Education in Conflict and Crisis: How Can Technology Make a Difference?

A Landscape Review

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Un réseau international pour l'éducation en situations d'urgence
Una red internacional para la educación en situaciones de emergencia
Uma rede internacional para a educação em situações de emergência
الشبكة العالمية لوكالات التعليم في حالات الطوارئ

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Foreword and Acknowledgements

This Landscape Review complements a series of products already published as part of the Mobiles for Education Alliance (mEducation Alliance). [1] The review was commissioned by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and is the result of a collaborative effort with All Children Reading: A Grand Challenge for Development (USAID, World Vision (WV) and the Australian Government), World Vision International (WVI) and the Inter-Agency Network for Education in Emergencies (INEE). The review offers a selection of projects presented as case studies and synthesizes key themes and considerations for practitioners and policy makers in this field. [2] It also presents needed directions for research and development.

The completion of this review, its clarity, comprehensive view of the field, and organization, would not have been possible without the contributions, conceptual and written revisions, and collaboration of Dr. Michael Holländer, Alexandra Galeitzke, and Sophia Palmes from GIZ. Their close and trusted engagement, exceptional coordination of this project, and knowledge and insight of the topic have greatly enhanced both the quality and depth of the Landscape Review. Anthony Bloome (USAID), Wendy Smith (WVI), Linda Hiebert (WVI), and Rebecca Leege (WV) have also been instrumental to the development and completion of this Landscape Review. I thank them for their time, commitment, expertise, and consultation. I would also like to thank Dr. Sarah Dryden-Petersen (Harvard Graduate School of Education) and Marie Maier-Metz (UNHCR) for their peer review and constructive feedback.

I am grateful for the data that INEE provided from their survey on the use of information and communication technologies (ICT) in education in emergencies. Thanks to Billi Shaner (WVI) for processing that data. Special thanks also go out to Becca Fronczak and Kelle Rose, graduate students at the University of Washington Information School, and to Ronja Schröder, for their diligent work compiling data for the ICT project inventory, creating the list of academic journals and resources, and copy-editing this manuscript. Thanks also to the University of Washington Information School for generously providing resources in the form of graduate student support to organize this material.

Peter Transburg (INEE) and Stephen Richardson (IRC) were important resource persons and greatly contributed to a workshop at the mEducation Alliance Symposium in October 2015, organized by GIZ to get input and feedback from practitioners. These efforts and the rich dialogue at the mEducation Alliance Symposium were important to the development of this Landscape Review. Finally, I wish to acknowledge the significant contributions of numerous people who provided valuable insight and content through interviews: Anthony Bloome (USAID), Don Dippo (York University), Paul Frisoli (IRC), Juan Pablo Giraldo Ospino (UNICEF), Jacob Korenblum (Souktel), Rana Mandani (JEI), Sandra Maignant (IRC), Mary Mendenhall (Columbia University Teachers College), Kurt D. Moses (FHI360), Edmund Page (Xavier Project), Claire Pelley (OMPT), Kate Radford (WCH), Stephen Richardson (IRC), Jackie Strecker (UNHCR), Matt Streng (Mercy Corps), and Peter Transburg (INEE).

I hope that practitioners, researchers, and policy makers will benefit from the content and perspectives in this Landscape Review. The aim of the review is to highlight trends and promising practices, as well as to consider critical perspectives related to using ICT for education in conflict and crisis. The review intends to contribute to the identification of knowledge gaps and make recommendations in this field. While this is still an evolving field and more evaluation needs to be done, as well as successful projects brought to scale, I am optimistic that the potential of ICT can be further harnessed to provide access to quality education to people facing conflict and crisis.

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1 'Mobiles for Reading', 'Mobiles for Youth Workforce Development' and 'Mobile Education for Numeracy'.

2 Next to this Landscape Review with a focus on ICT for education in conflict and crisis, a Landscape Review with a particular focus on ICT for education for refugees and internally displaced persons (IDP) was commissioned by the mEducation Alliance. These two products are intended to complement each other and give practical guidance to practitioners and policy makers in this field.

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Executive Summary

Crisis and conflict are among the biggest obstacles to ensuring inclusive and equitable quality education for all. [3] However, education is a human right with important implications for health, livelihood, and peace building in contexts of conflict and crisis. The use of information and communication technology (ICT) has the potential to support, enhance, and enable education for the most marginalized, affected by war, natural disasters, and the rapid spread of disease. Across these different contexts, tools like radio, mobile phones, mobile projectors, e-readers and tablets, laptops and computers can facilitate teaching and learning in a range of different ways. The term "mobility" with regard to learning is highly relevant in this landscape: it recognizes that learning should not stop as people move, and that people on the move are focused on continuing their education. The aim of this landscape review is to identify major trends, patterns, and lessons learned about the use of mobile technologies in crisis and conflict settings, and also to define gaps in our existing knowledge base.

The current landscape of ICT for education in crisis and conflict

This Landscape Review shows that the majority of projects operate in **post-conflict settings and focus on long-term development**. The identified projects support education in different ways: they operate in the field of education system strengthening, teacher training, vocational training and tertiary education, and formal and non-formal education for children and youth. ICT also play a role in informal learning through digital and social media.

ICT have a high potential for **education system strengthening**, despite the particular obstacles that exist in conflict and crisis settings. Enabling education systems, for example, involves the use of mobile money transfers to ensure teachers receive regular salaries. Two-way communication systems using SMS (text messaging) over mobile phones promote safe learning spaces by informing parents, guardians, and young people directly about danger near schools. ICT is also being used for data collection about students, teachers, schools, and the larger education infrastructure. However, the project landscape shows much more room for growth with regard to ICT for education system strengthening in conflict and crisis.

The two major areas of programmatic focus in ICT for education in crisis and conflict are **teacher training and student learning**. A characteristic of programs working in post-secondary education – including higher education, teacher training, and vocational training – is that they are using multiple tools for teaching and learning, which gives learners varied opportunities for participation in unstable contexts. This includes the use of locally existing technologies, such as mobile phones. Overall, **blended learning** is an important component of education at the post-secondary level.

The examined case studies also confirm that **human resources** and teachers are still crucial to the success of educational initiatives and projects. Good blended learning practices involve using technology to support face-to-face learning.

Programs using ICT to enhance basic formal and non-formal education for children and youth are **adopting learner-centered pedagogies and community-based practices. Radio** is being used to mobilize in- and out-of-school children. **Mobile phones** distribute audio recorded or SMS-based information and quizzes related to curricula. **Tablets** are employed to reach out-of-school children in remote locations. Adopting locally situated and culturally relevant pedagogy and practices is important across tool use.

Efforts are also being made to build on existing and established **Open Educational Resources (OER)**. The advantage of OER in crisis and conflict is that learning materials can be made available rapidly, at low cost, and adapted locally to specific target group needs. This can be particularly useful in humanitarian contexts where fast action is necessary. However, attention has to be paid to the nature of content created or available with OER. There is also a critical need for adequate technology training and pedagogical training for teachers and community members using OER.

Digital video is being used to impart necessary life skills to communities facing conflict and crisis and by creating

3 See Sustainable Development Goal (SDG) 4.

community dialogue about important topics. Sharing information in multimedia forms like digital video can teach people how to respond to a health crisis and events of natural disaster. **Social media and networks** can be a crucial source of information for displaced people in search of access to education. Virtual social networks play an important role in mapping and following pathways to education in conflict and crisis settings.

Most of the identified projects are still at a **pilot stage**, testing innovative approaches and technologies, and examining ways to increase sustainability and scale. However, there is **no single or simple model for either sustainability or scale** given the diversity and complexity of contexts in conflict and crisis. ICT for education programs in conflict and crisis need to be iterative and adaptable. Tools can and should be the least determining factor for the success of a project; rather, good building blocks for teaching and learning remain the foundation of quality educational programming.

Recommendations

- **Focus on Efficient Technology Usage, Local Maintenance, and Local Procurement:** Explore the potential of using singular devices for group learning, ensure a plan for local, long-term maintenance, and procure appropriate and locally available technology.

- **Have Clarity in The Purpose and Context of ICT Use:** Assess local conditions and define clearly the purpose of intervention before implementation; work with community members to determine appropriate ICT application whenever possible.

- **Consider "System Strengthening" Initiatives:** Analyze and compile best practice related to system strengthening in crisis and conflict in order to bring ICT to its full potential with regard to system strengthening.

- **Attend to the Needs of Inclusive Education:** Focus more on inclusion of additionally vulnerable populations such as girls and people with disabilities.

- **Consider Do No Harm and Conflict-Sensitive Education:** Consider privacy, security, and digital data ownership. Ask questions related to how could digital data be used against beneficiaries or for partisan political purposes. Attention should also be paid to the needs and interests of host communities. Develop an ICT supplement for existing conflict analysis tools to help evaluate the appropriateness of ICT supported education interventions in crisis and conflict settings.

- **Identify Accreditation and Certification Mechanisms:** Find ways to accredit or certify learning and consider digital tools and platforms to support these processes. Provide accredited or certified opportunities for non-formal learning that can transition into formal education.

- **Acknowledge the "Claims vs. Evidence" Gap and Compile Resources:** Improve documentation and access to information about projects, research, evaluation, and related theory.

- **Create Cross-Sectoral Collaboration:** Explore possible benefits from collaboration and partnership focused on cross-sectoral, locally situated problems related to education.

- **Explore Informal Learning Structures:** Use digital media and social networks as vehicles for information on access to education and support for educational initiatives.

Acronyms

BHER	Borderless Higher Education for Refugees
BMZ	German Federal Ministry for Economic Cooperation and Development
CEO	Chief Executive Officer
CET	Commonwealth Education Trust
CTL	Connect to Learn
eLS	eLearning Sudan
EMIS	Educational Management Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GMR	Global Monitoring Report
ICT	Information and Communication Technology
IDP	Internally Displaced Person
INEE	Inter-Agency Network for Education in Emergencies
IRC	International Rescue Committee
IRI	Interactive Radio Instruction
JC:HEM	Jesuit Commons: Higher Education at the Margins
LMS	Learning Management System
MNO	Mobile Network Operator
NGO	Non-Governmental Organization
OER	Open Educational Resources
OHCHR	Office of the United Nations High Commissioner for Human Rights
OMPT	One Mobile Projector per Trainer
REACH	Results for Education and Child Health
RTWG	Refugee Teacher Working Group
SDG	Sustainable Development Goals
SIRIP	Somali Interactive Radio Instruction Program
SMS	Short Message Service, also known as "text messaging"
STEM	Science, Technology, Engineering and Mathematics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USB	Universal Serial Bus, also known as a "flash drive" or data storage device
WCH	War Child Holland
WVI	World Vision International

CHAPTER 1: Background and Context

1.1 Introduction: ICT for Education in Conflict and Crisis

Globally, up to 65 million children between the ages of 3 and 15 are estimated to be out of school. Roughly half of these children live in conflict and crisis-affected areas and it is predicted that 175 million children globally will be affected each year by natural disasters (Nicolai, Hine & Wales, 2015; Global Monitoring Report [GMR], 2015). A child living in a fragile or conflict-affected developing country is nearly three times as likely to be out of school as a child living in another developing country with low education enrollment (The World Bank, 2011). "The problem of out-of-school children is becoming increasingly concentrated in conflict-affected countries, where the proportion increased from 30 percent in 1999 to 36 percent in 2012" (Global Monitoring Report [GMR], 2015, p. 8).

While gains were made for education over the duration of the 2000-2015 Millennium Development Goals, conflict-affected countries have seen much less progress than non-conflict areas (Mundy & Dryden-Peterson, 2011). The new refugee crisis – the worst since the end of WWII – is creating a "lost generation" of young people with no or inadequate access to education. As stated in "Framework for Action Education 2030" (UNESCO, 2015, p. 5): "The failure to prioritize education in humanitarian response renders entire generations uneducated, disadvantaged and unprepared to contribute to the social and economic recovery of their country or region".

Education, however, is a human right (OHCHR, 1966/2015). A recent Education for All Global Monitoring Report (GMR, 2015) has reconfirmed the essential role of education to improve health, livelihood, and peace building in fragile contexts. The new Sustainable Development Goals (2015-2030) also include a focus on "inclusive and equitable quality education and [to] promote lifelong learning opportunities for all." [4] The realities of conflict and crisis for education present a significant challenge to reaching these global education goals.

Enhancing and supporting education in conflict and crisis using information and communication technology (ICT) has garnered increasing attention in recent years. This includes the use of mobile communication and computing devices (e.g. radio, mobile phones, digital video, tablets, e-readers), content storage and dissemination tools (e.g. USB drives, mobile projectors), and traditional computers and laptops. The term "mobility" with regard to learning denotes an important perspective on education relevant to this report: it recognizes that learning should not stop as people move, and that people on the move are focused on continuing their education.

The term mobility also conveys a standpoint on learning as something that is fluid and flexible, broadcast through radio waves, over mobile networks and across the vast webs of the Internet – even when infrastructures collapse or people's physical mobility is stifled. Mobility in/for learning is suggestive of the role of people in education and across borders. Mobile devices can support communication between people. Technology can support the sharing of resources in otherwise restricted environments and across impassable boundaries. Such opportunities can lead to the exchange of valuable information, to the building of social capital, and to the construction of pathways to and through education.

Thinking about the role of ICT for education in conflict and crisis includes, but also expands beyond, what might be typically defined as "teaching" and "learning." Technology can be used for rapid delivery of content, to create custom audio or video recorded modules for mass dissemination, or to connect learners and teachers in different locations using SMS, email, or other forms of communication. There are also many factors, processes, resources, and activities involved in the larger structure of education systems. Across education systems technology can support school administration, teacher professional development, or teacher payments. Technology can also be used for data collection related to students and schools. Finally, ICT can enable monitoring and evaluation procedures and facilitate access to social support.

4 Sustainable Development Goal (SDG) 4

1.2 Purpose and Aims of the Report

The aim of this landscape review has been to review existing research evidence and gray literature, identify key stakeholders, analyze data from a recent survey collected on the subject, and compile practices from the field. The landscape review draws on this scope of information to identify major trends, patterns, and lessons learned about the use of mobile technologies in crisis and conflict settings, and also to define gaps in our existing knowledge base. It is thus meant to promote a clearer view of the use and effectiveness of ICT for education in crisis and conflict settings.

Additionally, this review seeks to brief practitioners and policy makers worldwide about how to further improve the implementation of technology-enabled projects in these settings. The hope is that such a landscape review will generate stronger dialogue among practitioners, donors, and technology creators. In practice we hope the study will further engage the community in peer-to-peer learning and collaboration to drive promising programs to scale, and create pathways through education, to reach greater numbers of conflict and crisis affected children.

Key questions framing this landscape review include: Which kind of projects are currently being implemented and what are their approaches? Who are the stakeholders? What are results, evidences, and lessons learned from the projects? What should specifically be taken into consideration, when implementing ICT projects for education in crisis and conflict settings? What are the main knowledge gaps in this field?

This report does not present every ICT initiative or all programs underway. Rather, it draws on salient examples of technology use in and for education to highlight cross-cutting ethical, technical, and educational considerations related to conflict and crisis. The landscape review builds on the observations and findings of precedent research and reports. Examples serve to elucidate specific points, not to promote or critique their contributions to target communities. [5]

To accompany this report, the mEducation Alliance also commissioned a separate Landscape Review focused on ICT for education for refugees and internally displaced persons (IDPs). [6] These two products are intended to complement each other and give practical guidance to practitioners and policy makers in this field.

1.3 Defining ICT for Education in Conflict and Crisis

Education in emergencies, conflict, and protracted crisis includes refugee education, education for internally displaced persons (IDPs), children, and adults living in regions of natural disaster and epidemic, and those who are not considered to be displaced, but are living in the midst of violence and political unrest in their home countries (Dryden-Peterson, 2011). Conflict-affected states include regions where "armed violence over government or territory emerges and disrupts the lives and livelihoods of citizens" (Mundy & Dryden-Peterson, 2011, p. 2). "Fragile states" more broadly include "states where governance and institutional factors create a predisposition for future conflict" (Mundy & Dryden-Peterson, 2011, p. 3). Crises from natural disaster and disease impact social stability and have an effect on access to and quality of education. Conflict and crisis have a widespread impact that also affects host communities where refugees seek asylum; this is discussed at various points throughout this review.

Education is impacted by conflict and crisis at the level of system-supports, such as financial systems to pay teachers or mobile networks to communicate with parents about schooling. Schooling is impacted by a lack of teacher training, by breakdowns in formal, accredited programs, and by gaps in programming between formal and non-formal initiatives. In addition, informal learning and pathways to education, such as through media and social networks, are important in the face of conflict and crisis. ICT can impact education across these different levels.

