperlocal, small-scale, low-cost schools. This might be seen as an extension of the connected classroom concept, combining it with teacher training and mentoring, digital content, and possibly even scripted lessons. These schools might be led by refugee teachers or by community teachers (educated volunteers who do not have formal training as teachers), who would get some initial training, ongoing support, and a kit consisting of a projector, curated digital content, and basic classroom supplies.

Similar community- or home-based schools (*without* the technology) have been used effectively for Afghan refugees in Pakistan, South Sudanese refugees in Kenya, and Rohingya refugees in Malaysia (Dryden-Peterson 2011; UNHCR 2015b), and the practice is widespread in some developing countries, outside of the refugee context. Similar community-based schools *with* an added technology component have shown improved learning outcomes in developing countries (Power et al. 2014).

It is also worth considering how to effectively engage the broader set of ICT communities in finding ways to address the education and skills crisis faced by refugees. Some of the host countries (as well as the countries of origin, as in the case of Syria) are home to a burgeoning tech-entrepreneurial ecosystem. These companies could draw on rapid technical skills training that can quickly upskill the refugee population. There is an emerging trend in such rapid training focused on web development, web design and data analytics etc., which are now expanding to emerging markets as well as the refugee contexts. Some of these are called “coding bootcamps” that offer full-time training over 2-4 months at various skill and educational levels.

Teacher Training and Mentoring

Although ICT has many capabilities for supporting learning, it is not a complete solution to the educational needs of displaced children and youth. Moreover, none of the digital solutions described above are likely to be effective in the absence of dedicated and trained teachers. Teachers are central to learning, particularly in the case of refugee education. To use ICT effectively, teachers – whomever they may be, formally recognized teachers, informal teachers, untrained volunteers -- need special training, and to manage the special circumstances of refugee education, even experienced teachers can benefit from training in psychosocial counseling, differentiated instruction, and management of large classrooms with pupils of different ages.

A recent global review of ICT for refugee education (Creative Associates International 2016) noted two important points: first, ICT program designers can work with local authorities to strengthen teacher training; second, ICT can serve teachers in a variety of other ways, helping them track students and manage and monitor learning; connect with their peers via SMS or social networks to share knowledge and offer support; and access psychological services to aid students who are suffering from post-traumatic stress and trauma.

Only rudimentary steps have been taken so far in teacher training and mentoring. For the most part, ICT-enabled teacher training has been a component of a few tightly targeted projects related, for example, to entrepreneurship or computer programming. A single more robust ICT-enabled teacher training approach is seen in UNICEF’s Raspberry Pi for Learning Initiative (Pi4L). This program is built around four learning tracks delivered both offline and via small computer labs. Three of the tracks are optimized for students and one is focused on teachers and teacher-trainers. These teacher training courses, together with training kits for community teachers and teacher-trainers, are delivered by the International Education Association with oversight and accreditation by The College of Teachers in London.

Experience in other world regions demonstrates that ICT has much more to offer to teachers in refugee situations. Dahya (2016), for example, documents three promising examples of using ICT to train teachers of refugees—one from Iraq and two from Kenya.

1. In the Kurdish region of Iraq, the International Rescue Committee has launched ‘Connect to Learn’ in ten schools in the Domiz refugee camp. The project engages 160 Syrian teachers in professional development via a cloud-based server, with a particular focus on psychosocial training. The ICT system provides access to training materials, including YouTube videos, to support children affected by conflict. Technology also enables the ‘Connect to Learn’ teachers to form learning circles and share information and experience (peer-to-peer learning).
2. In addition, technology can enable ongoing expert mentoring. As part of the global Refugee Teacher Working Group initiated by UNHCR, Teachers College is leading an effort to develop a new teacher training pack for previously untrained refugee teachers recruited to provide education to the children living in the camps. The training, piloted with twenty teachers in the Kakuma Refugee Camp in Kenya, involves a ‘mobile mentoring’ prototype. Good teaching practice among the novice refugee teachers is captured on low-tech cameras and smartphones to demonstrate what is possible, even in spite of challenging classroom environments. Ongoing SMS messaging engages the teachers and reinforces training, and allows teachers to ask questions and request help and advice.
3. Another example of even greater computer-enabled teacher training comes from the Dadaab Refugee Camp in Kenya. Borderless Higher Education for Refugees (BHER), a consortium of Kenyan and Canadian universities, provides technology-enabled training to teachers there. Approximately 60 per year complete the program and receive an accredited Certificate in Educational Studies from York University in Toronto.

Facilitating Formal Schooling

In addition to delivering educational content to students and teachers, ICT can facilitate the re-integration of displaced children and youth into formal schooling in their country of refuge. In part, this is simply a matter of refreshing lost knowledge, re-establishing study habits, and so forth. But education technology can improve the efficient use of school facilities, provide new ways to document learning, and improve administration.

Bridging: supporting the movement back to formal schooling. The displaced—adults and children alike—are subject to post-traumatic stress. Many children who have lived through trauma find it difficult to return to schooling or even to concentrate. ICT may be able to play a role in easing the return to formal schooling. This could take the form of accelerated ‘catch-up’ programs, refreshing pupils’ knowledge, helping them revive the habits of study and ability to concentrate, guiding them and their parents in regard to enrollment procedures and preparing for placement examinations.

In this regard, there have been calls to provide better information to parents on how to enroll their children in the national school system. One approach is to facilitate communication among parents via social media.

Reducing pressure on school facilities. While public schooling in the Arab countries, both rich and poor, has not produced strong learning outcomes, as shown in a review of PISA, TIMSS, and PIRLS⁵ data for thirteen Arab countries (Steer, Ghanem, and Jalbout 2014), school performance is likely to decrease even further

⁵ PISA stands for Program for International Student Assessment; TIMSS stands for Trends in Mathematics and Science Survey; PIRLS stands for Progress in International Reading Literacy Study.

when it has to move to double-shifting to meet the needs of refugee populations. Aside from overcrowding and other problems, double-shifting often entails reduced classroom hours. Since ICT can enable off-site learning, it is possible that it can compensate for lost classroom time and relieve pressure on school facilities (provided the necessary, complementary support eco-system for out-of-school learning with ICTs is in place). The ‘Learn Syria’ initiative piloted by Rumie already claims this as an outcome.

Documentation/certification of learning and achievement. Diplomas and certificates are seen as an indispensable link between schooling and employment in the MENA region and provide major incentive to school attendance. Hence, the difficulty that refugee students have in obtaining certification of their learning is a major hindrance to schooling. Without a clear path to a diploma or other certification, the motivation of Syrian school pupils and their families, already facing profound uncertainty, may flag. Children, already facing substantial difficulties (unsafe walk to school, bullying, and so on), may drop out. Moreover, inasmuch as refugee families, especially those in urban areas, are frequently on the move, trying to improve their situation (e.g., relocating to cheaper housing or to reunite with relatives or neighbors), the issue of certification is doubly complicated. It would thus seem sensible to address the issue of documentation of learning, perhaps creating a standard basic (3 R’s) curriculum for emergency situations, which could be adapted to specific crises. A competency-based approach to certification would be ideal, especially if mapped to national curricula. A RAND report on the Syrian crisis made a similar observation in regard to Jordan, Lebanon, and Turkey (Culbertson and Constant 2015, 25–26).