Throughout this report, formal education is understood as institutionalized, continuous education, within state (-approved) educational establishments (schools, universities or vocational training institutions) characterized by defined learning objectives, curriculum, and certification. Non-formal education refers to organized and intentional learning that happens outside of the formal education system but still can be based on explicit learning goals. These categories sometimes overlap, particularly in the complex and fast-changing conditions of conflict and crisis. Informal learning is a part of everyday life, work, and community engagements with no specific aim necessarily and no certification.

To situate this discussion, the report offers a working definition of ICT for education in conflict and crisis as follows: the adoption, application, or integration of information and communication technology to support, enhance, and enable

5 Annex 4 offers a working list of ICT for education programs in conflict and crisis settings.

6 See Landscape Review of Technology for Refugee and IDP Education.

educational opportunities and practices across education systems, in distinct contexts of immediate and ongoing conflict and crisis, with a focus on the psycho-social well-being and locally-situated needs of beneficiaries.

1.4 Structure of the Report

This landscape review is framed with a focus on two overarching areas related to ICT for education in conflict and crisis. The first and main area of focus is related to context, taking into consideration the uniqueness of each conflict and crisis setting. A leading question here pertains to how technology is and can be used to enable, support, or enhance access to quality education in specific contexts of conflict and crisis. For example, 8.5 million children and young people were impacted by the Ebola outbreak in Guinea, Sierra Leone, and Liberia (Nicolai, Hine & Wales, 2015). In Sierra Leone, the Ebola outbreak interrupted an already weak education system. Civil war had depleted the education bank in the country leading up to the Ebola crisis, where literacy rates were already below 45 percent and school attendance at the secondary level even lower. After school closures were implemented to stop the spread of Ebola, radio lessons were provided to engage upwards of 50 percent of young people in daily guided learning and activities (Poon, 2015). Radio, being free and widely available, allowed lessons distributed in this medium to rapidly reach a maximum number of people who could not congregate in a classroom or community setting.

In another example, a recent report from Save the Children (2015) indicates that within Syria school enrollment has dropped from almost 100 percent pre-crisis to 50 percent; almost 3 million Syrian children are out of school entirely. Programs like Learn Syria are using Rumie Tablets to support this faltering education system. Rumie tablets are specially designed for access to pre-loaded content approved by the Syrian Education Commission. Tablets cost roughly US$ 50 per device and they can be used for access to resources in Arabic, digital calculators, educational videos, and games, as well as mechanisms to track student progress (Learn Syria, 2015). The content on these devices and their ties to government curriculum is important to their long-term relevance within formal schooling structures.

The second area of focus in the report relates to the challenging issue of sustainability and scale in the landscape of ICT for education in conflict and crisis. Different types of programs, their purpose and position within education systems, and the target communities served, require unique considerations for sustainability and scale. For example, formal education initiatives need to support approved curricula. This can be a challenge in the face of collapsing infrastructure and political systems. Initiatives that require the purchasing of new technology have important financial considerations to make with regard to long-term maintenance of new devices, when few long-term funding structures exist. Successful projects developed at the community level face social, political, and economic complexities when looking to scale up or to scale out to larger and sometimes different populations. These are just a few of the factors related to sustainability and scale that will be discussed in this report. One certainty is that there is no single or simple model for either sustainability or scale given the complexity and often changing realities of education in conflict and crisis.

The following chapter, Chapter II, outlines the methodological approach used to inform this landscape review. Chapter III is organized according to type of initiative, looking first at those that aim at strengthening education systems through data collection, mobile money transfers, and creating safe learning spaces. Projects directly related to teaching and learning are also discussed, including teacher training, higher education, vocational training, and basic formal and non-formal education. Furthermore, the chapter also explores opportunities for informal learning through digital media and virtual social networks. In this way, the chapter presents a selection of projects that show a range of possible ICT applications to support education in conflict and crisis. It concludes with reflections on inclusive education and addresses some of the ethical and political considerations related to conflict sensitive education and Do No Harm.

In Chapter IV issues related to sustainability and scale are discussed, looking at the different contexts of "rapid response" education and reconstruction of education systems. Finally, Chapter V gives an overview of the most important summary points related to the landscape of ICT for education in crisis and conflict, provides recommendations, and concluding remarks.

CHAPTER 2: Methodology

2.1 Research Evidence

Many researchers claim that more research-based evidence with regard to ICT initiatives for education in development and in conflict and crisis is needed: Carlson (2013), Kleine, Hollow and Poveda (2013), Jenson (2012), Raftree, (2013), Valk, Rashid and Elder (2010), and Wagner (2014) all identify this as a major challenge and ongoing concern. [7] Evaluating the effectiveness of ICT initiatives in educational contexts is difficult under controlled and well-resourced conditions – a problem that is hyperbolized in more volatile contexts. Jenson (2012) identifies that, "Part of the reason for the claims versus evidence gap with regards to ICTs and learning is because technologies are utilized as just one of many tools for teaching and learning, and their effects on student achievement are thereby difficult to isolate and measure" (p. 2). Power et al. (2014) identify a lack of "conclusive evidence of measurable changes in teaching and learning practices, through students' use of edtech" (p. 19).

"Evidence" for many ICT for education initiatives in both "developed" and "developing" contexts show mixed or emerging results. Lessons learned from ICT for education in development are especially relevant to work in conflict and crisis because displacement and refugee crises affect local or host education systems. The vast majority of displacement, refugees, IDPs, and contexts of natural disaster are situated in developing countries.

Research conducted for this report supports the need for randomized control trials and quasi-experimental designs. However, they are not the only form of data collection valued or needed: theory related to education and technology in conflict and crisis, and qualitative research documenting meaningful participation and outcomes for target groups are also needed. In addition, the field could benefit from more research and data collection related to using ICT to strengthen education systems, such as by paying teacher salaries or documenting attendance.

2.2 Research Methods

This landscape review has been prepared as a desk review of research papers and reports related to the field of ICT for education in conflict and crisis. Areas of study explored for this desk review include: education in emergencies; forced migration studies; refugee education; ICT for education in development; conflict and crisis studies; and pedagogy and technology. [8]

To supplement some of the gaps in the existing literature, and to ensure that the experiences of practitioners were reflected, 15 interviews were conducted with professionals working in education, non-profit, and non-governmental sectors. These 45-60 minute interviews were focused on extracting detailed information about one or two key ICT for education programs. Internet research was conducted to acquire more information about projects referenced by interviewees. Interview notes and recordings were reviewed for key themes and for unique insights into the field. Interviews were not transcribed nor coded in accordance with rigorous qualitative research standards – their purpose here has been to complement and supplement the larger discussions about using technology for education and to understand practitioner perspectives on sustainability and scale in conflict and crisis. Their contributions have informed the report immensely and reference to these interviews is included throughout. [9] Further feedback and input from practitioners was also collected during an interactive workshop at the mEducation Alliance Symposium [10] in October 2015 where preliminary findings from this report were presented and discussed.

7 In a review of academic literature related to education in crisis-affected contexts, Burde, Guven, Kelcey et al. (2015) identify only 184 research articles from peer-reviewed journals that are considered "rigorous" empirical studies in conflict and crisis settings. Research on education in certain intersecting fields, like peace and conflict studies and international studies, has been very thin. Annex 1 presents a working list of academic journals that may serve as references for research related to conflict and crisis, highlighting education-specific publications that are practitioner-oriented.

8 Works cited in this paper and additional resources reviewed for this paper are documented in the reference list.

9 Annex 2 presents a list of interview participants.

10 http://www.meducationalliance.org/page/2015-meducation-alliance-international-symposium-0

Finally, at the outset of writing this report, the Inter-Agency Network for Education in Emergencies (INEE) [11] and World Vision International [12] had distributed a survey to practitioners working in ICT for education in emergencies. The survey was distributed in English, Arabic, French, Spanish, and Portuguese using the data collection platform Survey Monkey. Across the language groups, there are 56 complete surveys, most of which were completed in English. This small data set is presented in descriptive form throughout the report to enhance our view of the ICT for education in conflict and crisis landscape. [13]

Limitations to this report include a lack of access to information about projects where monitoring and evaluation are not available online or were not available to share through network contacts working in this sector. The intention of the report to assess the current landscape of the field also meant that a "rigorous review" of academic literature and meta-analysis of those existing empirical findings was not within its scope. [14] In addition, the author was unable to interview a full representative set of people working in this field, though attention has been paid to speak with people whose projects cover a range of educational programs and technology use in conflict and crisis, and in different regions of the world. Community members – young people and their families – were not interviewed or consulted directly with regards to the use of ICT for education in conflict and crisis. This is an ongoing gap and no doubt a loss to knowledge about ICT for education in these settings overall. In summary, this report explores empirical research as well as gray literature, and draws on interviews with key informants working with NGOs to synthesize patterns, questions, and concerns related to the use of ICT for education in conflict and crisis.

11 The Inter-Agency Network for Education in Emergencies (INEE) is a network of individual members and partner organizations committed to supporting education in emergency contexts. INEE "serves to ensure the right to education for all regardless of crisis or conflict, along a spectrum of preparedness, prevention, response and recovery" (INEE, 2015, http://www.ineesite.org/en/).

12 World Vision International "is a global Christian relief, development and advocacy organization dedicated to working with children, families and communities to overcome poverty and injustice" (WVI, 2015, http://www.wvi.org/about-world-vision). World Vision serves all people and is actively involved in contexts of conflict and crisis including the current Syrian Refugee Crisis.

13 The survey posed field-relevant questions related to technology solutions or interventions underway. Questions included: What is the programmatic focus of the technology solution? What is the target geography of the technology solution? What is the hardware requirement for the technology solution? What are the infrastructure requirements for the solution? An overview of selected data from the survey is summarized in Annex 3.

14 The recently published report by Burde et al. (2015) serves as a good starting point for such a review of empirical data, and includes several examples also related to ICT, though technology is not its focus.

CHAPTER 3: ICT for System Strengthening, Teaching, and Learning

The discussion of ICT use for education in contexts of conflict and crisis begins in this section with examples of how to strengthen education systems. Subsequent sections address formal and non-formal education, from teacher training to education for children in and out of school. The use of ICT for teaching and learning includes both online and offline solutions – or blended learning. [15] Issues related to accreditation and certification of educational programs, integration of new technologies, and usage of open educational resources (OER), to name a few factors, are discussed throughout this section. Power, Gater, Grant et al. (2014) suggest, "... the effective use of any learning technology is bound up in pedagogy, curriculum, purpose, role and activities" (p. 12). Throughout this section, the context of each project is key.

3.1 Strengthening Education Systems

Education is often understood in terms of classrooms, curricula, teaching, and learning. However, education systems require support at many different levels outside of and surrounding core components of classroom teaching and learning. Supporting education in turmoil requires interventions ranging from infrastructure to administration as well as monitoring, evaluation, and student assessment. This section presents examples of ways to use ICT to encourage the rebuilding or strengthening of education in contexts of extreme adversity.

Data Collection

It is the case that collecting information about school infrastructure, about teacher and student attendance and retention, or about intersecting health services can positively impact the overall functioning of a school or education system. For example, **FHI360's K-Mobile program** has been supporting the Ministry of Education in Liberia to build their capacity and to map schools in the country. Even prior to the outbreak of Ebola in 2014, which shut down schools for months, Liberia's education system was poor. The government lacked information about the number of schools, teachers, and students across the country. FHI360's data collection software and locally networked data collection tools allowed teachers and community-based data collectors to work with FHI360 and document the number of teachers, schools, and students in the region. Through this process they were also able to report on the state of the infrastructure in use (FHI360, 2015). The same software and approach was used by FHI360 in South Sudan, Sierra Leone, and 11 of 12 UNHCR supported countries, such as Ethiopia, for mapping and detailing refugee education offerings.

FHI360 is also addressing cross-sectoral data collection needs and possibilities, considering how to document, for example, the health related conditions of young people in schools via mobile tablets or cell phones. Results for Education and Child Health (REACH) documents factors related to health and nutrition that also impact a child's ability to learn. A similar example of cross-sectoral data collection comes from the Ministry of National Education in Turkey which is working with UNICEF to monitor and document demographic data of non-Turkish students. This online data management system called YOBIS allows for tracking of both education-related records and health records, with the aim of better serving non-Turkish students and responding to the changing needs of host schools (Jalbout, 2015a).

Mobile Money Transfers

Mobile-money transfers can also contribute to rebuilding and strengthening education systems in conflict and crisis settings. In an unpublished landscape review about mobile money transfers to support education, Chaiken (2014) discusses how mobile money transfer programs are used to pay school fees or to pay teachers in regions including Afghanistan, Liberia, and Somalia. In Afghanistan using mobile money to pay teachers has made access to regular salaries convenient, safe, and transparent. A scarcity of banks

15 Blended learning, also termed hybrid learning, refers to the use of both in-person, face-to-face teaching and the use of online and digital materials. Blended learning can take many different forms and be composed of different amounts or methods of in-person and online or remote activities. Contemporary approaches to blended learning encourage peer supported group activities and use of electronic or digital resources (on and offline) to deliver curriculum.

in the war-torn country makes receiving payment by cash challenging. USAID used SMS (text messaging) to survey people about their preferences in rural and urban areas with regard to using mobile money to pay civil servants electronically. Following positive survey responses USAID applied this finding to teachers pay (IST Research, n.d.). Ensuring teachers are paid regularly and have easy access to their salaries serves as an important incentive towards rebuilding education in Afghanistan (USAID, 2013). Chaiken (2014) considers how mobile money transfers can encourage and enable more stable schooling structures. During times of political and economic disarray, or when facing geographical barriers related to natural disasters and their extreme environmental conditions, people are deterred from getting to banks or school offices to receive and make payments.

Creating Safe Learning Spaces through Two-Way Communication

One reason why school attendance is low during conflict and crisis is that schools are not perceived as a safe and secure space. ICT can be used to create safe learning spaces through the dissemination of security-relevant information. Working with **Souktel**, an organization that specializes in "digital solutions" for humanitarian aid and development, UNESCO created a digital communication system for teachers and administrators in schools in Gaza. This system was designed to communicate with parents and students about attacks on and around schools.

The system involves mass SMS distribution of messages alerting parents of danger near their child's school and informs them of when that danger subsides and children can return to school (Barry & Newby, 2012; Souktel, 2011; Souktel, 2012). Souktel worked closely with the Mobile Network Operator (MNO) in the region to create a "Safe Schools" brand – a trusted label for text messages to ensure parents in this network know they can trust the information coming to them in this text message form. Jacob Korenblum, President and CEO of Souktel, described the challenge of ensuring that communication can continue when Internet services are down: "If there was a power outage and head teachers were in their houses instead of in the school ... we developed another application that effectively unlocked the phones of head teachers ... and authorized them to send messages with specific codes that would say 'I'm a head teacher, I'm authorized to do this' and allowed them to send mass messages" (Korenblum Interview, November 2015).

UNESCO also implemented a second level administrative monitoring program, whereby messages sent could be tracked and access to the mass SMS network could be shut down should a phone be lost or stolen. These mechanisms ensure that messaging is closely monitored and that the community can easily recognize the messages as coming from a trusted network (Souktel, 2012). Korenblum explained, "we had to create a fairly complex, tiered platform where UN officials could see all of the traffic and messaging that was happening, but the schools individually could only see the information for their own target population" (Korenblum Interview, November 2015). The system remains in place in the region and its use is ongoing.

Here accountability for messaging and communication, preparedness in advance when possible, collaboration across MNOs, government, education sectors, and community partners are important for success. Further monitoring and evaluation of educational outcomes related to initiatives designed to support school attendance using mechanisms like mobile money transfers or SMS notifications about school safety is needed. In Burde et al.'s (2015) review of empirical research they identify that cash transfer programs can increase enrolment and attendance, but not necessarily learning outcomes.

In a review of using mobile technology in emergencies focused on cash transfers and two-way communication, Hollow, Mitchell, Gladwell et al. (2012) point out key considerations for mobile ICT initiatives. They identify mobile cash transfers in emergencies as offering greater transparency for who is working and who is paid, a cost efficiency related to the widespread penetration of mobile phones that could increase the potential for scale. They also discuss challenges to these processes such as the disruption of mobile networks during emergencies – particularly natural disasters when infrastructure collapses – and barriers of use due to low literacy levels, registration requirements, and a need for procedural protocols to be in place for this type of initiative to work well.

3.2 Teacher Training, Higher Education, and Vocational Training

This section begins with a discussion about initiatives for teacher professional development that aim to train educators using a range of ICT. In this review of ICT use for education in conflict and crisis there are shared patterns in higher education programs (including but not limited to teacher training) and vocational training programs, particularly in refugee camps. The following examples demonstrate some of these patterns, including the use of multiple devices within programs, flexibility in programming models related to which technologies are used and how they are being used, and the adoption of blended learning. The importance of harnessing existing resources is also a key theme that has emerged in the higher education and vocational training sectors.

Teacher training

According to the INEE survey on technology and education in emergencies, teacher training ranked as one of the highest listed areas of programmatic focus for technology-educa-

tion solutions. Fifty-two percent of respondents identified teacher training as one of the focus areas of their initiative. Supporting teachers in particular leads to exponential benefits across education sectors through better pedagogical practices, improved curricula, and direct impact on students. In refugee situations in particular, many teachers are untrained or inadequately trained. The UNHCR (2012) suggests that, "Teachers matter more than any other single factor to learning and to the ongoing, formative assessment that is critical to improving learners' achievement" (p. 11).

The International Rescue Committee (IRC) has launched **Connect to Learn (CTL)**. CTL is a teacher professional development solution to fit this particular demographic and context. IRC identified that their existing educational programs using ICTs elsewhere were not fitting for this community.

Connect to Learn (CTL)

The International Rescue Committee has launched Connect to Learn (CTL) in ten schools in Domiz refugee camp in the Kurdish region of Iraq. The target community is 160 Syrian refugee teachers with relatively high levels of education. "In the Syria Response Region, teachers are a lot more qualified, have a lot more education, and have a lot more experience than a lot of the other teachers we work with in different contexts," explained Paul Frisoli, Education Technical Advisor for IRC (Frisoli Interview, November 2015).

Photo credits: ©IRC

IRC created this teacher professional development solution working with Ericsson to provide ICT hardware and connectivity via a cloud-based server and the Internet. The cloud-based server gives teachers access to resources to support teaching and learning with children affected by conflict, focusing on social-emotional skills, literacy, and numeracy. Teachers have access to training materials prepared by IRC, and can use the technology to connect to each other and share experiences across the schools involved. While Ericsson has provided the platform for sharing materials and communicating, AsiaCall is involved as a partner to support Internet connectivity. CTL is funded in part by the US Bureau of Population, Refugees, and Migration (BPRM). By the end of the program, teachers across these schools will be equipped with skills to improve their instructional capacity and also to create 'healing classrooms'.

Healing Classrooms are focused on psychosocial support through learning circles in conflict and crisis settings. Healing Classrooms expose teachers to teaching practices and engage teachers in critical discussions focused on creating supportive, constructive, compassionate classrooms that deal with individual and collective trauma. Instructional videos for Healing Classrooms are already available on YouTube. Pico projectors can facilitate group engagement with recorded video lessons, an important reminder regarding the ability for single devices or tools to facilitate learning among many learners.

Importantly, CTL is paired with teacher training and assessments to monitor program effectiveness and revise program content as needed. Preliminary research identified that while teachers were engaged in a certain level of technology use on mobile phones and computers prior to the intervention, they did not necessarily know how to translate that knowledge into educational contexts for teaching and learning (Frisoli Interview, November 2015; Richardson, 2015).

In addition, translating resources into Arabic and ensuring that technologies were appropriately configured for local connectivity required time and attention. Frisoli clarified that "anything we do that is technology based is not the solution, but it facilitates sharing of materials or understanding of practices embedded in a teacher development system" (Frisoli Interview, November 2015).

A program like CTL is possible within the context of protracted crises where certain institutional structures supporting education (like schools) are already in place. In this case, as elsewhere, understanding the pre-existing knowledge, values, and teaching practices of the community is crucial to determine what kind of additional training for teachers is needed (see also Carlson, 2013; Power et al., 2014).
A recent prototype launched in Kakuma Refugee Camp

(Kenya) is focused on the use of mobile phones (SMS and WhatsApp Messenger) to support teacher training through mobile mentoring (m-mentoring). A collaborative project initiated by Mary Mendenhall (Teachers College, Columbia University), Mary Tangelder (Finn Church Aid) and Mohamud Hure (UNHCR) builds on a new training pack - Training for Primary Education Teachers in Crisis Contexts - recently developed by the Refugee Teacher Working Group (RTWG). [16] The **m-mentoring** prototype, supported by IDEO, provided 20 teachers, who had already participated in a training based on the new RTWG materials, with post-training support to help them apply what they had learned in their classrooms. During the m-mentoring prototype, teachers received instructional support tips and motivational quotes about classroom management.

Graduate students at Teachers College, Columbia University, were also able to crowd-source potential solutions to problems posed by the refugee teachers during this process (e.g. how to better support student learning in over-crowded classrooms). This project is focused on the delivery of very specific communication to support, enhance, and extend teacher training. Research related to the use of a specific communication tool (text messaging) may illuminate how particular technologies can be used to leverage human resources, increase the effectiveness of teacher trainings, connect teachers to people and resources outside of their local settings, and provide real-time data about what is and is not working in the classroom (Mendenhall Interview, January 2016). [17] This type of project presents unique possibilities for both sustainability and scale in the future.

Higher Education

The distinct conditions of displacement and disaster in different contexts create environments where certain types of education are possible (or impossible). For example, protracted crises where massive amounts of people have been displaced for extended periods of time often have structures in place for education. Such is the case in Dadaab, Kenya, where refugees have been living since the early 1990s. Over the decades of continued forced migration of primarily Somali refugees into Dadaab, schools have been established to accommodate the needs of children and young people living in the region. With such educational structures in place, creating opportunities for continued education at the post-secondary level has become important. Access to different types of technology has also infiltrated local society and micro-economies in the form of Internet cafés, mobile phone sales, and mobile phone charging stations. Such realities present distinct conditions that make certain kinds of technology use possible in these contexts where at least some minimal required infrastructure is already in place.

Inquiring about how technology is currently being used for education in conflict and crisis, INEE survey respondents identified that desktop computers (63 percent) and laptop computers (75 percent) are still important required hardware for their interventions – an interesting result considering the current popularity and interest to develop mobile technology initiatives. Gaible and Burns (2005) identify existing and stable financial infrastructure, access to human resource, and technological support as conditions that support the use of computers and computer labs in teacher training. These conditions are uncommon in conflict and crisis. Many well-intentioned interventions focused on expensive and maintenance-heavy computer labs or laptop deployments have failed (Jenson, 2012). This is especially evident when computer labs are treated as though access is enough, and when long-term funding for maintenance and technology training are not included in the program plans. In addition, many of the functions available on computers are becoming rapidly available on smaller and more mobile devices at a lower cost and with fewer infrastructural requirements.

INEE survey respondents also indicated using tablets (59 percent) and mobiles (45 percent) showing that multiple devices are in use across programs. **Borderless Higher Education for Refugees (BHER)** and **Jesuit Commons: Higher Education at the Margins (JC:HEM)** are two examples of higher education programs delivered to refugees in long-standing refugee camps and using multiple tools for content delivery. JC:HEM offers a university-accredited diploma in Liberal Studies to students in Syria, Malawi, Kenya, Jordan, and elsewhere. They use the Learning Management System (LMS) Blackboard as well as Google applications like Drive, Hangouts, Calendar, and email for content delivery and communication. Importantly, courses are designed to be culturally relevant, multicultural in perspectives and design, and delivered using a holistic pedagogical perspective (JC:HEM, 2014). Borderless Higher Education for Refugees is discussed in the Feature Box.

16 The RTWG was founded in April 2014 and is comprised of seven partner agencies: Finn Church Aid, International Rescue Committee, Norwegian Refugee Council, Save the Children, Columbia University Teachers College, UNHCR, and UNICEF, working in close association with INEE.

17 Further research about the role of text messaging in teacher training is underway. In Kenya teachers in Mendenhall et al.'s program, and also in the Kenya Equity in Education Program (KEEP) and Borderless Higher Education for Refugees (BHER) program, are using text messaging as part of their educational ecosystems. In addition to (and in conversation with) Mendenhall et al., researchers from University of Washington, Harvard Graduate School of Education, and Kenyatta University are collecting data about this emerging phenomenon across programs in Kenyan refugee camps (Principal Investigators: Dr. Negin Dahya and Dr. Sarah Dryden-Peterson).

Borderless Higher Education For Refugees (BHER)

"We are in a world where conflict and environmental destruction ... are going to have lots of people, families, and communities, living in precarious contexts. The willingness of post-secondary institutions to step-up and engage and provide opportunities for those people will never be as large as the need. The only way we can even make a dent in this is to learn to collaborate and cooperate across institutions and across time and spacial boundaries. The only way really to do that is to rely on technology to create conditions to allow people to collaborate."

Don Dippo, Co-Principal Investigator Borderless Higher Education for Refugees

Interview, November 2015

Borderless Higher Education for Refugees (BHER) is a consortium of Canadian and Kenyan universities who are working primarily with UNHCR and Windle Trust Kenya in Dadaab, Kenya. BHER aims to provide internationally accredited university certificates, diplomas, and degrees to refugees living in refugee camps. The target group is teachers working in Dadaab because enhancing the quality of teaching through teacher training will also positively impact children and youth going to school. Mobilized by Dr. Wenona Giles (York University) starting with a conference in 2008, BHER has developed into a full-scale, certified, university program for refugees. BHER was funded by The MasterCard Foundation for a feasibility study in 2011, by the Social Sciences and Humanities Research Council of Canada Partnership Development Grant, and currently through a multi-million dollar grant for development and implementation from the Canadian Department of Foreign Affairs, Trade, and Development.

Delivery of courses for students in Dadaab involves both face-to-face and online components. The different university partners – York University, Kenyatta University, University of British Columbia and Moi University – determine the particular tools and form of content delivery for their own courses. York University (Canada) offers a one-year, post-secondary level certificate in primary education from within Dadaab using a blended learning model. Some courses are delivered in person at The Learning Center. Other courses are available online to students at both York University in Toronto and to students enrolled in Dadaab, creating cross-cultural learning spaces. Course content and assignments are adapted to also be relevant to students in Dadaab. The Kenyatta University (Kenya) component of BHER offers a two-year diploma in education and has adopted the use of tablets for students taking their courses online. Course content is available for download so that students only have to be online periodically to continue with their work.

All BHER students in Dadaab have access to computers at a central computer lab (The Learning Center) in the town of Dadaab. Mobility to and from The Learning Center has sometimes been a challenge, as has inconsistent access to Internet and the Learning Management System (Moodle). Therefore, additional ICT-based channels are being used for content delivery and communication. These channels include pre-recorded instructional videos available online, email communication, SMS, peer support and learning groups in person, connected over Facebook, and using WhatsApp Messenger. The programs also work with community mobilizers in Dadaab who facilitate study groups, answer procedural questions about courses, and act as a liaison between students and BHER instructors and administrators based in Canada. Teaching staff work remotely from Nairobi in some cases, communicating with students using text and instant messaging, as well as email. Sixty students completed the Certificate in Educational Studies accredited by York University and graduated in 2015. There are likely to be another 60 students graduating with the Certificate in 2016.

Vocational Training

The InZone program offers one example of a blended learning program for vocational training that adopts flexible programming and the use of multiple technology tools for content delivery. **InZone** is focused on education and training for adult field interpreters working with UNHCR and involves both face-to-face training and online course work. Adopting a program that has been successfully deployed in Afghanistan and Sudan, Moser-Mercer (2014) considered the context of Dadaab and the restrictions in that region. In this example, Moser-Mercer arranged with Coursera and the Commonwealth Education Trust (CET), who are delivering the online component of the program, to download video files in advance and provide access to that content via USB and shared devices for the refugee participants in Dadaab. Though some content and communication was supported by computer access provided by UNHCR field offices in Dadaab, learners used their cell phones 75 percent of the time to engage with and complete course work. Email was a key communication mechanism with the lead instructor throughout the program. Participants recommended course

providers use WhatsApp Messenger as part of their communication network since it is less costly than pay-per-text SMS (Moser-Mercer, 2014). This example highlights the importance of conferring with students and using technology already available to them. Moser-Mercer also highlights the importance of support for learners engaged in distance learning as a key component to the success of this program. In this example, the use of multiple devices, flexibility in programming, and the adoption of blending learning that focuses on human interaction are evident.

Blended Learning in Teacher Training, Higher Education, and Vocational Training

The choice of when to use a device for education in conflict or crisis is dependent on a range of factors: security in local regions, access to mobile devices by beneficiaries, condition of or access to computer labs, Internet strength and availability, and pre-existing literacy levels of participants, to name a few considerations. Importantly, with longer-term projects at the levels of teacher training, post-secondary education, and vocational training for adults, delivery of education changes both in form and content as the local conditions also change. In this regard, it is important to consider how content can be delivered across different devices and how program designs can be made flexible to meet the reality of people's lives in these contexts. For example, can a module be available either on computers or over mobile devices? Can an assignment be returned using multiple channels of communication? Can learning goals be met through various types of assignments or student engagements with course content?

According to Burde et al. (2015) with regard to distance learning, "Existing research from non-crisis, low-income countries indicates that print, TV, and radio broadcasts appear more successful than the Internet, since the digital-access divide is often significant ..." (p. 21). Such a statement serves as a reminder that blended learning can also include "traditional" technologies and tools like print, TV, and radio to enhance educational content. Burde et al. also explain that learning through mobile phone applications is showing potential for success, and that using multiple modalities can better support distance learning, particularly in rural settings (e.g. use print, TV, audio, and Internet).

Blended teaching and learning is discussed in this report as related to practices that engage students in both face-to-face education with peers and teachers working in the community, and in individual learning, group assignments, and activities facilitated by information available through ICTs. In some cases when access to computers fails, instructors can email information out or post information to Facebook groups accessible by mobile phones, chat with students using WhatsApp Messenger about content and assignment work, and relay messages through community-based staff who call and speak with students face-to-face about their continued studies. This flexible approach to teaching harnesses available technology within the restrictions of local contexts to best serve students.

The BHER program also emphasizes flexibility in curricular programming. This includes how content is delivered and how assignments can be submitted. It also extends the notion of "flexibility" to program design by accommodating for missed deadlines, allowing for made up course work, the repetition of failed classes, and alterations to course assignments and teaching practices as needed. Such flexibility is especially important for women in this community, who start out at a huge disadvantage and face ongoing social and cultural challenges to continuing their education. Don Dippo, Co-Principal Investigator of BHER, highlights that student success in their project has been facilitated by the following: "the tenaciousness of our students, the persistence and dedication of our staff on the ground, and the flexibility of the people who are teaching the courses and who are prepared to stay with these students."

Moser-Mercer (2014) also reminds us that support for teacher and adult education using blended learning models goes beyond access to online materials alone: "The distance in distance learning becomes infinity if all that connects learners in the field to teachers and tutors posted hundreds and thousands of miles away is a computer or mobile interface" (p. 2). A key component to good blended learning models involves building on human resources.

Certification and accreditation are also crucial to the successful deployment of these types of programs. Adults facing broken infrastructure and forced migration are aware of the value of accredited programming and formal certification to show for the education they have received. Some kind of recognition of that work is understandably important for people whose futures are so uncertain that they cannot be sure of where they will live or what kind of work they might do. Accreditation at a post-secondary level is quite common. Digitized transcripts and certificates of completion for educational programs could be an asset in the future of ICT for education initiatives in conflict and crisis.

3.3 Basic Formal and Non-Formal Education

Turning the discussion to education initiatives working directly with children and youth, Kleine, Hollow and Poveda (2013) address the importance of focusing on community needs in development settings. Recent reports on ICT for education in development, and in conflict and crisis, have identified clearly that understanding the student and teacher population is important. They articulate the reality that "children are not a homogenous user group" (p. 23) and that there are a multitude of barriers to meaningful participation across the ages when implementing ICT for education initiatives in development.

The examples in this section are primarily situated in teaching and learning with children and adolescents as the target beneficiaries. While formal educational practices involve school systems and sanctioned curricula leading towards accreditation, non-formal education oftentimes responds to failures or to the absence of a functional education system. These programs are important and arguably needed in the immediacy of conflict and crisis while efforts to reconstruct or expand the capacity of formal education are underway. They "add" to the education system when they engage students in meaningful social activities like gameplay, provide psychosocial support, contribute to skill-building such as with language learning, and when they prepare young people for work and school. Both formal and non-formal education present complicated issues related to sustainability and scale.

Accreditation and certification are important in this section also. Certification requires some form of assessment and validation of the teaching and learning process, and importantly of learning outcomes. For formal education programs, certification is both essential and more likely to align with regional or national curricula, and potentially more sustainable with government sanctioned support. Non-formal programs may find certification more challenging to coordinate (UNICEF, 2015) and similarly more difficult to sustain and scale – but not impossible. In any case, it is important for learners, teachers, and community members participating in formal or non-formal education to be recognized for their efforts; it is also important that what they learn has practical applications towards bettering their own lives, the lives of their families, and of their local community members. The examples presented here are in many ways a center point for discussion about the use of ICT for education in conflict and crisis.