Since the introduction of such a major addition to global education would likely take many years, if it is possible at all, a more realistic step in the nearer term would be to develop a list of simple competencies available to parents and students stating what they should be able to do at different ages, supplemented with simple assessments and links to online learning. The simplified age-based benchmarks (perhaps in the form of ‘I can’ statements) might be based on internationally recognized systems, such as TIMSS/PIRLS, PISA, or others.

Information Management Systems. Education Management Information Systems (EMIS) store system-wide education data, aid policy and planning, and monitor indicators and outcomes; Learning Management Systems (LMS) may be used to deliver a course, communicate with students, monitor their performance, and maintain records. Clearly, this software could play a central role in refugee contexts and, indeed, efforts are now underway to improve systems in this way to support provision of educational services to refugees. One example is YOBIS (<https://yobis.meb.gov.tr/>), a data management system, created by Turkey’s Ministry of National Education and UNICEF, which documents demographic data of non-Turkish students and tracks their education records (and health records). This appears to be a supplement to the ministry’s existing national EMIS. In the context of the refugee crisis, national information management systems could also benefit from innovative data collection technologies. The RAND study, for example, makes an interesting recommendation to develop a plan to make strategic use of more available school spaces, using geographic information systems (GIS) to map where the school-age refugees are in relation to available school spaces in the host countries. (Culbertson and Constant 2015). Some additional technologies described in Annex 1, such as Tangerine, Open EMIS Refugee, and sQuidcard, could contribute to these efforts.

Evidence of Effectiveness and Guidelines for ICT for Refugee Education

Currently, there is a significant lack of evidence on the effectiveness of ICT in refugee education, which should not in fact be surprising given the context. While a number of studies have shown some effectiveness, they cannot yet constitute a robust body of knowledge such that agencies, humanitarian

organizations, and NGOs would know which computer-based learning interventions would be most effective.

Several recent reviews exist (Dahya 2016, Burde et al. 2015; Carlson 2013), though all warn that the available literature is quite limited and that the studies and information sources reviewed generally fall far short of the 'gold standard' of independent, peer-reviewed evaluations with carefully randomized experimental trial designs. Much of the information comes instead from the implementers themselves, which inevitably implies conscious or unconscious bias.

Establishing annual independent sample testing of refugee learners using a variety of student assessment tools is needed. Indeed, Dahya (2016) calls for randomized control trials and quasi-experimental designs, like in any other field of research. In addition, theory related to education and technology in conflict and crisis, as well as qualitative research documenting meaningful participation and outcomes for target groups, are also needed. These, it must be pointed out, are expensive however. Perhaps a combination of rapidly prototyped pilots combined with more effective forms of M&E could offer a golden medium?

In the meantime, lacking a robust evidence base, leading researchers and practitioners⁶ have formulated design principles that can provide guidance. These are given in Annex 2, though the following main principles recur often:

Objectives

- Have clarity of purpose before adopting ICT
- Ensure that the technology will add value to existing solutions
- If a lower-cost technology is available to solve a particular problem, use it instead

Context-specific, fit for purpose design

- Start with a strong contextual analysis that looks at access, quality, and protection
- Design with the user in mind
- Learners need content that meets their academic, linguistic, and skill needs. Use a human-centered design process with users.
- Support a diversity of approaches to supplement traditional education access
- Design for scale; Build for sustainability
- Be data-driven
- Work with the policy and economic constraints of the host labor market
- Mobilize predictable medium- to long-term financing that flows through an agreed coordination structure
- Identify accreditation and certification mechanisms

Technology

- Optimize programs for smart mobile devices (phones and tablets)
- Ensure programs work without Internet, but are Internet-ready when the time comes
- Ensure reliability and sustainability of technology

Content

- Take advantage of the growth of open/free content⁷ movement by finding ways to support its use by teachers in the field

6 Creative Associates International (2016), Dahya (GIZ, 2016), Jalbout (Global Business Coalition for Education, 2016), DFID Discussion Paper (2015), Power et al. (DFID Educational Technology Topic Guide, 2014), Carlton (USAID, 2013), and Winthrop and Smith (Brookings Institution, 2012)

7 Even if this content may not be entirely 'free,' as there are costs of adaptation and use, it is still good value for money.

- Prioritize open-source development and user-generated content
- Address privacy and security

Teacher Training

- Focus on teacher development and pedagogy, whomever those ‘teachers’ may be (formal, informal, volunteer adult)
- Build mentorship structures when and wherever possible for both teachers and students
- Be collaborative (donors, tech companies, NGO’s).

M&E

- Increase coordination and monitoring and evaluation of programs
- Build evidence and data on impact and invest in innovation
- Reuse and improve

Conclusion

ICT is no “silver bullet” solution to the conflict-related education crisis in MENA, though it could potentially be part of ‘solutions’ to various aspects of the question. As we have seen, it holds promise in improving *what* is delivered (through digital resources), *how* it is delivered (via content delivery), in teacher training, and in facilitating formal schooling. In the absence of an evidence base on the effectiveness of ICT in refugee education, however, much depends on how wisely it is adopted following currently emerging guiding principles.

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Annex 1: Projects under Development or Underway

The following is a list of projects currently underway or under development, using digital technology for education in the MENA region, including those specifically aimed at assisting children and youth displaced by conflict. The project descriptions have largely been taken from the websites of the organizations and projects and not always checked for accuracy.

The projects are divided into the following categories:

- Mobile Learning;
- Content Providers/Open Educational Resources;
- Tablets/Connected Classroom Infrastructure;
- Innovation Labs;
- Learning Management Systems; and
- Curricula.

Mobile Learning

Aliim

Smartphone Schools Program (Lebanon and Jordan)

<http://aliim.org/>

Aliim leverages technology and mentorship to provide greater access to safe, quality, and relevant educational opportunities for refugees and marginalized youth affected by conflict or living in post-conflict settings.

Aliim's Smartphone Schools Program is the first mobile learning program that aims to empower Syrian refugee girls aged 12–16 living in the Levant or migrating to other regions of the world, to continue their education and access better economic opportunities through technology and a global network of mentors. Aliim follows a theoretical framework to contextualize its curriculum so as to better address the specific needs of Syrian refugees—with a focus on girls—and adapt to the resources available in a particular conflict-affected setting.

This new program emphasizes conflict resilience and life skills, including basic literacy, numeracy, English language, and entrepreneurial skills. Aliim believes that these skills will serve as the building blocks for reconstructing individual lives, helping communities get back on their feet, and paving the way for new economic activity to flourish after war.