Learner-Centered Pedagogy and Community-Based Practices

Learner-centered pedagogy and community-based practices using ICT for education can give students opportunities to collaborate and work in groups, to direct their own learning, and to expand the relevance of classroom curriculum to the larger scope of their lives (Carlson, 2013; Power et al., 2014; Jenson, 2012). This is especially important for girls and young people with disabilities (Burde et al., 2015). A learner- and community-centered approach to ICT for education is culturally relevant, supports the use of single devices in groups, considers the geographic accessibility of programs, and builds inclusive education for those additionally marginalized within these already vulnerable populations.

Interactive Radio Instruction (IRI) is one example of programming that offers low-cost, widely available opportunities for education that can be designed to meet locally situated practices and norms. **The Somali Interactive Radio Instruction Program** (SIRIP, 2005-2012) worked with local community educators and leaders to develop instructional content and supplement formal education in math and reading. In addition, the initiative targeted out-of-school students and those in alternative schools like Qu'ranic and community schools. Books and other teaching materials incorporating Somali history, language, and cultural norms were produced to supplement radio broadcasts. Casual listeners were part of the SIRIP audience, as well as children in school and out of school. Radio broadcasts included prompts that invited teachers and students to participate in activities that enriched the learning process (e.g. song, question-and-answer, or other physical movements guided by the broadcast).

Pre- and post-test scores showed notable gains in math and literacy for children participating in the IRI program, particularly at the grade one level (USAID SIRIP, 2012). Engagement in school, measured through enrollment, also increased over the course of IRI implementation in Somalia. In this context, interactive radio broadcasts that were recorded on digital media players were able to reach a large and dispersed number of people, at low cost, and in a meaningful and culturally relevant way (Trucano, 2010). As an initiative working in both formal and non-formal contexts, SIRIP had an expansive reach of 330,000 in-school and out-of-school learners (USAID SIRIP, 2012).

Tablets and games are also increasingly of interest and in use in the landscape of ICT for education in conflict and crisis. The Feature Box about **War Child Holland's eLearning Sudan (eLS)** project introduces various considerations related to the development of educational games and use of tablets in rural villages in Sudan.

Can't Wait to Learn – eLearning Sudan (eLS)

"There's co-creation at a number of levels. There's co-creation and participation at the child level, at the community level (caregivers, etc.), there's also – what does the Ministry of Education expect? How do you do research in a meaningful way that is respectful of the needs of the children and also is cognizant of the context?"

Kate Radford, Innovation Program Manager War Child Holland

Photo credits: War Child Holland

Interview, November 2015

eLearning Sudan (eLS) is a tablet-based "applied math game" within a larger initiative, Can't Wait to Learn. The eLS project incorporates math learning into an interactive and multimedia activity ('applied game') available on tablets to out-of-school children in Sudanese villages. The project started with a small proof of concept and simple research question, "can students learn?" and worked with 60 students and a control group, showing that indeed the application did work and students did learn.

The program – currently studying the effectiveness of this program with 600 children in nineteen Sudanese communities – still focuses on one subject: early mathematics. Combined with the support of the community and the Ministry of Education, eLS seeks to support and expand educational possibilities and pathways towards a Certificate of Primary Education for children in regions without established schools or trained teachers. The inception of the project focused on equity, access, and learning outcomes – quality education – for children who otherwise do not have it.

In this example, children are invited to learn math through games based on local market and farming cultures (War Child, n.d.). Importantly, this "applied game" is one part of an e-Learning package that includes access to solar power and community facilitators trained in both child-friendly educational approaches and on how to use the game and tablets (War Child Holland, 2015). "We believe we have been able to have successful learning outcomes because we have been cognizant of the context and we have adapted to the context," explained Kate Radford, Innovation Program Manager for War Child Holland (Radford Interview, November 2015).

Partners involved in the project include: The Ministry of Education in Sudan who has been involved in curriculum development; TNO, a research institute which has provided distance learning, applied gaming and research capabilities; and, Afhad University for Women who has also supported the project in instrumental ways. Following a pilot study, the program team began to think about what would be needed to take the project to scale. A strong partnership with UNICEF led to further opportunities for funding the program at a larger scale. eLS has also had long-term funding from the Ministry of Foreign Affairs of the Netherlands, which was earmarked to support innovations such as eLearning Sudan – Can't Wait to Learn.

Examples of students playing the game and successfully entering grades three and four are being documented, this following only minimal weeks of instruction delivered through game play. In addition to scaling up in Sudan, Can't Wait to Learn is developing a literacy component and looking to adapt the applied game for use in the Middle East. Meanwhile, ongoing research and evaluation are underway to clearly document the success and limitations of the project. Following a pilot study, the program team began to think about what would be needed to take the project to scale.

In a different kind of example, current UNHCR Learn Lab initiatives include **Ideas Box** in Burundi where 4000 Congolese refugees reside in the Kavumu and Musasa camps. Building on the success of Libraries Without Borders and UNICEF's The Story Box (La Boîte à Histoires) in Haiti, Learn Lab created a portable, multimedia toolkit focused on education. Working in collaboration with professional designers, the Ideas Box was constructed with the environmental and social realities of Burundi in mind. The Ideas Box is multifunctional, with built-in screens as well as laptops and tablets that can be stored away in the box, benches and table edges that fold out, and the inclusion of e-readers, curricular materials (board and videogames, arts and crafts), a generator, and Internet. Designed for Kavumu and Musasa, Ideas

Box collapses available technologies and needed materials into a multipurpose, mobile resource that can be made culturally relevant because trained, local instructors can use it for various purposes. This can be described as both a learner-centered and community-based approach to education.

Initial content available through Ideas Box has included use of Khan Academy courses and sites like Wikipedia, though resources available are being updated continuously based on the needs and interests of the local communities. Additional boxes have been deployed to Jordan, Lebanon, and Ethiopia. Cost and production of the boxes is one of the primary challenges to be overcome in their use and distribution (UNHCR Innovation, 2015). However, by focusing on the construction of a multipurpose box that can be adopted for student-centered learning in each local context this initiative can serve as a facilitating tool for good teaching and learning practices. This project also exemplifies an important component of ICT for education initiatives: the use of existing online resources and OER. Using existing tools and resources can decrease overall costs of program development and delivery, though other limitations related to what is available (content, language, form) can also be a barrier to their use. UNHCR Instant Network Schools (INS) also focus on both technology integration and pedagogical training for teachers to create rich learning environments.

Photo credits: © Mercy Corps

Mercy Corps is another organization looking to use technology to increase learning opportunities for adolescent Syrian refugees, particularly for those outside of the formal education system. Working on a prototype in Turkey, Mercy Corps is testing out the use of technology for educational purposes. Matt Streng, Senior Youth Development Advisor, explained their project is not currently based on a formal, ministry accredited program. Rather, they are using tablets loaded with Turkish and Arabic language classes and basic numeracy, requested by youth in Gaziantep, Turkey. "It will be very much an outreach oriented model. We are trying to find a blend between self-guided course work and in-person course work. We're currently testing, iterating, and trying to find out which technologies work. A lot of the work will be self-guided from adolescents' homes and then about once a week we'll have learners come together in a community center, or mobile safe space where community centers aren't available, to build their identity with the program, build social capital, and reinforce the psychosocial components of the program. We are starting with a basic language and financial literacy program but over time we'd like to align with either the Syrian or Turkish curriculum to facilitate learners taking the 12th grade leaving certificate" (Streng Interview, November 2015).

Refugee children in Lebanon are also being introduced to non-formal programming using **Raspberry Pi**, "a low-cost computer, containing educational software, such as Khan Academy Lite" (Eames, 2014). "One out of ten people in Lebanon is a child from Syria, and the majority of these children are not in school" (Jalbout, 2015b, p. 1). Raspberry Pi provides children in community centers with access to learning materials, games, and programs designed for coding, numeracy, and science education. The program design adopted by Raspberry Pi builds on established models of science and technology education, including computing education, through games and creative digital production. Such a program, with specific science and technology learning outcomes, may work in this context because of the high pre-crisis education levels of the Syrian community.

Karen Fisher (University of Washington Information School) and colleagues are exploring how Syrian youth at the UNHCR Za'atari refugee camp in Jordan help others with regard to mediating information and using technology. Their methodology involves field visits to Za'atari where they carry out co-design workshops at NGOs. In these workshops, youth engage in narrative storytelling, participate in conceptual, co-design activities related to creating ideal ICT tools, and paper prototype their inventions. This work may set an important foundation to understand what kind of technology Syrian youth in Za'atari use, and what benefits they envision for education when using ICT. Young people do not use technology in this program but do explore the role of technology in their lives. Based on established youth development principles, the workshops emphasize education in basic STEM areas, strengthen literacy, and enhance oral presentation skills. With regular reporting to and coordination with the UNHCR youth taskforces, the workshops are synergistic with efforts to provide education to refugees across the Za'atari Camp (Fisher Personal Communication, January 2016).

Use of Mobile Phones in Education for Children and Youth

Other formal and non-formal education initiatives are exploring the role of mobile phones to support literacy and numeracy. These programs focus on curricular support modules using interactive audio recorded messages or SMS. For example, **Xavier Project** supports safe learning spaces for refugees in urban Kenya and Uganda by sponsoring students through language learning and vocational training. Xavier's recent collaboration with Eneza Education Partnership has enhanced those learning outcomes. Using Eneza's dial-in educational support program, Xavier is adding Eneza's subject-specific quizzes and mini-lessons to their program

Photo credits: © Xavier Project

design, which is accessible by mobile phone or computer. These quizzes are aligned with the Kenyan national curriculum, supporting teaching and learning within the established education system.

Through **Eneza**, students can access information from Wikipedia or ask a tutor questions directly. Through Xavier Project, Eneza is being used to enhance face-to-face education, maintaining a community-oriented approach to refugee education. Community engagement is key to sustainability and scalability of this type of programming, according to CEO of Xavier, Edmund Page. Community connections help navigate and leverage local resources like working space and access to existing devices. The Eneza program currently costs $1.73 per child, per month. Early research shows that working with other support structures through Xavier (e.g. language learning, vocational training, scholarships), Eneza mobile phone modules can further enrich the educational experience of the students involved.

Companies like **Ustad** are also using audio and mobiles for education. Ustad allows for the creation of content using a free downloadable editor and provides access to available existing content. Ustad can be shared to multiple devices and also includes a reporting tool. A cost breakdown on their website identifies minimal cost models per student and additional cost options if the client wants support to launch an Ustad project.

While potentially valuable, it is important to ensure that comprehensive teacher support around this type of mobile learning is included. Meaningful education and locally relevant curriculum requires that segmented, factual learning be minimized (see Mendenhall, Dryden-Peterson, Bartlett, et al., 2015 for more discussion on this topic). Appropriate scaffolding is needed to apply fact-based content – perhaps recorded in digital formats or sent by text messaging – to local contexts. Teacher training and ongoing program support is invaluable to the long-term effectiveness and sustainability of mobile initiatives delivering fact-based content.

Uses of mobile technology for learning literacy and numeracy are being tested in development settings and these outcomes should be considered in the context of conflict and crisis also. In a study in Pakistan, girls in rural communities who used text messaging to communicate with their teachers showed an increase in literacy (Miyazawa, 2009). In another example, researchers from Carnegie Mellon University and University of California Berkley used educational games on mobile phones for literacy with children in India. These games adopted a practice of teaching, playing the game, and practicing the literacy skills being delivered. Pre-post tests of reading comprehension showed comparative gains following the implementation of this project (Kumar, et al., 2012).

Valk et al. (2010) suggest that many mobile learning projects show mixed-results. These mixed results highlight the need to closely consider factors such as device specifications (e.g. screen size) in relation to program design, the role of pre-existing literacy and language levels of learners, the importance of teacher training related to supporting blended pedagogy and curriculum, and the impact of infrastructure and cost on programming and program success. In a review of mobile programs for development published by VOTO Mobile, Farmer and Boots (2013) suggest four barriers to the success of mobile education programs: "literacy, accessibility and technology limitations; challenges with Mobile Network Operator connections; unreliable delivery and connectivity; and a lack of human design knowledge and best practices" (p. 1). The latter of these findings points to the need to identify not only if programs work from the standpoint of the sender, but also how they are received, read, viewed and interpreted by the receiver.

According to the INEE survey, mobile phones followed laptop computers, desktop computers, and tablets as program hardware requirements currently in use. The relatively low usage of mobile phones specifically may reflect the unclear parameters for effective use of mobiles for education in conflict and crisis. Though computers and laptops similarly have inconsistent outcomes in educational contexts, using these tools for learning is more common and perhaps more comfortable for practitioners. Ultimately, it is the detail of context knowledge as well as the quality and appropriateness of pedagogical practices that makes any tool effective for education. Interestingly, relatively few INEE survey respondents indicated SMS networks (21 percent) as a program requirement, a hardware function that might hold power in conflict and crisis settings.

Building on Existing Open Educational Resources

Technologists, educators, researchers and humanitarian aid workers are looking to mobile learning and new technology initiatives to serve more people in ways that are cost and resource efficient. As such, it may be important for new initiatives to draw on existing and established resources to support their programming. Programs discussed in this report do just that, using Wikipedia and Khan Academy to reach young people in fragile contexts. Organizations like UNHCR Learn Lab are using SKYPE in the Classroom and Worldreader. Worldreader has expanded access to e-books through e-readers and also on mobile phones, since mobiles are already in the hands of so many. This creates an oppor-

tunity for rapid expansion and scale with potentially smaller financial requirements.

OER are an important part of this landscape. Initiatives like the **eGranary Digital Library,** for example, provide an offline Internet library. The built-in search engine and proxy mimic an experience like being on the Internet and provide access to established resources including Wikipedia, Khan Academy, MIT Open Courseware, and access to websites like World Bank and Center for Disease Control. Importantly, this device allows users to upload materials of their own and create their own websites. This function draws attention to the need for resources that are locally accessible at all times (offline) and the need for materials created within communities and in local languages. Collections available through eGranary are periodically updated and included in the cost of purchase (eGranary, 2013). Other organizations like Open Learning Exchange are also working on building digital libraries of open educational resources (Open Learning Exchange, 2014).

Considering the learning potential of existing online programs, companies like **Outernet** are also seeking to change the structure of how information is exchanged, and who has access to it. Using a satellite network to share digital information, Outernet's technology allows content to be shared and downloaded on mobiles, tablets, or computers without Internet access or other currently standard forms of communication infrastructure. The "free-to-receive" service creates a new landscape of possible access and distribution models for online educational content. Working with IREX and Bibliomist Libraries with IDPs in Ukraine, Outernet is using ICT to enable access to content that might support education in non-formal contexts like libraries.

Mobile phones, SMS, tablets, and laptop and desktop computers are tools that can serve and support education in conflict and crisis in many ways. Practitioners are facing obstacles reaching out-of-school children, lacking resources in school, and seeking effective ways to enhance quality of and access to education under the complicated and challenging conditions of conflict and crisis. Throughout different levels of education – teacher training, higher education, vocational training, school-aged formal and non-formal education – ICT can facilitate quality teaching and learning. It is possible that good programming using ICT has and will engage otherwise disengaged young people in literacy and numeracy, and provide unique and much needed opportunities for young people and adults to cultivate skills that can directly contribute back to their communities. Direct feedback from children and adolescents is needed to understand the role of technology in education in their lives. Co-designing with young people may result in innovative, locally relevant, community-oriented programming that works for and within unique contexts of conflict and crisis. More research to confirm positive outcomes of ICT use for education in conflict and crisis is needed.

Life Skills

In a unique example of technology innovation that does not use digital tools, but is still "mobile," Stanford University's Learning, Design and Technology Program has launched a project called **Beyond Boxes**. Beyond Boxes draws on existing resources – packing boxes already being shipped to remote communities – and prints information on the boxes, or packs materials inside the boxes, to support teaching and learning. Beyond Boxes "aims to leverage existing supply deliveries and distribution channels to increase access to learning in situations of conflict or crisis, where there may be school interruptions" (Beyond Boxes, 2015). Working in protracted refugee situations in Uganda, cardboard boxes are used as the paper to imprint instructions on and are used to cut out paper prototypes of tools like shoe soles (e.g. cut out different traces or prints and assemble them). In the case of Beyond Boxes, these are not digital OER, but share in the concepts of making teaching materials and learning modules available to communities at low-no cost, and doing so by building on existing resources. This type of initiative can offer additional teaching materials and support livelihood initiatives that involve the production of goods and services.