The project is still in its early stages, but it has developed curriculum in partnership with Syrians, created the pilot program plan, and developed the app wireframe and user experience design.

Creative Associates International & Et4d

Iqra

<http://www.et4d.com/>

A smartphone app for early-grade reading and learning, Iqra will have three key components: learning to read in Arabic, practicing with activities, and reading stories.

Mohammed bin Rashid Al Maktoum Foundation (Dubai)

A pilot project will load the best coursework on offer—in mathematics, science, foreign languages, and literature—onto a mobile phone and place it in a student’s hand. The Maktoum Foundation’s project is based on ‘Ustad Mobile’, a project originally piloted in Afghanistan (<https://www.ustadmobile.com/>). The new project for Syrian refugees will be designed for low-end smartphones rather than feature phones, the most basic mobile phone. The Ustad Mobile system works without requiring a mobile signal while in use, which makes it suitable for even the most difficult regional situations. Ustad Mobile allows not only for access to existing educational content but also for content creation using a downloadable editor. Ustad also has the ability to track usage and progress among students and teachers, allowing for remote analysis of the usage data.

This is evidently a new program under development, as the only information available on the web is a mention in an editorial by Gordon Brown, UN Special Envoy on Global Education.

Norwegian Agency for Development Cooperation (Norad)

EduApp4Syria Competition

<http://www.norad.no/en/front/thematic-areas/education/innovation/eduapp4syria/>

Norway is leading an initiative to develop a smartphone application that can help Syrian children learn how to read and improve their psychosocial wellbeing. This is taking the form of an international innovation competition in cooperation with the Norwegian University of Science and Technology (NTNU), All Children Reading: A Grand Challenge for Development, the mobile network operator Orange, and the INEE.

The innovation competition required bidders to submit an app prototype as well as a YouTube video in addition to traditional tender documents. Moreover, bidders were expected to create open-source products and license them under Creative Commons license (CC-BY). In spite of the unusual requirements, Norad received 79 bids from 31 countries, including MENA countries.

Norad will fund 1–2 apps, not only their initial launch but through several iterations and improvements based on user testing and feedback. The apps are aimed for homes rather than classrooms and are not tied to any particular curriculum. They are to be downloadable for offline use. The design goals are that the games be seen by parents as appropriate and relevant, and by children as engaging and immersive, with game qualities, rapid feedback, and clear goals.

Olé: Open Learning Exchange

Open Learning System

<http://ole.org/mena/>

<http://ole.org/2016/02/ole-iea-partnership-agreement/>

Olé’s Open Learning System is designed to improve the quality of teaching, provide high-quality OERs, and support frequent monitoring of the progress of students and their schools. The Open Learning System works off the Internet and can function with locally generated power. An Open Learning Kit includes a low-cost, user-friendly Basic e-Learning Library (BeLL) and a personalized LMS, integrating mother tongue and English as a Second Language instruction. The kit is a library on wheels, lockable, easily portable and is able to function in areas with limited Internet connectivity and power.

This project has evidently not been launched yet, as the MENA page on Olé’s website includes the following statement: “We are seeking a partner with whom we can join forces, share our knowledge and resources, and thereby improve the quality and access of critical learning resources for all of the children.”

Pearson and Save the Children

Every Child Learning

<http://www.savethechildren.org.uk/about-us/who-we-work-with/corporate-partnerships/our-partners/pearson>

This partnership between Pearson and Save the Children foresees such technology-assisted solutions as:

- Development of mobile education solutions which are unrestricted by borders, and enable continuity of learning by overcoming barriers such as limited classroom space and high student-teacher ratios;
- The development of a condensed and modified curriculum that can be delivered without shipping textbooks and extensive teaching materials; and,
- Solutions to grading tests for a qualification when the logistics of a national marking system are not in place and children lack formal school records.

Worldreader

Worldreader Mobile

<http://www.worldreader.org/>

Worldreader is on a mission to bring digital books to every child and family, so that they can improve their lives. Worldreader reaches readers in 69 countries, providing them with 28,514 book titles in 43 languages—but not yet Arabic.

Worldreader Mobile is a single place to discover, read, and collect free e-books in a variety of languages, from different parts of the world. It has storybooks that can be read to children, gives access textbooks that can help with assignments, or look up important health information that one has been curious about. Worldreader Mobile is available on any Internet-enabled mobile phones, including on the simplest feature phones.

Content Providers/Open Educational Resources

K-12

Ashabona

<http://www.ashabona.com/>

Elementary educational games (grades 1-6, plus introductory Arabic for non-native speakers)

Center for Educational Research and Development (CERD), Lebanese Ministry of Education and Higher Education

<http://www.crdp.org/ar>

CERD is a national organization charged with modernization and development of education, based on educational planning, in collaboration with all stakeholders in Lebanon. CERD’s website provides online access to national course curricula as well as approved textbooks. The website contains materials in Arabic, English, and French, but not all materials are available in all three languages.

Institute for the Study of Knowledge Management in Education (ISKME)

OER Commons Arabic

<https://arabic.oercommons.org/EN/>

OER Commons Arabic, a microsite of open educational resources, can be aligned to various sets of educational standards. The site features Arabic-language capability, authoring tools, and a discussion/blog space. So far the site has focused on Arabic language and science and math, with content from MIT Blossoms, PHeT Interactives, and (in Arabic-language translation) Khan Academy.

ISKME also maintains a hub on its main site dedicated to learning Arabic: **<https://www.oercommons.org/hubs/arabic-language>**. While there is considerable overlap with OER Commons Arabic, the hub includes some additional materials.

Intel

Skool Egypt

<http://www.skool.com.eg/Default.aspx?tabid=87>

A set of Arabic-language learning objects and simulations for mathematics, biology, chemistry, and physics at primary, preparatory, and secondary levels, with guidance for teachers and parents.

Al-Jazeera

Creative Commons Repository

<https://archive.org/details/aljazeeramedia>

Launched in 2009, the Al-Jazeera Creative Commons Repository hosts select broadcast quality media that Al Jazeera has released under various Creative Commons licenses. Video footage, as well as photographs from Al Jazeera's Flickr Feed, is available free of charge to be downloaded, shared, remixed, and subtitled for noncommercial purposes, including education.

Learning Equality

KA Lite

learningequality.org/ka-lite/

Open-source software that mimics the online experience of Khan Academy for offline situations. Running KA Lite as a local server, you can watch Khan Academy videos, do Khan exercises, and track student progress—all without an Internet connection. KA Lite is already being used UNESCO's Pi4L project, described below.

Little Thinking Minds

<https://www.littlethinkingminds.com/index.php?q=ar>

Educational content for Arab children under 7.

Maktaba Children's Library

<http://www.maktabaqatar.org/>

Maktaba's mission is to inspire children and their parents to fall in love with books and reading. By focusing on the value of reading for pleasure as a tool to improve literacy, encourage curiosity, and foster intercultural dialogue, Maktaba aims to contribute to the continuing development of communities in Qatar

and throughout the region. Simply put: through books and play, Maktaba Children's Library will help bring imaginations to life.