Photo credits: © OMPT

One Mobile Projector per Trainer (OMPT) employs video education to transmit important life skills to the most underserved and remote communities. The project delivers training and technology to local partners in communities looking to create digital videos. OMPT identifies that having a strong community network is crucial to the successful deployment of their initiative. Under this model the videos made are guided by community needs and local conditions.

For example, OMPT supported efforts to control the outbreak of Ebola in Guinea in 2014 by delivering video production training while the epidemic was underway. Using video allows for clear demonstrations of what to do in a way that a medium like radio, for example, might not be able to capture. OMPT delivers four-day video education workshops that include the basics of video production, editing, and the use of Windows Movie Maker, which is available for free on Windows machines. This train-the-trainer model builds capacity within local contexts, giving community members the skills needed to produce their own video messages in moments of crisis. These trained individuals can

then spread important messages throughout the community by screening the digital videos produced. [18]

3.4 Informal Learning

Informal learning provides opportunities for acquiring knowledge or skills from work, community engagement, media, and other day-to-day practices. Understanding the role of digital, visual, and social media is important to better understand the world young people live in, how and where they are learning about local history, current events, and other topics, and the nature of their education-related communication.

Digital & Visual Media

The role of visual media is important in the social and cultural landscape of conflict and crisis. Fincham (2012) discusses the role of traditional media, TV, YouTube videos, and of communication over social media in the (re)construction of nationhood for Palestinian refugee youth in Lebanon. In this example, visual media literally teaches young people about the world they are living in. This informal teaching and learning impacts the pre-existing knowledge young people have when entering formal and non-formal education spaces.

In a qualitative study of 50 Palestinian youth in camps, Fincham (2012) identifies that local political organizations used TV to broadcast their views of Palestinian nationhood to inform and shape the viewing community. According to Fincham, "TV is the most important medium through which symbolic systems of 'Palestinianess' are reproduced" (p. 129). Fincham (2012) explains that: "...in the absence of state structures, the social and political divisions between the school and the community become blurred as multiple civil society institutions, such as the family, political organizations, the media and religious institutions, work to produce and regulate identities in daily life" (p. 119). In this case, informal learning from many avenues impacts how and what individuals learn.

Organizations like **FilmAid** (FilmAid, n.d.) harness the power of digital and visual media through filmmaking and film screenings. Their work aims to engage communities in the production and dissemination of knowledge using this medium. FilmAid works with youth to teach them to create their own narratives, turn them into film, and use those films to engage the community in dialogue about the issues represented in their work. Mobile projections can be hosted in the middle of a refugee camp or disaster area with minimum electricity or connectivity. Members of the community are trained to facilitate workshops on health and protection issues, with the support of FilmAid's media content. They also engage in an important aspect of education: social support from the community garnered through film screenings and festivals. These types of digital video programs also create possibility for creative self-expression in a multimedia form (visual and auditory) that can allow for communication and discussion about a range of content also related to subjects taught in schools.

Social Media and Social Networks

The important role of social media and out of school learning in conflict and crisis is immense. Efforts to harness or create networks using digital and social media for informal learning requires in-depth engagement with local communities and awareness of possibilities, such as false or skewed messaging, that can shift and shape society and culture. The power of social media is accompanied by challenging questions related to control of information and the allocation of responsibility for communication as well as education in the event of conflict or crisis. Social media is in use and will continue to play an important role in the landscape of conflict and crisis. Researchers and practitioners are exploring the role of social media and social network sites (e.g. Facebook) for education.

Exploring the importance of social support in refugee education, Dryden-Peterson and Dahya (2012-2014) conducted research about the relationship between transnational support, ICT, and higher education in the Dadaab refugee camps of Kenya. In this research, mobile phones and transnational social networks were identified as important components of the higher education landscape for refugees. Participants in this research indicated that peer and teacher networks were key components to their educational success. They also indicated that access to higher education was integrally tied to ongoing communication with peers and teachers via communication on Facebook, and through text (SMS) and instant messaging (e.g. Facebook chat, WhatsApp chat, etc.) on mobile phones (Dahya & Dryden-Peterson, under review). Important information about program applications, university culture, and general motivations to continue were exchanged on these digital platforms.

Social media and social capital in this case are an important part of refugee pathways to education. Trusted networks in these communication landscapes matter immensely. Fincham (2012) suggests, "the Internet has transcended geopolitical borders and enabled Palestinian youth throughout the diaspora to communicate" (p. 129). Indeed, the spread of information in conflict and crisis over social media networks are shown to be important forms of participation that inform and influence communities in powerful ways. Studies focused on the role of social media, like using Twitter during disasters and crises, also show that important community

18 A selection of produced videos can be seen at OMPT's YouTube channel.

mobilization, organization, and information exchange happens over these platforms (for examples, see Starbird & Palen, 2012; Qu, Huang, Zhang et al, 2010). Understanding social networks may provide opportunities to crowd-source information from the community about educational needs, locate people, schools, and resources, and assess activities underway in real-time that impact teaching and learning.

The role of social media and communication technology has also been a cause for concern. Discussing ICTs in Kyrgyzstan, Matveeva (2013) describes how mobile phones, messaging, and the spread of digital videos inflamed conflict rather than diffusing it. Matveeva claims: "A prominent feature of new ICTs is that they more rapidly promote rumors in a society where people are inclined to trust rumors anyhow. Thus, ICTs need to be considered not in isolation but in how they relate to conventional, face-to-face social interaction: they magnify the messages already in public domain." (p. 61).

According to Matveeva (2013), in the case of Kyrgyzstan, attempts to provide information and early warning of conflict failed because the community there, at that time, had information gatekeepers who preferred oral communication and this left much room for alteration of content. In contrast, wealthy and middle-income countries with higher technological competence and existing social media use have noted social media technologies as important to the landscape of emergency response and communication (e.g. The "Arab Spring," see Hollow, Mitchell, Gladwell et al., 2012). Considering these cases, it is important for the larger context of a community's social and cultural design to be well understood in advance of launching new or building on existing digital and mobile social networks to support or inform about education in conflict and crisis.

Considering the scope of the projects discussed using digital video and social media, it is evident that their transformative potential requires strong support structures in the community of use. These networks propagate important – sometimes lifesaving – information that relates directly to learning, community organizing, emergency response, and long-term reconstruction. Caution is needed with regard to not only how and what information is spread, but also why certain pieces of information are distributed while others are omitted.

3.5 Inclusive Education

The concept of inclusive education, in its broader definition, focuses on shaping education systems and learning environments in a way to increase access, enhance acceptance, maximize participation, and increase achievement for all students (Artiles et al. 2007, p. 6). The aim is to enable equitable, collaborative participation of all children without discrimination and in a high quality education setting. Inclusive education calls for the acknowledgement of difference across learners and the inclusion of learners from different ethnic, racial, gender, sexuality, class, and ability based communities. Using ICT in crisis and conflict for the purpose of inclusive education, targeting girls and young people with disabilities, as well as groups otherwise marginalized from education, warrants further attention in this field. Ongoing gender disparities and the stark lack of access to quality education for children and young people with disabilities are a key concern in this report. Nicolai, Hine and Wales (2015) remind us of the heightened gender disparity for girls and young women in conflict-affected regions, and the ongoing reality that most children and young people with disabilities in conflict and crisis do not attend school.

Gender

It is well known that girls and women in developing contexts continue to face social and cultural roles and responsibilities that compromise their educational pursuits and limit their access to education, technology, and technology training (Haftkin & Taggart, 2001; Raftree, 2013; UN Women, 2005). Addressing pedagogical issues and interventions related to how ICT for education in conflict and crisis should be integrated for more inclusive education needs attention to mitigate rather than reify the existing divides.

A study by UNESCO on mobile reading focused on Worldreader and showed that people using Worldreader mobile were reading more overall. At the same time, UNESCO identified clearly that the adoption of Worldreader mobile was not created equal across the sexes: significantly more boys and men used Worldreader mobile compared to girls and women. However, girls and women who did have access read almost three times more than their male counterparts (West & Chew, 2014).

War Child Holland's eLearning Sudan - Can't Wait to Learn addresses inclusion directly to ensure that both boys and girls engage with the program. Girls are represented as role models in the applied game through instructional videos. Results have shown no significant differences between boys' and girls' engagement with the program, meaning that the activities' effectiveness is the same for both sexes. Projects like OMPT consider the need for single-sex viewing spaces.

The York University component of BHER recently completed its first full year of university-level courses in educational studies. Thirty percent of the students who completed their first year in this program are women. The recruitment of women is the result of deliberate interventions at the BHER application stage and as a result of later support related to female retention. Retention efforts have included making nursing rooms available at The Learning Center and being flexible with class attendance and assignment deadlines for all students.

In an example from Pakistan, a government money transfer initiative to support girls' education faced challenges with regard to getting funds to girls and their families. The cost

of dispersion of funds sometimes outweighed the stipend provided, and getting the cash out on time and in full posed a challenge. In response, working with Telenor, Easypaisa was adopted to ensure that the stipend provided for girls' school supplies and fees are delivered directly and securely to the recipients using mobile money transfer (Telenor, 2015).

Inspired by the success of cash-transfers to support development in other sectors in Haiti, the government of Haiti introduced **Ti Manman Cheri** – a conditional cash transfer initiative targeting mothers with children in primary school. Here, cash-transfers were used to support women living in poverty by incentivizing their support of children going to school regularly. However, Zimmerman and Bohling (2013) have identified a number of challenges from the early design and implementation stage of Ti Manman Cheri. These challenges included unforeseen interruptions to payment schedules and the need for women to walk long distances to have their payments cashed out. These are a few examples of how ICT for education projects in conflict and crisis are targeting girls.

In any ICT for education project, measures should be taken to ensure that women's access to and training with technology at the student and teacher level are equal to boys and men. With regard to creating gender equitable spaces when using technology for education, Jenson (2012) argues: "To change the status quo takes direct intervention: training women along side men, recruiting them to learn how to service ICTs, and placing ICTs in their hands directly rather than allowing them to stand back while their male counterparts take control. In gender equity intervention projects, this [equality] has been best accomplished through interventions that at least initially allow women to 'skill up' in women's only groups, with female mentors and female instructors." (p. 44) Initiatives that require technology training should ensure girls and women have dedicated and hands-on time with technology.

Kleine et al. (2013) highlight that men and boys often dominate technology and control the social engagements and leisure activities of girls and women. This is a crucial point to remember when implementing an ICT for education project. In addition, girls must be protected from sexual exploitation that can be mediated by technology (see Kleine et al., 2013 and Mitchell, 2011 for further discussion on this topic).

Burde et al. (2015) identify that none of the 184 empirical studies examined for their report on education in crisis-affected contexts were designed specifically to focus on the girls, though some studies compared learning outcomes and impact between boys and girls (p. 54). Only 17 percent of INEE survey respondents indicated that their ICT interventions focused on gender. According to the INEE Pocket Guide on Gender, gender-responsive education should address gender barriers, respect difference related to gender identity, support gender equity and parity across educational structures, and work to eradicate gender discrimination (INEE 2010b, p. 8). More work on gender equity using ICT for education in conflict and crisis is needed.

Disability

Young people with disabilities are more likely to face exclusion from education – a serious problem considering that disability is correlated with poverty (GMR, 2015). Disability status is an important predictor for non-enrollment in school, more so than socioeconomic status, location in a rural community, or gender (GMR, 2015).

Intersecting factors like gender and disability status can create even greater cause for concern, where young people like girls with disabilities are especially at risk and marginalized from society and school. Barriers to supporting young people with disabilities include, "a lack of understanding about forms of disability and disabled children's needs; insufficient resources to accommodate diverse needs, including a lack of teacher training and physical facilities; discriminatory attitudes towards disability and difference; and poor data on which to build policy" (GMR, 2015, p. 101; see also WHO and World Bank, 2011).

According to a UNESCO (2010) report on using ICT for inclusive education, ICT can enable participation in educational activities like reading and writing, can transform educational approaches to create more inclusive learning environments, and can be used to enable or augment communication. Mainstream technologies such as computers that come equipped with accessibility features are one means of fulfilling these possible ways to support students. There are also formatting styles that are considered to have 'accessible' functions including HTML (Hypertext Markup Language) and DAISY (Digital Accessible Information System) books. Traditional formats like Braille can also be adopted and made accessible by using ICT. Assistive technologies like hearing aids, screen readers, and adaptive keyboards are also important in the ICT for inclusive education landscape (UNESCO, 2010, p. 2).

However, the use of ICT for education can also run the risk of further excluding the already marginalized. Conflict and crisis result in significant emotional, psychological, and physical trauma for young people, and attention to disabilities within education and when using technology in these contexts is important. No case studies targeting persons with disabilities in crisis and conflict were found throughout the research conducted for this study, despite the explicit interest of the author and commissioning parties to identify such projects and explore their success and challenges.

3.6 Conflict Sensitive Education and Do No Harm

According to INEE (2015), conflict-sensitive education should consider local contexts of conflict or crisis and analyze the two-way interaction that ensues between local contexts

and education systems or programs. In addition, conflict sensitive education should work towards minimizing harm and negative impacts on the community while maximizing positive impacts. The network of factors that are part of this conflict-sensitive education landscape are further complicated with the adoption of ICT. Technological tools can both support inclusion and exacerbate exclusion. This section will focus on specific ways in which ICT use for education can cause harm, further exclude, or risk inflaming conflict.

The Politics of Content Creation

With regard to refugee education specifically, Dryden-Peterson (2011) identifies that, "The inherently political nature of the content and structure of refugee education can exacerbate societal conflict, alienate individual children, and lead to education that is neither of high quality nor protective" (p. 82). Examining the nature of content available is important. Education can be laden with inconsistency and politicized content in host and home countries in and after conflict. For example, Paulson (2015) discusses how issues of nationality and political identity are intertwined with history education in ways that can both help and harm the reconstruction of conflict and post-conflict communities. Under these inconsistent and contentious conditions, understanding the role of technology to support education, and to help ensure content is appropriately and responsibly delivered, is important.

One key concern in this discussion is related to whose content is being shared and what impact that content might have in conflict and crisis settings. Throughout this report numerous examples of programs drawing on existing digital resources were presented. In the review of literature that has informed this manuscript few questions about the impact of content created outside local and target communities emerged. This is especially important when building tools or providing access to content for distribution internationally – often created in the West – that may be laden with particular values, beliefs, or incomplete historical representations of both local and global issues.

In addition, pre-recorded content available to and shared across personal devices, like mobile phones, can have reach beyond the individuals enrolled in the program for which it was intended. This is not necessarily harmful, nor is it necessarily useful. It may be worth considering the nature of the content recorded and how or if it requires structure and scaffolding to be understood. Sensitive content, for example, that relates to gender-based violence or addresses historical, political, or international topics, should be assessed for potential to be misunderstood if digital content is distributed outside its intended form.

Data Management, Privacy, Security, and Ownership

The question of data management, privacy, security, and ownership with regard to ICT initiatives that enable education warrants conversation. In some cases, data collected is anonymous and personal information is hidden from view by design of the data collection tool in use. Sometimes, however, protection of population identities is dependent on how data collection tools are used and who is collecting the data. The important questions here pertain to who owns digital data, how that information is secured and protected, and to what extent the subjects of data collection understand how that information will be used.

This discussion needs to be made deliberate by everyone involved in ICT for education in conflict and crisis work because the risks are immense. Consider, in what ways might digital data be used against beneficiaries or for partisan political gain? What are the political implications of large data sets that geo-map or locate schools, for example, in the context of schools being recent targets of conflict (e.g. in the 2015 shooting of 148 university students in Garissa, Kenya and the 2014 kidnapping of 248 girls in Nigeria by Boko Haram)? Mancini and O'Reilly (2013) suggest that digital information can be leveraged to "incite violence, promote conflict, and perpetrate crimes…[R]estrictive governments can use information and communication technologies to prevent information from getting to one group in society and identify members of a dissenting group..." (p. 90)

Approaching the topic from an even larger conceptual scope, who – politically, in terms of governments and agencies – controls data collected in the context of humanitarian aid or development cooperation? There is power in information and in having information. Children's individual profiles, classroom demographics, regional educational initiatives, etc. could be misused in politics, for capitalist economic gain, or outright exploited to pernicious ends.

The question of privacy rights, the right to be forgotten, and other legal frameworks for data collection and protection requires further attention in projects using ICT for education in conflict and crisis. Meaningful discussion about this topic requires a high level of both experience and knowledge regarding the possible outcomes and implications of digital data.

Do No Harm

Conflict-sensitive education identifies the importance of minimizing negative impacts on communities' involved in and surrounding educational initiatives. Minimizing harm when implementing a new ICT initiative may include managing expectations and providing technical support to better ensure positive engagements with new technology and digital content. Unfulfilled hopes and promises related to technology-based or technology-enabled programs that fail could break trust and demoralize communities. A loss of trust and demoralization as a result of a failure to deploy, integrate, or adopt new technology can dissuade people from engaging with important educational tools and programs in the long-term. Klein et al. (2013) suggest, "Every time

a project fails, some of these hopes get dashed – often in contexts where hope is in short supply" (p. 47). Such failure risks exacerbating "digital divides" regarding who uses new technology and who does not.

Throughout this research, it has also become clear that some organizations are uncertain about the full scope of how their technology solution is implemented in contexts of conflict and crisis. In some cases, the process of following the impact of a program is deferred to community partners. Such divisions of labor leave much room for questions about who is responsible for the outcome of projects, particularly when multiple collaborators divide workflow without a primary person overseeing the full scope of a project in each context of use. Contractors and educators offering technology solutions that can be applied across settings (e.g. software) should consider the potential reach and impact of their tool or product, particularly if they are open source. Technology creators who aim to serve communities in conflict and crisis can provide information about their tool ranging from integration with existing technologies to privacy and security. Importantly, when a technology is being used in a community someone on the project team should have a view to both the technological implications and educational possibilities of the tool's use in that context.

Considering further marginalization of already vulnerable communities, there is good reason to question the ethics of running pilot projects or beta-testing new tools or initiatives in already fragile contexts. "Control studies" by design provide a service or intervention to some community members and not others. A risk assessment of potential harm is necessary at the outset of any intervention or testing. A plan to ensure that all control study members (control group and intervention group) receive the benefits of the project successes at some point later on should also be included. This may for instance simply concern the technological literacy acquired when using the new tool.

In addition, it is important to recognize the value of in-depth case studies and descriptive qualitative research that can offer insight and empirical evidence without forcing "control" into highly uncontrolled – and uncontrollable – environments, particularly with regard to the social and cultural impact of a new ICT initiative in contexts of conflict and crisis. Importantly, locations of conflict and crisis are not experimental "labs". Careful research into previous and existing programs, and their success and failures should be completed before any pilot testing. This includes looking to literature and projects in broader development contexts where much research has been done (see Annex 1). Consultation, collaborative design or development work with the target community is also crucial.

There may be a gap between established practices for conflict-sensitive education in conflict and crisis, outlined by INEE in the Conflict Sensitive Education Pack, [19] and the development and implementation of ICT for education initiatives in these settings. The INEE conflict-sensitive education guidelines and protocols should be referenced and incorporated into ICT for education initiatives. An ICT focused supplement is needed.

Inclusion of Host Communities

In situations of forced displacement, the inclusion of host communities is an important aspect of Do No Harm. In some cases, host communities are equally poor and lacking in educational resources as refugees. This, too, is an important consideration for conflict sensitive education considering all community members who will be impacted by new initiatives in education in these complicated settings. The influx of refugees can seriously impact local conditions, change classrooms, and alter social and cultural norms.

Teachers in countries like Turkey, who are hosting Syrian refugees, are faced with changed classroom landscapes, students who do not speak Turkish, and students with varied psychosocial needs. These conditions, along with double-shift school schedules for refugees, mean host communities are hugely impacted by the refugee crisis (Jalbout, 2015a). Ensuring that access to new tools is inclusive of host community members, and that opportunities facilitated by ICTs also reach host communities, is important.

19 http://toolkit.ineesite.org/inee_conflict_sensitive_education_pack

CHAPTER 4: A Discussion on Sustainability and Scale

Questions of both sustainability and scale are at the forefront of discussion with regard to examples of ICT for education in conflict and crisis settings. Interesting initiatives are being designed and deployed using ICT for education but their expansion and longevity are unclear. Organizations and technology developers are working with and under very different parameters in formal and non-formal contexts, when looking to enable education. This section addresses some of the needed considerations for new projects and for building on existing education systems in conflict and crisis. Sustainability and scale are discussed with reference to different phases of conflict and crisis, such as "rapid response education" in or immediately following an emergency, pilot projects, and longer-term initiatives.

4.1 Rapid Response Education and Pilot Projects

Partnerships and alignments with governments and school systems take an immense amount of time and work. This reality points to a tension between those projects seeking to offer some learning, activity, or engagement desperately needed for children and youth in conflict and crisis settings immediately, and those setting the foundation for the reconstruction or development of educational systems in the long-term. In effect, the transition from "relief" to "development" for education in conflict and crisis presents a range of challenges, including competition for limited resources, poor coordination of procedures involving both donors and governments, and difficulties in humanitarian aid and response staff transitioning to longer-term development models of practice (Mendenhall, 2014).

Part of the challenge of sustainability related to ICT for education in conflict and crisis is the immediacy and unexpected onset of conditions that warrant intervention. Funds to support education in emergencies and in environments of protracted crises and fragility are even more precarious than those for education in development more broadly. There is indeed an expansive gap between funding available and funding needed for education in conflict and crisis settings. Funds that are available are often short-term and unpredictable (Nicolai, Hine & Wales, 2015), making long-term projects all the more challenging. Strategizing opportunities for funding from ongoing and repeated funding calls, and establishing relationships with corporations and private donors whose interest might align with a project, is important for long-term deployment. [20]

In a series of essays on the subject of scale in humanitarian aid written for The World Humanitarian Summit, Dan McClure and Ian Gray (2015a) identify that pilot programs appear to be proliferating, and in some ways showing success in local contexts, though without much clarity or evidence about how, when, or if these projects can expand to reach more people. Part of their proliferation may relate to the reality of short-term funding cycles that make long-term planning difficult. This is especially true with the added and sometimes changing costs of ICT, ICT training, and ICT maintenance.

Taking into consideration that in many cases there is no time and there are no funds for pilot studies, this phase of development can seem arduous and impractical. Ensuring there is some collaboration between governments and community groups delivering education in the transition from relief to development is important (Menhenhall, 2014). McClure and Gray (2015a) suggest that many organizations are "innovating outside their core competencies" (p. 5). As such, building on established programs, co-designing with community members, using technology already in use locally, and creating strong partnerships with funders may offer the support needed for new ICT initiatives to succeed and be sustained in the long-term.

Tensions related to providing access to education and learning opportunities and establishing more long-term opportunities for accredited schooling are evident. Regarding the Syrian refugee crisis, Matt Streng from MercyCorps explained their current position on scalable education in Gaziantep, Turkey: "...adolescents have limited mobility and lack of access to formal education which has compelled us

20 Annex 4 presents a list of ICT initiatives underway for education in conflict and crisis that might serve as a starting point.

to think beyond formal education and ministry run school… We felt that if we were going to reach at-risk adolescents not in school at scale, we would need to find technology that would allow us to increase that access." In this region, programs at schools and community centers are not always available to adolescents because of transportation costs, safety and security issues, physical or psychological trauma, or because young people are working to support their families. Streng continued, "What we're asking ourselves now is how can technology allow an adolescent to learn from wherever they are, regardless of if that's their home, or getting together with others at a café with a tablet and learning side by side." (Streng Interview, November 2015). In this case, scale is closely tied to access and opportunities to learn.

Matt Streng also explained that in their adoption of tablets for non-formal education in Turkey a shipment of donated tablets was held up due to customs procedures. As a result, they opted to purchase tablets locally in Turkey instead (Streng Interview, November 2015). Such a lesson learned highlights both the importance of building on locally available resources as much as possible and being open and flexible to changing project plans as real-world barriers and needs emerge. Understanding the notion of a "pilot project" as an iterative process – not a rigid test or experimental design – may better serve the complexity and uncertainty of conflict and crisis settings (see McClure & Gray, 2015b and 2015c for more discussion on this). This does not mean learning outcomes or other evaluation measures are ignored. Rather, an iterative research and design process means engaging with community and altering practices along the way.

Integrating with larger social, political, and economic systems that support sustainability and scale can be difficult. McClure and Gray (2015b, 2015c) argue that scaling up requires added complexity related to filling program gaps, implementing quality control mechanisms, and supporting administrative processes. Scaling up requires "plugging in" to the complex world in which the initiative exists. Sustainability and scale cannot be afterthoughts to the development or even pilot testing of a new initiative. They must be addressed at the start and adjusted throughout the implementation of a project, which also requires research and evaluation along the way.

There is an additionally pressing question about whether or not all projects can be or should be scaled. The proposition is not to discard small, focused, context specific projects. Rather, the question is: Within conversations about scale, can the value of small, local, focused projects also be recognized? How can projects that are good in a specific context and at a small scale also be continually funded and sustained? How might small projects, not meant to scale up or out, support pathways into other and more formal schooling?

For projects that do scale, a project that has been scaled up cannot simply be dropped down into a different environment (McClure & Gray, 2015a). Kate Radford from War Child Holland explained, "If it was so simple we would have done it years ago." She also explained it is the building blocks of educational programming that are the foundations of good teaching and learning, and that these building blocks are the most readily transferable components of a program into different contexts.

Unique considerations regarding what type of technology to use for an educational initiative are based on a range of factors. These include the type of technology that is appropriate for the educational purpose and also within the region, with the specific conditions of conflict or crisis in mind. Launching projects, ensuring they are sustainable, and effectively scaling them up in size or out to other contexts requires a detailed and locally situated understanding of what types of technology are available, can be maintained, and are already in use at every stage.

4.2 Reconstructing Education Systems

The failure of bridging projects, rapid response, and pilot projects sometimes relates to a lack of integration into certified, accredited school programs or "next steps" along pathways to education. When intentions are to support formal education, aligning educational initiatives with regional curriculum can support the possibility of sustainability and scale in the future. This is more likely in long-term development contexts and/or in post-conflict situations where some infrastructure is being redeveloped. Several projects referenced in this landscape review describe an interest to align with ministry-approved curriculum. Such decisions and planning are needed from the outset of a project to better ensure goals for curricular accreditation are met.

According to the INEE survey responses, the majority of programs using technology for education are in long-term development settings (48 percent) and in post-conflict recovery and response settings (50 percent). Working with governments and formal curriculum when possible can support long-term education initiatives and this is no different when working with ICT. [21]

21 Consider a non-ICT related example from the Democratic Republic of Congo, a country with a considerably strong education system in sub-Saharan African in the 1980s, when 25 percent of the government budget was allocated to education. In 2010 that number was at a mere 2.5 percent, up from the 1 percent budgetary allotment of the 1990s and early 2000s (Torrente et al., 2015). In 2001, UNHCR and IRC began working with refugees in the Bétou district of the Republic of the Congo. Collaborating with the Ministry of Education (Democratic Republic of Congo), UNHCR and IRC identifed a process for refugee students to follow the home country curriculum and receive certification for completion of primary and secondary education. In this case, similarities in host community language and customs made this type of initiative more viable and created smoother transitions across these educational contexts (UNICEF, 2015).

In the example of War Child Holland's eLearning Sudan – Can't Wait to Learn project, the Ministry of Education in Sudan was involved from the start and engaged in the curriculum and learning modules built into the applied game they developed. One focus, in addition to the existing community engagement, was the larger ecosystem of support for the project (e.g. ongoing funding, technical support, research evidence). Kate Radford from WCH discussed scaling out in the following way: "Can we develop an adaptable model? I use the word 'adaptable' not replicable. An adaptable model that can be used in multiple conflict and crisis settings…it's a huge balancing act." (Radford Interview, November 2015).

Sustainability of ICT use is only one component of sustainable programming overall. An important part of the sustainability of the BHER project, as another example, is the continuation of government sponsor funds and agreements among the partner universities about how to subsidize enrollment costs. Currently, all refugees enrolled pay no fees due to subsidies arranged for by the universities. Such negotiations with university administrations took 1-2 years to organize before the project could be launched.

Looking at formal education initiatives discussed in this report, their complexity is evident. Long-term and large scale formal education projects conduct feasibility studies, and partner with national and regional government sectors, local NGOs, and technologists as needed for their projects; they often take years to really get going and then incrementally develop, refine, and grow throughout the implementation phases.

Sustainability and scale are challenging aspects of this landscape and require further attention. In particular, close consideration for different types of conflict and crisis and their stages of development should be explored in relation to both educational program types and technologies available across these varied conditions. And, clear assessments of project goals and learning outcomes are needed from the start of a project in order to build towards sustainable, scalable programming.

INEE survey respondents indicated that many of their projects had evidence that their technology solution improved learning outcomes or met the educational needs of the target community. However, to the question, "Has an evaluation been carried out for this solution?" only one quarter of respondents answered "yes". These conflicting responses demonstrate an ongoing gap between implementation, particularly of new programs, and evaluation with regard to ICT initiatives for education in conflict and crisis. There is a direct relationship between assessment and evaluation of pilot as well as more established programs and creating sustainable projects that can move to a larger scale.

CHAPTER 5: Conclusions and Recommendations

This report has unveiled a diverse landscape of ICT for education in crisis and conflict with a large and growing number of initiatives and projects. Overall, many projects were identified, operating in different contexts such as protracted crises, post-conflict settings, refugee settings, or health crises (see Annex 4 page 42). Despite the diversity of projects, approaches, and settings, a number of general observations and patterns can be deduced. These are depicted in the following summary points.

5.1 Summary Points

(1) **Settings:** The majority of projects operate in post-conflict settings and focus on long-term development.

(2) **Major areas of programmatic focus:** The two major areas of programmatic focus are teacher training and student learning. Despite the high potential of ICT for education system strengthening – facilitating data collection, paying teachers, or improving administration – the project landscape shows much more room for growth in this area.

(3) **Technology usage and multifaceted approaches:** Most projects offer technology solutions based on the use of laptops, desktops, tablets, or mobile phones. A characteristic of programs working in post-secondary education – including higher education, teacher training, and vocational training – is that multiple tools and devices, online and offline solutions, are combined to ensure that the target group can be reached through different channels, under unstable and fast changing conditions of crisis and conflict.

(4) **Human resources:** The examined case studies confirm that human resources and teachers are still crucial to the success of educational initiatives and projects. Trained, local instructors are essential to the successful delivery of education in conflict and crisis. Good blended learning practices involve using technology to support face-to-face learning – technology is being used to leverage human resources. Human resources are an important element of the above-mentioned multifaceted approaches. Teachers play an important role in facilitating learning processes and also in improving psychosocial wellbeing.

(5) **Learner-centered pedagogy and community-based practices:** Programs using ICT to enhance basic education, and education focused on teaching and learning with children and youth, are adopting learner-centered pedagogies and community-based practices. These include and build on the use of different types of devices to engage children and adolescents in interactive, culturally relevant, inclusive learning. Community-oriented programming means technology is used to bring learners together, and to situate learning and deliver programming in locations that are accessible to people facing conflict and crisis (which might include homes, cafés, and community centers, as well as schools). Technology is also used to facilitate peer-to-peer learning in school and community contexts.

(6) **Content:** Efforts are being made to build on existing and established OER. The advantage of OER in crisis and conflict is that learning materials can be made available, rapidly, at low cost, and adapted locally to specific target group needs. This can be particularly useful in humanitarian contexts, where fast action is necessary.

(7) **Informal learning, digital video and social networks:** Digital video is being used in non-formal education and for informal learning in important ways, including imparting necessary life skills to communities facing conflict and crisis and by creating community dialogue about important topics. Social media and virtual social networks are an important part of refugee pathways to education. Social media and networks can be a crucial source of information for displaced people in search of access to education.

(8) **Sustainability and scale:** Most projects are still at a pilot stage, testing innovative approaches and technologies; a few are just starting to scale up and/or scale out their activities. There is no single or simple model for either sustainability or scale given the diversity and complexity of contexts in conflict and crisis. Different types of programs and their purpose, context, and target communities served require distinct considerations with regards to sustainability and scale. For instance, a different approach to sustainability and scale might be necessary in an acute emergency phase caused by natural disaster or epidemic compared to a long-term refugee setting. One challenge with regard to sustainability and scaling-up ICT-supported education interventions is the lack of consistent and long-term funding in emergencies and protracted crises.

In closing, the current landscape demonstrates that there are many accomplishments in the area of ICT for education in conflict and crisis with regard to effective, valuable, and meaningful initiatives underway. However, there is also much work to be done to further harness the unique possibilities of ICT for education in conflict and crisis. There are still knowledge gaps to be filled, unexploited potentials, and room for improvement. The following recommendations are an attempt to highlight important gaps, identify areas requiring greater attention, and to propose action steps that may support and serve target communities and practitioners.