Maktaba Mobile is an interactive virtual library aimed at young Arabic readers worldwide. Designed to promote Arabic literacy and foster intercultural dialogue among Arab youth, the web portal and mobile app provide a virtual library which is complete with fun and interactive learning resources.

Massachusetts Institute of Technology

BLOSSOMS

https://blossoms.mit.edu/videos?field_topic_value_many_to_one=All&term_node_tid_depth=62&term_node_tid_depth_1=All

BLOSSOMS video lessons are enriching students' learning experiences in high school classrooms from Brooklyn to Beirut to Bangalore. The BLOSSOMS video library contains over 100 math and science lessons—including about 50 in Arabic—all freely available to teachers as streaming video and Internet downloads and as DVDs and videotapes.

Every lesson is a complete resource that includes video segments, a teacher's guide, downloadable handouts, and a list of additional online resources relevant to the topic. Each 50-minute lesson builds on math and science fundamentals by relating abstract concepts to the real world. The lessons intersperse video instruction with planned exercises that engage students in problem solving and critical thinking, helping them build the kind of gut knowledge that comes from hands-on experience. By guiding students through activities from beginning to end, BLOSSOMS lessons give students a sense of accomplishment and excitement.

MIT faculty members and partnering educators in Jordan and Pakistan created the first BLOSSOMS lessons, and today educators from around the world create and submit BLOSSOMS modules.

Nafham

<http://www.nafham.com/>

Nafham is a free online K-12 educational video platform that provides students with 5- to 15-minute crowdsourced educational videos, covering their official public curriculum organized by grade, term, subject, and academic schedule. The platform currently has more than 23,000 videos covering Egyptian, Saudi, Kuwaiti, Algerian, and Syrian curricula and is available online through the website, mobile apps (Android/iOS), and the smart TV app. To date more than 5,000 videos have been crowdsourced.

In the MENA region, providing quality digital materials that cover every lesson delivered in K-12 schools requires a huge effort that cannot be handled by a small or medium-size organization. Nafham has based its business model on building partnerships with the private sector and other organizations as well as online advertising. Videos can be curated by Nafham staff or crowd-sourced by teachers, parents, or students themselves. Nafham uses crowdsourcing as a tool to collect, edit, and deliver materials in video format accessible to all.

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PhET Interactive Simulations, University of Colorado

Arabic-Language Science Simulations

<https://phet.colorado.edu/en/simulations/translated/ar>

Founded in 2002 by Nobel Laureate Carl Wieman, the PhET Interactive Simulations project at the University of Colorado - Boulder creates free interactive math and science simulations. PhET simulations are based on extensive education research and engage students through an intuitive, game-like environment where students learn through exploration and discovery. More than 100 simulations in chemistry, physics, and mathematics are available in Arabic.

Rumie

LearnCloud

<http://learncloud.rumie.org/>

Rumie's LearnCloud is a crowdsourced open repository of free learning resources in many languages from around the world. LearnCloud backs up Rumie tablets, which contain preloaded learning materials for Syrian refugees.

Kingdom of Saudi Arabia

OER Repository

<http://oer.elc.edu.sa/?q=en/oerrepo>

The Saudi Ministry of Education has launched a national OER program that enhances educational content to support college education. The program seeks to find a sustainable path to partnership in the design, improvement, maintenance, and enhancement of the quality of digital educational content. The program will contribute to the provision of more educational opportunities for those who speak Arabic. This will be achieved through partnerships with leading international and Arabic institutions to build a digital repository, localize OER, and build high-quality Arabic educational content. In addition, it will open the way for academics and students in the Middle East to enrich content through a well-defined process of ensuring quality.

The OER repository will offer a sustainable and productive environment that supports Open Educational Practices (OEP) and enhances the credibility and reliability of the content that such an environment produces by fulfilling the needs of participants. The OER repository will provide numerous methods to facilitate the participation of those involved in utilizing available resources to enhance the creativity, innovation, and exchange of experiences in designing, developing, and improving processes, as well as establishing a community of practice by following an open approach and sharing digital resources.

Tahrir Academy

<http://tahriracademy.org/>

Although Tahrir Academy was shut down in 2015, its website remains. The website features more than 400 educational videos classified into courses in subjects ranging from physics and astronomy to Arabic grammar. A not-for-profit online collaborative learning platform, Tahrir Academy built an Arabic-language video library to provide educational content to 13- to 18-year-olds, with its main focus on Egyptian youth. During its first year, Tahrir Academy achieved more than 2.5 million views on YouTube.

Tahrir Academy was founded in 2012 by Wael Ghomri, an Egyptian digital pioneer, internet activist, and Google executive, with a stated mission to "foster community-based learning by promoting a culture of knowledge-sharing through the power of the Internet."

To fulfill its mission, Tahrir Academy aimed to empower a network of community clubs that depend on crowdsourcing. The framework encouraged bringing together people of a wide variety of backgrounds, interests, and skills interested in pooling their collective knowledge, skills, and resources to create educational content.

UNICEF

Sahabati ('My Cloud')

One initiative now under development is *Sahabati* ('My Cloud' in Arabic), the virtual school for education in crises. Originally conceived for countries affected by the Syria crisis, *Sahabati* is designed to provide children and adolescents affected by conflict in the region with the opportunity to continue their education and receive certification for their learning, irrespective of their location and the schooling time they have lost.

The initiative will be rolled out through an online learning platform that will host an Arabic-language curriculum of four core subjects: Arabic, English, mathematics, and science, with a system of online assessments and certification.

UNICEF Lebanon

Raspberry Pi for Learning Initiative (Pi4L)

<http://www.unicefstories.org/2014/05/08/raspberry-pi-for-learning-initiative-pi4l/>

The Pi4L program is built around four learning tracks delivered both offline and via small computer labs. Three of the tracks are optimized for students and one is focused on teachers and teacher-trainers. The learning platform will be built on a Raspberry Pi hardware/software combination that includes distributions of Raspbian (the operating system) and associated teaching software, together with dedicated content curated for primary, secondary, and remedial students. The system will be optimized for offline delivery such that at the most basic level it can function as a content and continuing education delivery tool.

Pi4L Student Tracks

- 1. Core Skills Modules (ages 6–12):** Literacy, numeracy and science (KA Lite content).
- 2. Technology Applications (ages 5 – 18):** Learning to Code and Coding to Learn. Develop hard skills by providing coding instruction as a vehicle for learning.

Teacher Track

- 3. Continuing Education and Certification for Teachers:** Quality Assurance and Certification by The College of Teachers, London, United Kingdom.

Teacher training courses and together with training kits for community teachers and teacher-trainers delivered by International Education Association with oversight and accreditation by The College of Teachers in London.

UNRWA YouTube Channel

<https://www.youtube.com/user/unrwatv>

Teacher Training

DOT Lebanon

No Lost Generation Project

<https://lebanon.dotrtrust.org/>

Since 2003, Digital Opportunity Trust (DOT) Lebanon has delivered training programs that equip vulnerable populations and people with entrepreneurship and technology skills. DOT Lebanon's programs are delivered by new graduates from Lebanese universities (DOT Interns) who act as trainers, mentors, and coaches and become ambassadors of change in their communities.

DOT has collaborated with World Vision Lebanon and Tabshoura, an online alternative learning tool (see Tabshoura entry below), on the ICT in education project "No Lost Generation: No Syrian child is left behind," providing training to teacher facilitators and NGO staff.

UNICEF Lebanon

Raspberry Pi for Learning Initiative (Pi4L)

<http://www.unicefstories.org/2014/05/08/raspberry-pi-for-learning-initiative-pi4l/>

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Teacher Track

Continuing Education and Certification for Teachers: Quality Assurance and Certification by The College of Teachers, London, United Kingdom.

Teacher training courses, together with training kits for community teachers and teacher-trainers, delivered by International Education Association, with oversight and accreditation by The College of Teachers in London.

The program will have a particular focus on those working to meet the needs of children who have had their studies interrupted or have otherwise left the school system. The teacher training course and the teacher kit will be developed in collaboration with The College of Teachers in London. The College of Teachers will also provide quality assurance, standards oversight, and a certificate of completion for those who successfully complete the training program.

Higher Education

Borderless Higher Education for Refugees

<http://refugeeresearch.net/ms/bher/>

Jesuit Commons – Higher Education at the Margins

<http://www.jc-hem.org/>

JC:HEM is a collaborative global partnership comprising organizations, institutions, companies and, above all, people, to provide tertiary education to those who would otherwise not have access to higher learning opportunities. It draws on the rich and centuries long Jesuit tradition of higher education and through a blended on-site and on-line approach mobilizes the resources of Jesuit and other worldwide networks of educational institutions.

Work accomplished from many volunteers, strong on-site and virtual partnerships, a lean executive team and the commitment from the students over the past five years continues to move JC:HEM forward in achieving its mission to “Transform Thinking. Transform the World.”

JC:HEM operates sites in Amman and Aleppo.

Kiron University

<https://kiron.ngo/>

Founded on the belief that the future of higher education is blended learning, a combination of offline and online education, the study program at Kiron has two component parts.

First, students participate in two years of online study, from anywhere in the world and according to their own schedule. Kiron’s innovative online platform offers rigorous and interactive courses, with five study tracks to choose from. The university works with NGOs to provide internet access and study hubs in many countries worldwide, and sponsors the purchase of laptops and other hardware for studying.

After completing the online study phase, and once their residence status has been finalized, students then complete their degree with a year at one of our partner universities, with a choice of 23 universities in diverse locations. These partner universities award credit points for many of Kiron's online courses, meaning that they count towards the final degree.

The Kiron vision is not just to overcome the obstacles that refugees face in accessing university but to build a better, more human-centered university that fosters personal growth. Our students benefit from access to psychological counseling, mentoring programs, and student support services. We collaborate with corporate organizations in host countries to provide internships and trainee programs for our students, to help them make a seamless transition into work.

Talal Abu-Ghazaleh Organization (Jordan)

<http://www.tagorg.com/?lang=en#>

Talal Abu-Ghazaleh International University

<http://www.tagiuni.com/>

Talal Abu-Ghazaleh International University (TAGI-UNI)—“the digital university of the world”—is the people’s gateway to the world’s best education, promoting global citizenship and individual responsibility. Under its mission “to make accredited educational programs accessible to everyone, everywhere,” TAGI-UNI uses partnership as its modus operandi—comprising a network of universities, NGOs, training institutions, and language schools—to deliver comprehensive education to a global student body. Thus, digital education provided by international institutions compels individuals to understand their interdependence and their interconnected roles in the modern world.

With its vision of “world-class education as a human right,” Talal Abu-Ghazaleh University seeks to democratize education through a system of channels to open students’ dialogue with one another,

therefore putting the quality of interaction in their hands. TAGI-UNI makes it possible for the transforming societies to embrace new concepts emerging from the ground up, given that accessibility to education is paramount for maximizing these societies' potential. Talal Abu-Ghazaleh University provides boundless world-class higher education across the globe to learners who may be unable to afford the costs of travel and allows them to engage in critical analysis of their experience and offer recommendations to improve the system of education. Not only is the popularity of programs reflected on the university's portal, but also their utility and relevance to the job market's needs. In addition, a range of global awareness programs facilitated by various NGOs and international bodies and aimed at providing education needed for global citizenship, is available for all TAGI-UNI students.

UNESCO

Jami3ti ("My University")

<https://amman.unesco.org/home/index?lang=1>

This website provides a single online platform for dissemination of relevant information to those that are either seeking or providing higher education opportunities or services. Jami3ti addresses the need for better understanding the demands for higher education of displaced Syrian youth in Jordan.

Platforms

DFID & sQuidcard

sQuid e-learning and monitoring software

<https://www.squidcard.com/products-solutions/education-learning/learning-development>

Working with DFID, sQuidcard has created an interactive learning platform, digital content, and a sQuid Checkin to monitor school attendance.

Education Media Company (Morocco)

Secondary school students in Morocco often struggle to find relevant information about the different career options they have, procedures they have to follow after high school, and exams they need to take to enter a certain school or university, among others. Education Media Company (EMC) was created in 2008 by a group of high school students to fill the information gap through online services. Today, it aims to become the first online career guide in Morocco.

Education Media Company mainly operates through three websites:

- 9rayti.com is EMC's first website. Launched in 2008, its main objective was to provide course notes and exercises for secondary school students to adequately prepare for the Moroccan Baccalaureate (Morocco's national secondary school diploma).
- Concourat.com was launched in 2013. This website is specifically designed for students preparing for post-Baccalaureate exams. In particular, EMC focuses on the entrance exams of the most popular schools in Morocco.
- Prepabac.ma aims to provide similar content as Concourat.com but adapted to secondary school students preparing for their Baccalaureate and Regional examination—the other main exam that secondary school students have to take in Morocco.

Global Learning International FZ-LLC (Dubai)

Learning.social Cloud Campus

<http://learning.social/>

Learning.Social is an easy-to-use social learning platform with thousands of sessions, expert tutors, and a growing community of learners. The service offers a primary school package, secondary school package, and business skills package from \$10-\$12 per month.

International Rescue Committee

Innovative education: Mainstream school systems in neighboring countries cannot cope with the refugee influx; and, with more than 80 percent of refugees living in urban areas rather than in camps, there is little point to focusing on camp-based models of teaching. Instead, a more informal system, supported by networks of local and refugee teachers—a model that was successfully pioneered in Congo and Afghanistan—can provide accredited learning.