5.2 Recommendations

(A) Focus on Efficient Technology Usage, Local Maintenance and Procurement

Single devices, such as the pico projectors used in the CTL project, can reach numerous beneficiaries at the same time. This is not only cost efficient, but also facilitates group learning. When choosing a technology to deploy, the range of its potential to reach more than one individual with a single device should be considered and strategies to make use of this potential should be developed. Projectors are just one example, but as the coverage of mobile and smartphones is rapidly growing their potential for multiple usage and usage by multiple beneficiaries can also be further considered. In this case, we can also learn from humanitarian agencies that already use mobile phones to multiple ends in their daily work, to reach beneficiaries, collect and share information, and manage clusters.

Another important aspect related to technology and sustainability is the use of locally available tools and technologies. The advantage is that high procurement and maintenance costs are avoided and learning processes are facilitated, as beneficiaries do not have to adapt to technologies they are not familiar with. This can also increase the sustainability of ICT-supported education interventions and better ensure local maintenance options are possible. Therefore, when considering bringing in a new technology, disadvantages and advantages should be weighed in context and in consultation with the community. A protocol for training and maintenance should be created for each setting.

A better understanding of how and where to get the right type of technology for an educational initiative in a specific context is needed. A support structure or online database of information pertaining to technology procurement in the context of conflict and crisis will be helpful to guide practitioners when making decisions about technology options. Human support in the form of regional expert consultants is necessary to mobilize local technologies.

(B) Have Clarity in The Purpose and Context of ICT Use

Large-scale ICT initiatives designed to support education require fair assessment of local conditions and a clear definition of purpose before implementation. This might seem self-evident, but this review has shown how important it is to adapt programs and technology solutions to their context of implementation and with explicit learning goals or system support in mind.

In addition, it is common that innovative ICT solutions are first developed outside of the local contexts in which they are meant to be applied. More discussion about the opportunities and limitations to adopting software and hardware under a range of conflict and crisis settings is needed.

The choice of when to use which device is dependent on a range of factors: security in local regions, access to mobile devices by beneficiaries, condition of computer labs, Internet strength and access, and pre-existing literacy levels of participants are just a few of the relevant considerations for ICT use in conflict and crisis. Importantly, projects should continuously re-adapt to changing local conditions and re-assess needs, if necessary.

A clear purpose that is fit for specific contexts is always needed and programs should remain flexible and aware of changing conditions, and of changing and locally available technology. Such a complex and iterative approach to "purpose" and "context" is both challenging and necessary for success using ICT for education in conflict and crisis.

(C) Consider "System Strengthening" Initiatives

The use of ICT for education in conflict and crisis has not yet been brought to its full potential with regard to system strengthening initiatives. One reason might be that system strengthening is not an easy undertaking – and probably neither a priority – under conditions of acute crisis. But the examined case studies have shown that ICT can make an important contribution to system strengthening in the form of data collection in humanitarian contexts or rebuilding education systems in post-conflict settings by facilitating teacher payments. With regard to mobile cash transfer, programs should focus on issues of accountability, preparedness, and collaboration for greater chances of success (see p.13). Overall, more compilation and analysis of best practice related to system strengthening in crisis and conflict is needed. As mentioned above, experience from managing humanitarian aid clusters could be a good point of reference.

(D) Attend to the Needs of Inclusive Education

ICT initiatives for education in crisis and conflict do not necessarily reach or impact girls and boys the same way, or reach young people with disabilities. Only a few examples of projects focusing explicitly on inclusive education and on

these specific target groups were identified in this review. This absence points to one of many areas requiring greater attention in this field.

Ensuring equitable, inclusive, and gender-responsive education may seem very difficult in crisis and conflict settings; however, emergencies can often provide unexpected opportunities for innovative programming and change if we look for them (INEE 2010a; 2010b). ICT have the potential to support inclusive education in these difficult contexts, but should also be looked at from a Do No Harm perspective with regard to particularly vulnerable groups.

More information about the impact of ICT for education initiatives in conflict and crisis focused on girls/women and young people with cognitive or physical disabilities is needed. In addition, there are other vulnerable populations who are, for instance, minority ethno-racial or religious communities within refugee camps, and in rural and urban settings. Research and program development related to gender, ability, and other issues of inclusion and equality for underrepresented groups should be a priority for donors and governments.

(E) Consider Do No Harm and Conflict-Sensitive Education

More discussion about the complexities of conflict-sensitive education and Do No Harm within the domain of ICT for education in conflict and crisis is needed. Before starting a program, one should consider how digital data could be used against beneficiaries or for partisan political gain. Issues pertaining to privacy, security, and ownership of digital data also require in depth discussion.

Other considerations for Do No Harm include the political nature of educational content, particularly when derived from external resources, and taking into account the needs of host communities. Technologists and educators in conflict and crisis settings should draw on existing conflict analysis tools (e.g. the INEE Conflict Sensitive Education Pack) to help evaluate the appropriateness of ICT supported education interventions in crisis and conflict settings. An ICT supplement focused on conflict-sensitive education and Do No Harm is needed.

(F) Identify Accreditation and Certification Mechanisms

Mechanisms for accreditation and certification using digital technologies are not a focus of discussion in the ICT for education in conflict and crisis landscape, though accreditation and certification are key to sustainability in this field. When learning outcomes are officially recognized they can give young people real prospects for the future. The possibility of digitizing accreditation in ways that are sharable, accessible, and internationally recognized warrants discussion in the use of ICT for education in conflict and crisis. So too is the topic of digitizing curriculum to make the creation of accredited and certified programs and pathways easier.

With regard to the current refugee crisis, accreditation and certification are important for preventing a 'lost generation'. War Child Holland's eLS project is a good example of how a program can, from the beginning, ensure that content is aligned with formal curriculum, that learning outcomes are officially recognized, and that first and small steps in educational programming lead to next steps in pathways to education.

ICT initiatives in crisis and conflict supporting non-formal learning can also make a valuable contribution to children's education, especially in acute humanitarian emergencies. They should find ways to accredit or certify learning, or lead into accredited or certified opportunities that can transition into formal education.

The Qingdao Declaration stipulates that the potential of innovative ICT-based approaches in certification and assessment could be used to "promote recognition, validation and accreditation of the knowledge, skills and competencies acquired through informal and non-formal settings, and to build bridges between formal, non-formal and informal learning" (UNESCO 2015a, p. 3). More attention should be paid to "quality assurance and recognition as crucial and interlinked elements for enhancing the relevance and credibility" of ICT-based learning (ibid., p. 2).

(G) Acknowledge The "Claims vs. Evidence" Gap and Compile Resources

An apparent gap from this review is related to research evidence, knowledge mobilization, and information management.

The INEE survey demonstrates that although most respondents claim that their technology solution is improving learning outcomes or meeting other educational needs of affected populations, they also admit that an evaluation had not been carried out for their solution. Increased monitoring and evaluation would facilitate mutual learning across different types of education initiatives and sectors.

Failure should also be well documented as valuable lessons can be drawn from unsuccessful efforts and initiatives. Research should be both qualitative and quantitative to enrich our understanding of the complex social and cultural impact of ICT for education initiatives and learning outcomes. Greater consultation and conference with community members about the quality of their experience and interests in using ICT for education in conflict and crisis is needed.

Within the existing literature and information on projects, the parameters of development, implementation, intended outcome or evidence of success, cost, and scale, are often unclear. Better documentation of project experiences and

impact, in terms of meaningful participation and outcomes for target groups, and more research with regard to ICT for education in conflict and crisis are needed.

While more documentation and access to information about projects, research, evaluation, and related theory are needed to enrich our work in this field, so too is a means of compiling those resources. A platform for knowledge management and information exchange allowing for rapid updates and upload of new projects and reports as they emerge is needed. Such an initiative might combine the use of a data collection tool with existing databases and networks, such as INEE.

(H) Create Cross-Sectoral Collaboration

Potential synergies from cross-sectoral collaborations should be further explored. Referring to the new Sustainable Development Goals (SDGs), Le Blanc (2014) argues that one of the distinct attributes of the SDGs that warrants attention is the need and opportunity for integration across goals as a "network of targets". With this network approach in mind, it is useful to consider, for example, how health and child protection overlap with ICT initiatives for education (e.g. data collection for education and health). Projects may benefit from collaboration and partnership focused on cross-sectoral, locally situated problems related to education. FHI360's REACH application is a good example for possible synergies.

(I) Explore Informal Learning Structures

Digital media and social networks can be important vehicles for information on access to education and support educational initiatives. However, information needs to travel through trusted networks: inappropriate uses or efforts to spread messages outside of trusted community networks could fail or, worse, inflame conflict or crisis. Educational initiatives incorporating or drawing on information distributed in everyday social and cultural activities might be harnessed for more formal educational purposes, possible only if support structures (human resources) to facilitate discussion and mediate community engagement are in place. Better understanding the role of online and other forms of virtual social networks (e.g. text messaging) is needed to build on these existing communities to support education.

5.3 Concluding Remarks

The strength in using ICT for education in conflict and crisis is delicate, simultaneously positioned on the margins of precarious contexts and great possibility. The idea that technology can solve all problems is long past; rather, the current era of technology development and use in education makes clear that technology is a tool to support, facilitate, and enable good teaching and quality learning.

Like any tool, technology can cause as much harm as good. Our responsibility is to harness the potentials, but also to understand in depth and with due diligence the potential positive and negative impacts of new ICT, or ICT-integrated programs, for education in conflict and crisis. There are evident tensions between acute crisis as well as the need for fast action, and attending to certain requirements for quality, sustainability, and contextual appropriateness. It is important to bear these tensions in mind and to find ways to balance them.

Certainly more evidence and empirical research is needed across the ICT for education in conflict and crisis sector. Innovation in educational programming with technology needs to start by building on good educational practices and those ICT initiatives with documented, demonstrated success. Such examples might be found in developing and developed contexts as well as in conflict and crisis specifically.

Although new approaches, models, initiatives, and interventions should start small with pilot projects, those pilot projects do not need to start from scratch. ICT for development, ICT for education, education and technology, humanitarian aid and development, refugee studies, and refugee education are all existing and established fields with various forms of research and reporting available. Though indeed better documentation and better-defined evaluation parameters are needed, no project is or should be starting from zero.

The great possibilities of ICT for education in conflict and crisis are entirely tied to the ongoing, thoughtful, complex work of the people teaching, developing tools, designing curriculum, and administering funds for education. Continued communication and exchange across these dedicated people and communities may exponentially benefit the field as a whole. Important to the conversation is a reminder that communities living through the tragedies of conflict and crisis are people with a wealth of knowledge and expertise. In each context, decisions about education, teaching, learning, and system strengthening require partnership and collaboration in and with those communities for whom education is a priority, and for whom ICT already play an important role.

Annex 1: List of Related Academic Journals

***Selections of journals easily accessible and relevant to practitioners are highlighted in blue.**

Journal Name (Hyperlinked)	Broad Subject Terms
Asian Journal of Communication	ICT
Asian Journal of Information Management	Information or Knowledge Management
Conflict and Education	Conflict or Crisis, Education
Conflict, Security, & Development	Conflict or Crisis, Development
Crisis Journal	Conflict or Crisis
Crisis Response Journal	Conflict or Crisis
Development	Development
Disasters	Disaster
Emerging Scholars and Practitioners on Migration Issues	Forced Migration Studies
Electronic Journal of Information Systems in Developing Countries	ICT & Development
Ethics and Information Technology	ICT & Ethics
First Monday	ICT
Forced Migration Review	Forced Migration Studies
Futures	Humans & Technology, Social Change
Human Rights Quarterly	Human Rights
Human Technology	Humans & Technology
ICTD Conferences	ICT
Information, Communication & Society	ICT
Information Development	ICT & Development
Information Technologies & International Development	ICT & Development
Information Technology for Development	ICT & Development

International Journal on Advances in ICT for Emerging Regions	ICT & Development
International Journal of Conflict Engagement and Resolution	Conflict or Crisis
International Journal of Conflict and Violence	Conflict or Crisis
International Journal of Conflict Management	Conflict or Crisis
International Journal of Distance Education Technologies	E-Learning, Distance Education
International Journal of Education and Development Using Information and Communication Technology	ICT & Development, ICT & Education
International Journal of Educational Development	Development, Education
International Journal of ICT Research and Development in Africa	ICT & Development
International Journal of Information Communication Technologies and Human Development	ICT & Development, Humans & Technology
International Journal of Information Systems and Social Change	ICT & Development, Social Change
International Journal of Inclusive Education	Education
International Journal of Refugee Law	Refugee Studies
International Migration	Migration Studies
International Migration Review	Migration Studies
International Review of Research in Open and Distributed Learning	Open & Distance Learning
Journal of Community Informatics	ICT
Journal of Conflict Management	Conflict or Crisis
Journal of Conflict Resolution	Conflict or Crisis, Social Change
Journal of Development Economics	Economics & Development
Journal of Ethnic and Migration Studies	Migration Studies
Journal of Genocide Research	Conflict or Crisis, Human Rights, Social Change
Journal of Global Peace and Conflict	Conflict or Crisis, Social Change
Journal of Immigrant & Refugee Studies	Migration Studies, Refugee Studies
Journal of Information, Communication and Ethics in Society	ICT & Ethics
Journal of International Development	Development
Journal of International Migration and Integration	Migration Studies
Journal of Law and Conflict Resolution	Conflict or Crisis

Journal of Peace Research	Social Change
Journal of Refugee Studies	Refugee Studies
Journal of Research in International Education	Education
Knowledge Management for Development	Development, Information or Knowledge Management
Migration and Development	Migration Studies
Peace & Change	Conflict or Crisis, Social Change
Peace and Conflict: Journal of Peace Psychology	Conflict or Crisis, Social Change
Perspectives on Global Development and Technology	ICT & Development
Refuge	Refugee Studies
Refugees Magazine	Refugee Studies
Refugee Survey Quarterly	Refugee Studies
Smart Learning Environments	ICT & Education
Technology in Society	Humans & Technology
The African Journal of Information and Communication	ICT & Development
The African Journal of Information Systems	ICT & Development
The European Journal of Development Research	Development
World Development	Development
World Journal of Science, Technology and Sustainable Development	ICT & Development

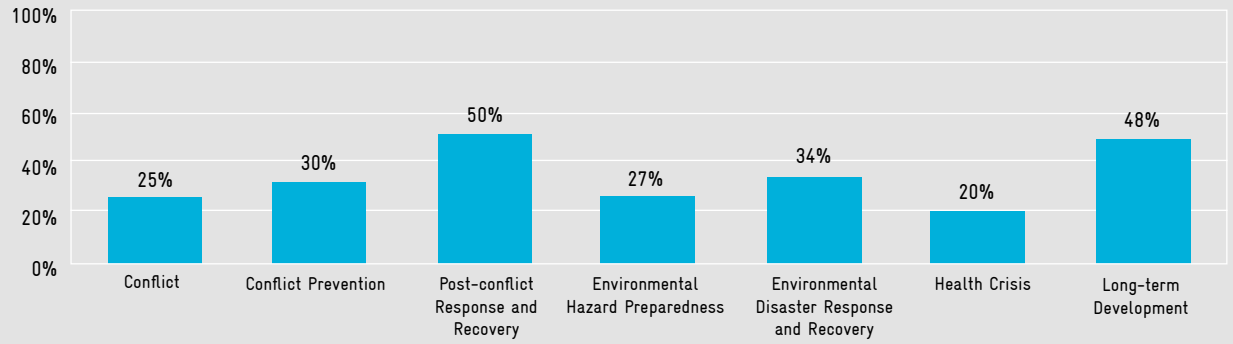
Annex 2: List of Interview Participants

Name	Title	Organization
Anthony Bloome	Senior Education Technology Specialist	USAID
Don Dippo	Professor, Co-Principle Investigator Borderless Higher Education for Refugees	York University, Borderless Higher for Education Refugees
Paul Frisoli	Education Technical Advisor	International Rescue Committee
Juan Pablo Giraldo Ospino	Education Specialist/Innovations in Education	UNICEF Innovations in Education
Jacob Korenblum	President & CEO	Souktel
Rana Madani	Deputy Chief Executive Officer	Jordan Education Initiative
Sandra Maignant	Child Protection Technical Advisor	International Rescue Committee
Mary Mendenhall	Assistant Professor of Practice - International and Comparative Education	Columbia University, Teachers College
Kurt D. Moses	Director of Policy and Information Systems, Global Education	FHI360
Edmund Page	CEO	Xavier Project
Claire Pelley	Program Coordinator	One Mobile Projector per Trainer
Kate Radford	Innovation Program Manager	War Child Holland
Stephen Richardson	Independent Consultant	International Rescue Committee
Jackie Strecker	Learn Lab Manager	UNHCR
Matt Streng	Senior Youth Development Advisor	Mercy Corps
Peter Transburg	Senior Coordinator, Communications	Inter-Agency Network for Education in Emergencies

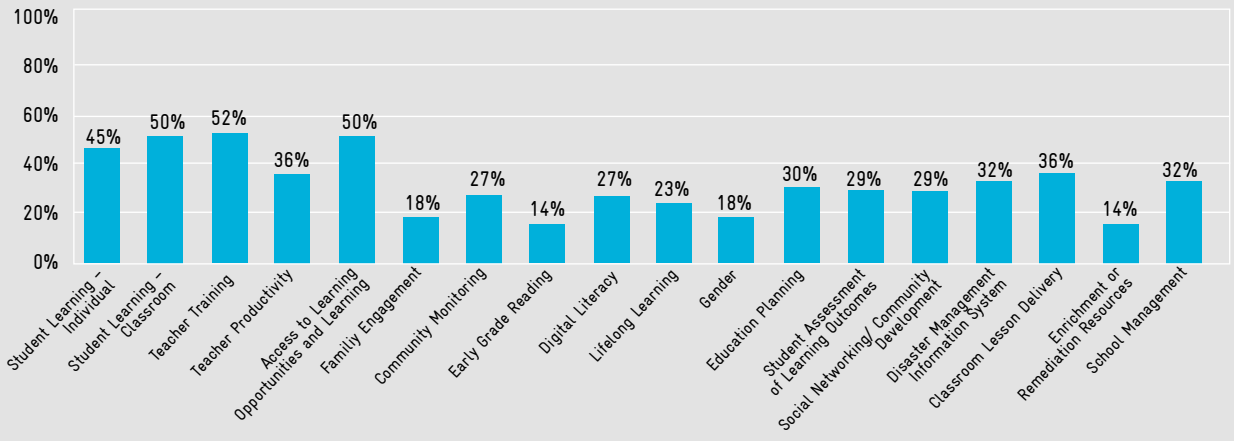
Annex 3: Select Results from INEE Survey "Technology and Education in Emergencies"

INEE distributed an online survey to practitioners working on programs using ICT for education in conflict and crisis settings. The response to this survey based on language of survey completion is: English n=32, Spanish n=14, French n=7, Arabic n=2, Portuguese n=1. In the landscape of people working in this field or at the development and implementation stage of ICT for education in conflict and crisis, the responses of these 56 individuals offer valuable insight into the field. Questions that were incomplete or where responses were unclear have been omitted from the findings.