Exploiting technology: Syrians are generally literate, numerate, and technologically sophisticated. A pioneering social-networking platform called Tawasul ('Connection'), established by the International Red Cross and the nonprofit news organization Internews, has been set up to help refugees help one another through the exchange of information and advice.

ITWORX Education

e-Learning Program for Young Syrian Refugees in Lebanon

In its longstanding mission to transform education through technology, ITWORX Education, a market leader in education technology solutions that address the needs of K-12 education institutions worldwide, has launched an innovative and holistic e-learning solution for underserved and underprivileged Syrian refugee children in Lebanon.

A non-traditional educational initiative that capitalizes on the power of simple mobile technology, the solution is designed to provide extended access to self-learning opportunities that address the needs, challenges, and potential of Syrian refugees.

At the center of the ITWORX Education solution, WinjiGo, an e-learning platform that enables an unlimited learning experience, connecting displaced children to sustainable educational opportunities. Building on its transformative and international potential for cross-border education, the education project will run in partnership with the Global Business Coalition for Education (GBC-Education).

In September 2015, ITWORX Education piloted a successful virtual schooling experience with the Saad Nayel School, located in a refugee camp in the Lebanese city of Shtoura, near the Syrian border. Going forward, it hopes to replicate this success for other Syrian refugee camps across Lebanon and the region.

Kezakoo.com (Morocco)

An online platform (in Arabic and French) that uses e-learning to fulfill the educational needs of students by increasing their access to accurate knowledge and consequently improving their academic performance. Kezakoo.com targets students enrolled in the Moroccan system at the primary, secondary (middle and high school), and tertiary (college and university) levels. Kezakoo.com's long-term plan is to become a large crowd-learning platform for students in Africa and the MENA region, which will enable them to create their own quality content with an incentive system based on rewards.

Lebanese Alternative Learning

Tabshoura

<http://tabshoura.com/>

Tabshoura is a free trilingual (Arabic, English, French) e-learning platform that complements secondary levels of the official curriculum of Lebanon with video and audio lessons, quizzes, and feedback on the learner's responses. All courses are available in all three languages.

Lebanese Alternative Learning is an NGO that developed from the Department of Education at St. Joseph University in Beirut.

H.H. Sheikh Sultan Bin Khalifa Al Nahyan Humanitarian and Scientific Foundation (United Arab Emirates)

Shamsun Al Arabia

<http://www.shamsunalarabia.org/>

To support students studying in Arab universities, Shamsun Al Arabia provides Arabic translations of MOOCs from prestigious international universities such as MIT and Yale.

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Qatar National e-Learning Portal

<http://www.elearning.ictqatar.qa/>

The Qatar National e-Learning Portal is an innovative platform dedicated to sharing knowledge to educate our people and strengthen our economy. The portal provides access to online courses covering topics in information technology and business. e-Learning is a fun, new way to learn that features a smart blend of virtual interactions alongside self-paced lessons.

Currently, the service is available to residents of Qatar only, and so far all materials are in English. It aims at adult learners, with courses in information technology and business. The portal offers more than 2,500 courses.

Queen Rania Foundation for Education and Development

Edraak

<https://www.edraak.org/>

Edraak is an educational initiative to bring MOOCs to the Arabic-speaking world, developed by the not-for-profit Queen Rania Foundation for Education and Development. The foundation, headed by Her Majesty Queen Rania Al Abdullah of Jordan, has committed to spending about US\$10 million to bring MOOCs to Arabic speakers, particularly youth and women. Edraak's partnership with edX was announced in November

2013. Edraak is built upon the Open edX platform. Course creators include the American University of Beirut, the Arab Open University, British Council, as well as Edraak itself.

The initial offering of ten MOOCs covered the following topics:

- Introduction to Computer Science and Programming
- Electrical and Electronic Circuits
- Journey in the Film Industry
- Children’s Mental Health
- Effective Strategies for Job Search
- Shopping Yourself in the Job Market
- A Successful CV
- Confidence Awareness
- Citizenship in the Arab World
- Arabs: Where from and Where to?

UNICEF Lebanon

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UNRWA and Intel

Interactive Learning Program

<http://ilp.unrwa.ps/>

<http://www.unrwa.org/newsroom/press-releases/intel-helps-unrwa-expand-innovative-self-learning-programme-children>

UNRWA will create an online portal as a central gateway for continuous education for children in times of emergency.

More than 22,000 UNRWA education staff provide basic education to almost 500,000 Palestine refugees in the West Bank, Gaza, Jordan, Lebanon, and Syria. The online portal will be accessible by all these students and teachers and in particular over 67,000 students who were affected by the conflict in Syria and studied in UNRWA schools before the conflict.

UNRWA is committed to supporting Palestine refugees living in conflict through its Education in Emergencies program, which increasingly draws on innovative teaching technologies and ICT. UNRWA has developed a comprehensive self-learning program, which has been now adopted for all Syrian children, with lessons broadcasted on the Agency's satellite and YouTube channel UNRWA TV, and a web-based Interactive Learning Program (ILP) addressing the learning needs of students. Recent efforts have seen UNRWA working closely with Digital Explorer and Skype in the Classroom to pilot #myvoicemyschool, which has connected classrooms in Lebanon, Syria and Jordan with classrooms in the United Kingdom.

Tablets/Connected Classroom Infrastructure

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<http://ole.org/mena/>

<http://ole.org/2016/02/ole-iea-partnership-agreement/>

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Rumie

Learn Syria

<https://www.rumie.org/learnsyria/>

Rumie is a nonprofit organization that refines technology solutions for global NGO partners to make education cheaper, better, and faster than existing alternatives. Rumie was founded in 2013. Its affordable tablets are now being used by partners in thirteen countries around the world with plans underway in more.

Learn Syria is a project which provides teachers with a set of curated learning resources, including online textbooks from the Syrian Education Commission, video lessons from Nafham and Tahrir Academy, Arabic encyclopedias and dictionaries, and so forth, for students aged 8–14.

The materials have been curated by volunteer educators and vetted by Rumie. From the crowdsourced library, local teachers select the final set of materials, which are mapped to curriculum standards of the Syrian Education Commission. The materials are preloaded onto low-cost (US\$50) Rumie tablets, backed by Rumie's LearnCloud (<http://learncloud.rumie.org/>), a repository of free educational resources.

Although the tablets are capable of connecting to WiFi, Rumie does not depend on connectivity. WiFi remains expensive and unreliable in many places, but computer memory has become an inexpensive commodity. Accordingly, memory capacity and battery life are emphasized. Preloading allows Rumie to provide a library of materials for less than the cost of a single hard-copy textbook. Rumie does require that local partners connect the devices to the Internet periodically, so that Rumie can collect data on usage and other analytics.

The project is being piloted with local partners. The partners are responsible for on-the-ground leadership and classroom issues (pedagogical integration and curriculum mapping). Rumie focuses on software, content, best practices. They are best at building the tool; local partners are best able to implement it. Even though, Learn Syria takes place on Rumie tablets, they are low-cost. Rume is working with the Syrian Kids Foundation to pilot the project at a school for Syrian refugees in Turkey. Rumie is working with Theirworld to launch the project in Syria, and hopes to pilot soon in Jordan.

The tablets also allow teachers to track student performance and include content relevant to Syrians:

- e-textbooks from the Syrian Education Commission
- Video lessons from Nafham and Tahrir Academy
- Offline encyclopedia and dictionaries in Arabic
- Tons of other science, math, and other resources
- Space to load or create local content

Rumie is the subject of a Harvard Business School case study: Kim, John J-H, and Amram Migdal. "Rumie: Bringing Digital Education to the Underserved." Harvard Business School Case 316-140, January 2016.

Thaki

<http://thaki.org/>

Thaki is a not-for-profit, non-sectarian, non-political association founded in 2015. In Arabic the name means 'smart'. Phonetically it is pronounced 'the key' —because it gives children the key to unlock their potential.

The concept is simple. Electronic devices, such as laptops, are often retired long before their productive life is over. Thaki collects such devices from corporations, institutions and individuals. Thaki loads the devices with links to educational content and puts them in the hands of young refugees with limited educational resources.

Providers of educational content include Sayegh, Ashabona, Tabshoura, and others.

TidWit

TidWIT Online Learning Platform (open access to Lebanese official curriculum)

<http://mehe.ontidwit.com/>

In 2015, TidWit committed to providing a fully digitized Lebanese curriculum for Lebanese public school students and Syrian refugees. TidWit will offer accelerated and remedial material online for free through the public school system, schools for Syrian refugees, community centers, and self-study opportunities. The pilot developed by TidWIT Inc. provides open access to the Lebanese curriculum to all Lebanese students as well as Syrian refugee students in three languages: English, Arabic, and French.

The classes are all made available via the TidWIT Online Learning Platform, fully customized to MEHE's look and feel. And it not only provides access to the curriculum but also to supporting material and libraries such as the Khan Academy, music libraries, classic book libraries, advanced concept libraries, and more. Additionally, as part of TidWIT's global partnership with Microsoft it also provides access to Bing Search tools, making the search for additional resources from within the curriculum easy.

UNHCR Innovation

Learn Labs

<http://innovation.unhcr.org/about-us/>

The Ideas Box, a portable multimedia toolkit focused on education, has been deployed in Jordan. Each box unfolds to create a customized library and media center, with Internet access and its own power source. The boxes contained a variety of items chosen in consultation with refugees and humanitarian staff based on the cultural and linguistic needs of their populations, and include e-readers and books, tablets and laptops, cameras and a video projector, board and video games, arts and crafts materials. A typical kit contains 4 laptops, 50 e-Readers, 5000 e-books, 250 paperbacks (customizable), MOOCs, Khan Academy, TV, 5 HD camera, board and video games, recreational activities, and more. The kit is easily transportable, sturdy, and takes only 20 minutes to set up.

UNICEF

Digital School in a Box

<http://www.unicefstories.org/2014/07/17/unicef-brings-together-bright-minds-in-uganda-to-tackle-tough-problems/>

The School-in-a-Box has become part of the UNICEF standard response in emergencies, first used in Rwanda, it has now been used in a dozen back-to-school operations around the world, including in Lebanon and Libya. The kit contains supplies and materials for a teacher and up to 40 students. The purpose of the kit is to ensure the continuation of children's education by the first 72 hours of an emergency.

In addition to the basic school supplies, such as exercise books, pencils, erasers and scissors, the kit also includes a wooden teaching clock, wooden cubes for counting, a wind-op/solar radio and a set of three laminated posters (alphabet, multiplication and number tables). The kit is supplied in a locked aluminium box, the lid of which can double as a blackboard when coated with the special paint included in the kit. Using a locally developed teaching guide and curriculum, teachers can establish makeshift classrooms almost anywhere.

The contents of the kit are culturally neutral, can be used anywhere in the world, and are often supplemented by locally purchased products, such as books in local languages, toys, games and musical instruments. Exercise books are printed without margins, so that children who write from left to right or from right to left can use them. Another version of the kit, without the lockable metal box, the School-in-a-Carton, is also available, as is a replenishment kit.

Innovation Labs

OpenIDEO

Refugee Learning Challenge (<https://challenges.openideo.com/challenge/refugee-education/funded>): *How might we improve education and expand learning opportunities for refugees around the world?*

OpenIDEO is an open innovation platform, serving a global community that is working together to design solutions for the world's biggest challenges.

At OpenIDEO, people from all corners of the world collaboratively tackle some of the toughest global issues. OpenIDEO tackles each social issue via a challenge, a three- to five-month collaborative process that focuses attention on the topic and creates a space for community members to contribute and build off each other. This approach is modeled on IDEO's design thinking methodology.

UNHCR Innovation

Learn Lab

<http://innovation.unhcr.org/about-us/>

The Learn Lab is a virtual space for innovation that helps UNHCR transform young people's lives through educational opportunities that enhance interpersonal skills and foster a strong knowledge base, critical thinking, and conflict resolution. The aim of the Lab, a collaboration between UNHCR Innovation and UNHCR's Division of International Protection, is to ensure that every refugee and forcibly displaced person has access to relevant and high-quality learning opportunities that will enable them to serve as agents of change for their communities.

For example, in Jordan, the Learn Lab has deployed the Ideas Box, a portable multimedia center providing a comprehensive set of tools and programs to access information, education, and culture. Each kit included several boxes that can be turned into tables, benches and other furniture. The boxes contain a variety of things chosen in consultation with refugees and humanitarian staff: e-readers and books, tablets and laptops, cameras and a video projector, board and video games, arts and crafts materials, a generator and Internet connection.

UNHCR Innovation

UNHCR Ideas

<http://innovation.unhcr.org/unhcr-ideas/>

UNHCR is piloting a crowdsourcing platform, *UNHCR Ideas*, to generate ideas from refugee communities, UNHCR staff, and partners. These ideas are voted on and vetted by the online community, end-users (refugees), and experts, and then prototyped and tested in the field.

USA for UNHCR

The Hive

www.projecthive.us

The Hive is an innovation lab that uses advanced data science and active collaborations with private sector change agents to develop groundbreaking new models for consumer engagement. As a special project of the UN Refugee Agency (USA for UNHCR) that is headquartered in New York City, the Hive was formed to be an instrument for changing the conversation in the United States around the refugee crisis. It uses sophisticated data insights on what motivates people to take action, and how, to create unconventional projects and campaigns aimed at engaging Americans in new ways. The Hive is championing the importance of activating the private sector around the solution to the refugee crisis in ways that exceed mere funding alone, as well as working with nonprofit organizations and social enterprises to develop new ways to engage, educate, and activate Americans in support of efforts to address the global refugee crisis.

UNICEF

<http://www.unicef.org/innovation/>

UNICEF Innovation is an interdisciplinary team of individuals around the world tasked with identifying, prototyping, and scaling technologies and practices that strengthen UNICEF's work. We build and scale innovations that improve children's lives around the world.

UNICEF Innovation works across three main areas:

- Providing support to hundreds of global UNICEF innovation projects that may need new partners, technologies, or connections;
- Development of and experimentation with new operational models, such as the UNICEF Fellows program;
- Looking at the 3–5 year future horizon for UNICEF—things that are coming but not yet ready: 3D printing, the future of transportation and identity, digital currency, and other future possibilities.

Learning Management Systems

DFID and sQuidcard

sQuid e-learning and monitoring software

<https://www.squidcard.com/products-solutions/education-learning/learning-development>

Working with DFID, sQuidcard offers an interactive learning platform and digital content and also sQuid Checkin to monitor school attendance.

RTI

Tangerine

<http://www.tangerinecentral.org/>

Tangerine® is a first-of-its-kind software application, optimized for data collection on tablets and smartphones. Its primary use is to enable capture of students' responses in oral early grade reading and mathematics skills assessments, specifically Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA), and interview responses from students, teachers and principals on home and school context information.

According to the Tangerine website, it has been used widely, especially in Sub-Saharan Africa, but so far only sparingly in MENA—in Morocco by RTI (the software's creator) and in Egypt by Save the Children.

The Tangerine approach improves data quality and the efficiency of data collection and analysis by simplifying the preparation and implementation of fieldwork, reducing student assessment times, reducing measurement and data entry errors, and eliminating manual data entry from paper forms.

Tangerine's source code is available for anyone who wishes to install and use Tangerine on their own web server. Tangerine's code and related documentation is available on Github, a commonly used repository for open-source software.

UNESCO

OpenEMIS Refugee

OpenEMIS Refugee is an open-source web-based application that facilitates the collection of school, student and staff data on a regular basis using either mobile phones or a computer. The platform is completely customizable to the camp context, allowing any data about refugee students and families to be collected. The platform generates reports to support the management of schools and classrooms and includes a data visualization tool to help teachers analyze the information collected and adapt their classrooms accordingly. UNESCO coordinates the initiative, with technical support from Community Systems Foundation.

Challenges Addressed

- Support educational planning and management through the timely collection of data

ICT4E Solution

Open-source web-based application that facilitates the collection of school, student, and staff data on a regular basis (mobile or computer)

Features

- Any data can be solicited - attendance, grades, cash transfers, meal programs, migration, and so on.
- Reports and data visualizer help teachers analyze information and adapt to classroom in real time.

Undergoing two monitoring and evaluation strategies to measure impact:

- Country Monitoring - link to education policy
- OpenEMIS Monitoring - internal metrics

Curricula

Educational Research Center

(a division of the Sayegh Company, an educational publisher based in Lebanon)

International Arab Baccalaureate

<http://www.educationalrc.org/IAB/>

The International Arab Baccalaureate (IAB) is a high-standard secondary school degree that Educational Research Center (ERC) is developing for students attending general education schools all over the Arab World. IAB builds on ERC's long experience in educational research, curriculum development, educational measurement, and professional development. It is designed to promote education that empowers students for success in modern everyday life and workplace. The IAB diploma is meant to be a passport to higher education that meets international accreditation criteria and requirements of admission at major universities worldwide.

Pearson and Save the Children

Every Child Learning

<http://www.savethechildren.org.uk/about-us/who-we-work-with/corporate-partnerships/our-partners/pearson>

This partnership between Pearson and Save the Children foresees such technology-assisted solutions as:

- Development of mobile education solutions which are unrestricted by borders, and enable continuity of learning by overcoming barriers such as limited classroom space and high student-teacher ratios;
- The development of a condensed and modified curriculum that can be delivered without shipping textbooks and extensive teaching materials; and
- Solutions to grading tests for a qualification when the logistics of a national marking system are not in place and children lack formal school record.

Annex 2: Design Principles for Education Technology

Creative Associates International (2016)

- Optimize programs for smart mobile devices (phones and tablets)
- Ensure programs work without Internet, but are Internet-ready when the time comes
- Learners need content that meets their academic, linguistic, and skill needs. Use a human-centered design process with users.
- Take advantage of the growth of open/free content movement by finding ways to support its use by teachers in the field
- Build mentorship structures when and wherever possible for both teachers and students

Dahya (GIZ, 2016)

- Focus on efficient technology usage, local maintenance, and local procurement
- Have clarity in the purpose and context of ICT use
- Consider ‘system strengthening’ initiatives
- Attend to the needs of inclusive education
- Consider Do No Harm and conflict-sensitive education
- Identify accreditation and certification mechanisms
- Acknowledge the ‘claims vs. evidence’ gap and compile resources
- Create cross-sectoral collaboration
- Explore informal learning structures

Jalbout (Global Business Coalition for Education, 2016)

- View technology as a tool and not the solution
- Support a diversity of approaches to supplement traditional education access
- Increase access to Internet and technological devices
- Increase coordination and monitoring and evaluation of programs
- Ensure credibility of programs through accreditation
- Work with the policy and economic constraints of the host labor market
- Prioritize open-source development and user-generated content

DFID Discussion Paper (2015)

- Start with strong contextual analysis that looks at access, quality, and protection
- Avoid establishing parallel systems
- Mobilize predictable medium- to long-term financing that flows through an agreed coordination structure
- Prioritize protection, education access, and quality in the response
- Build evidence and data on impact and invest in innovation

Power et al. (DFID Educational Technology Topic Guide, 2014)

Edtech programs should focus on enabling educational change, not delivering technology.

Effective edtech programs are characterized by:

- a clear and specific curriculum focus
- the use of relevant curriculum materials
- a focus on teacher development and pedagogy
- evaluation mechanisms that go beyond outputs

WARNING: Large-scale investment in edtech—particularly computers for student use—often produce limited educational outcomes.

Carlton (USAID, 2013)

- Clarify objectives
- Fit for purpose
- Be willing to embrace failure
- Know your time horizon
- Prioritize the human-ware
- Content is king
- Connectivity is queen
- Simplicity is golden
- Power up (never overlook the issue of reliable power)
- Do not ‘reinvent the flat tire’

Winthrop and Smith (Brookings Institution, 2012)

- Educational problem first. Start with the problem, not the technology.
- Added value. Ensure that the technology will add value to existing solutions.
- Sustainability. Will the project be relevant and accessible with the passage of time or will external factors or lack of relevance eventually lead those involved to abandon it?
- Multiple uses. Select a technology that can be used for multiple purposes.
- Lowest cost. If a lower-cost technology is available to solve a particular problem, use it.
- Reliability.
- Ease of use.

Digital Development (<http://digitalprinciples.org/>).

- Design with the user
- Understand the existing ecosystem
- Design for scale
- Build for sustainability
- Be data-driven
- Use open standards, open data, open innovation
- Reuse and improve
- Address privacy and security
- Be collaborative