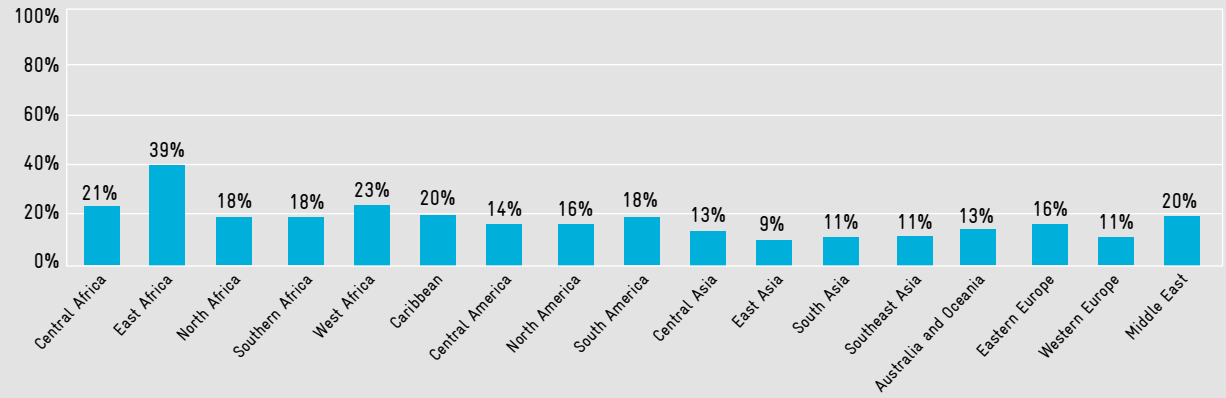
For what Context(s) is the Technology Solution Most Intended?
Select all that apply



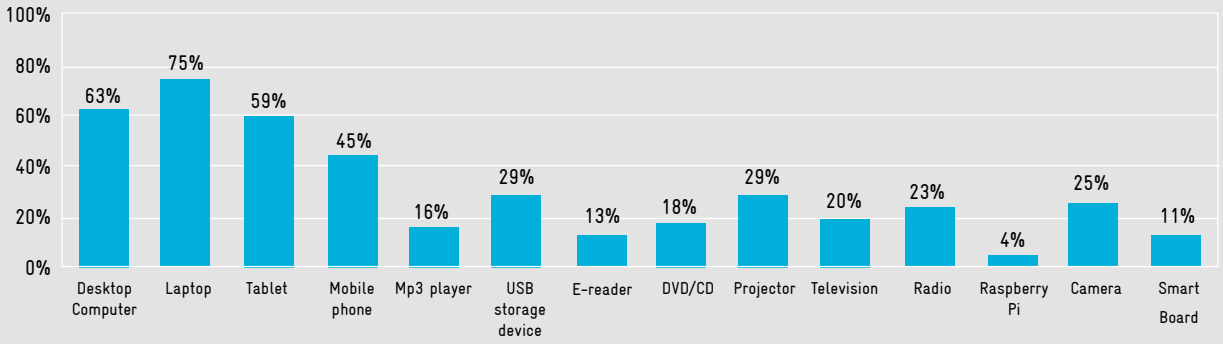
What is the Programmatic Focus of the Technology Solution?
Select all that apply



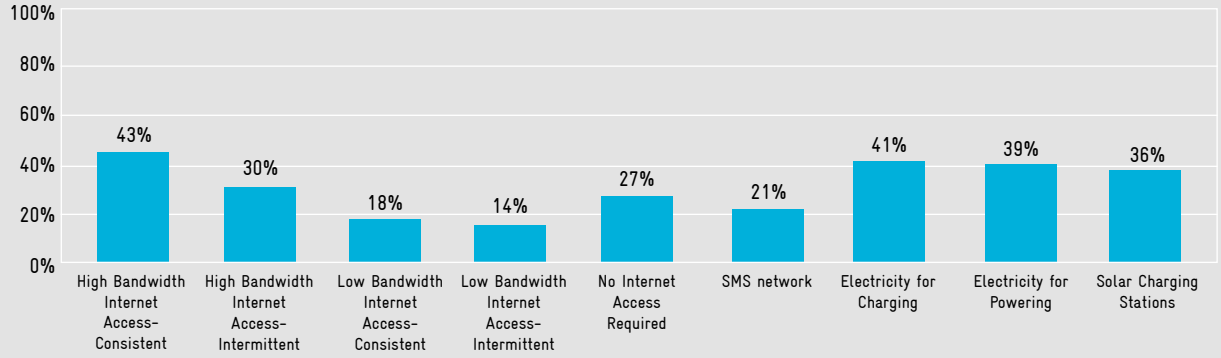
What is the Target Geography of the Technology Solution? Select all that apply



What are the Hardware Requirements for the Technology Solution? Select all that apply



What are the Infrastructure Requirements for the Solution? Select all that apply



SUMMARY OF YES-NO QUESTIONS

		YES	NO
Q18	Is training required for end users?	82%	18%
Q19	Is ongoing technical support provided for end users?	63%	37%
Q20	Is there evidence that the technology solution is improving learning outcomes or meeting other educational needs of affected populations?	70%	30%
Q21	Has an evaluation been carried out for this solution?	25%	75%

Annex 4: Project Inventory: ICT for Education in Conflict and Crisis

The ICT Inventory is a working list of projects, organizations, software, and hardware related to education in conflict and crisis. Some projects, tools, or organizations may be situated in developing contexts and are listed because they offer potentially valuable insight into ways in which ICT might be used for education in conflict and crisis. The list was compiled from the research and gray literature reviewed for this landscape review, from projects named by interview participants, and referencing projects known to the author, editors, and reviewers of this report. Information has been included here based on what was found in published reports, on project websites, in documents made available to the author, or through personal communication with people involved in these projects. Implementing organization lists and project locations are based on information we found to the best of our abilities. Links to websites have been included as hyperlinks. Please use this inventory as a starting point for connection, communication, and further research related to listed projects and organizations, not as an exhaustive tool. Furthermore, the Landscape Review of Technology for refugee and IDP education offers additional information on some of the listed projects and others. The field of projects is vast and rapidly growing.

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Aakash	School children and teachers	Low-cost tablet computers procured by the Indian government to help enhance quality of education. The vision is that computing and Internet access used in a blended learning environment will empower both students and teachers.	Tablet Technologies	India	DataWind
Access to Education	Out-of-school adolescent girls in rural areas	Pilot project to provide girls with access to secondary education through Interactive Radio Instruction (IRI). The project targets 500 out-of-school girls aged 12-16 in rural areas, who do not have access to schools in their communities.	Radios	Democratic Republic of Congo	War Child Canada, Congolese Ministry of Education, RTNC Uvira (local radio station), Congolese NGOs and community groups
African Virtual University	Adults pursuing tertiary education	The African Virtual University (AVU) is a pan-African Intergovernmental Organization established by charter with the mandate of significantly increasing access to quality higher education and training through the innovative use of information communication technologies.	Online Learning Technologies	Democratic Republic of Congo, Ghana, Kenya, Sudan, and other countries	World Bank, 18 African Governments
Australian Catholic University Thai-Burma Program	Adults pursuing tertiary education	ACU partners with universities from the US and Canada to provide tertiary education to Burmese refugees that were born and grew up in camps in Thailand. The program offers a course taught through a combination of online and face-to-face lessons.	Online Learning Technologies	Thailand	International Universities, CBOs, NGOs, and various religious orders
Badiliko	School-aged children and their teachers	Badiliko builds digital hubs at schools and provides a cascade model of professional development for teachers and school leaders.	ICT Technologies Online Learning Technologies Satellite Broadcast Technologies or Internet Connectivity	Kenya, Tanzania, Uganda, Ethiopia, Ghana, Nigeria	British Council, Microsoft, and other stakeholders

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Beyond Boxes	Formerly displaced persons in Uganda and current refugees from South Sudan	Through creative re-use of materials like cardboard boxes, communities in Pader, Uganda are turning packaging from short-term deliveries into a platform for longer-term skill building. Target learning outcomes include foundational STEM concepts relevant to life and livelihoods.	None. This is an innovation in technology and education using practical materials like boxes.	Uganda	Stanford University's Learning, Design and Technology Program
Borderless Higher Education for Refugees	Teachers in training living in Dadaab refugee camp	BHER provides gender equitable teacher training programs to working, untrained teachers who can then contribute back to the community, increasing and improving education in the camps overall. On-site and online courses are "stackable," allowing students to earn certificates or diplomas at each level of study, incrementally building towards earning a degree.	Online Learning Technologies Internet Connectivity Social Media Applications	Kenya	Global Affairs Canada, in partnership with Kenyatta University, Moi University, University of British Columbia, Windle Trust Kenya, York University, UNHCR
Broad Class	Children aged 5-9 in marginalized public schools	Interactive Radio Instruction (IRI) Program to improve literacy, numeracy, and healthy habits. Content covers all basic skills in national curriculum, and includes both national and regional languages.	Radios	Pakistan	The Communicators (Pvt.) Ltd, Power99 Radio, Pakistan's Federal Directorate of Education, Ilm Ideas
BRCK Kio Kit	School-aged children	The Kio Kit is made up of 40 Kio tablets, a BRCK modem/router, wireless tablet charging to reduce breakage, and a hardened, water-resistant, lockable case. There is a single plug used to charge the kit and one button to power on the entire system.	Online Learning Technologies Internet Connectivity Tablet Technologies	Kenya	BRCK
Can't Wait to Learn--eLearning Sudan	Out-of-school children	The eLearning Sudan project delivers mathematics curriculum to out-of-school children through a self-paced, interactive, tablet-based program that children access in community spaces.	Applied gaming, eReader and Tablet Technologies	Sudan	UNICEF, War Child Holland, Ahfad University for Women in Khartoum, TNO, Ministry of Education-Sudan

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
CE3 Project	Rural communities in Uganda	The Connectivity, Electricity and Education for Entrepreneurship (CE3) project is developing an ecosystem approach to energy ownership and sustainability in three pilot sites in post-insurgency Northern Uganda.	Satellite Broadcast Technologies or Internet Connectivity	Uganda	BOSCO-Uganda, in partnership with University of Notre Dame and Accenture Corporation
Connect To Learn	Secondary school students, especially girls	Global education initiative to scale up access to quality secondary education, in particular for girls, by providing scholarships and bringing ICT to schools in remote, resource-poor parts of the world, over mobile broadband.	ICT Technologies (over mobile broadband)	21 countries including Bhutan, Ghana, Myanmar, Sri Lanka	Earth Institute of Columbia University, Millennium Promise, and Ericsson
Connect to Learn (IRC)	Supporting Access to Education for Syrian Refugees in Dohuk, Erbil, and Sulaymaniyah Governorates of Iraq	Connect to Learn (CTL) aims to bolster teaching practice of Syrian refugee teachers in the Domiz Refugee Camp in the Kurdish region of Iraq. This project combines the IRC's expertise in teacher training and child well-being with Ericsson's CTL technology platform to provide professional development opportunities to teachers. CTL's cloud-based platform gives refugee teachers access to resources that can help better meet the complex needs of conflict-affected children, and thereby improve children's learning outcomes, specifically, social-emotional skills, literacy, and numeracy.	eLearning Technologies, including laptops, tablets and projectors, online educational resources, virtual teacher support groups, and Ubuntu cloud storage software The project is providing information and communications technology (ICT) hardware and connectivity via a cloud-based local server and the Internet provided by AsiaCall, a major telecommunications provider in the Kurdish region of Iraq.	Iraq	International Rescue Committee Funded in part by the United States Bureau of Population, Refugees, and Migration (BPRM)
Consortium on Connected Learning	Adults pursuing tertiary education	UNHCR support for existing formal higher education programs using Information Communications Technologies to provide refugees with accredited university education in remote locations. Project PDF	ICT Technologies (including computers, tablets, and mobile phones)	Afghanistan, Jordan, Kenya, Malawi, Thailand	IMS Global

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
CreativeU	NGOs, Communities of Practice, and professionals and youth in development	CreativeU is a responsive e-learning portal that connects development professionals, teachers, youth, and others working to improve their lives and communities around the world to high-quality online and mobile content for organizational and individual development, career improvement, and lifelong learning.	Online Learning Technologies Social Media Applications (CreativeU social and professional networking)	Anywhere	USAID, GIZ, Saylor Academy, NetDimensions, Cegos, LINGOS, TeachAIDS, The Foundation Center, Udemy, U.S. National Oceanic and Atmospheric Administration, University of Oxford, MicroLink, TPT, The Conflict Resolution Education Connection, Khan Academy, Save the Children, Tahrir Academy, Mountain Heights Academy, Hero's Horizons, Russell Stannard
CyberSmart Africa	K-12 classrooms and teachers	The CyberSmart Digital Learning Platform is a social enterprise that reaches classrooms without electricity in Sub-Saharan Africa and developing countries.	All-in-one solar powered mobile device (projector with loaded educational and multimedia content) Mobile Phone Technologies (SMS, video)	Sub-Saharan Africa and other developing countries	USAID, Earth Institute at Columbia University, Senegalese Ministry of Education, Orange
DevTrac	NGO administrators and staff, governments	DevTrac is an online and mobile tool that helps organizations monitor public service projects, as well as manage and publish the ongoing impact of their work.	ICT Technologies Mobile Phone Technologies	Uganda	UNICEF Uganda, DevTrac
Digital Community Center	Disadvantaged and underserved peoples of the Jordanian and Palestinian mixed community of Wahdat, with special attention to women and youth, ethnic minorities, seniors, and disabled persons	The Wahdat DCC provides youth life and vocational skills, adult vocational skills, small enterprise training, women's programs, School IT education, cultural history, inter-ethnic projects, and services for seniors and the disabled including communal support, social events, and welfare/health services.	Computer Internet Connectivity	Jordan	Relief International-Schools Online, Hewlett Packard, Royal Jordanian Government, UNRWA

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Digital Means	Children in primary school	Digital Means develops e-learning content based on the local government curriculum for English and mathematics, for grades 4 and 5.	Online Learning Technologies	Pakistan	Alif Laila Book Bus Society, Ilm Ideas, USAID
Discovery Learning Alliance (DLA)	Children in primary school	Discovery Learning Alliance uses the power of media to transform education and improve lives in under-resourced schools and communities around the world.	Media Technologies	16 countries including Angola, Brazil, Egypt, Ghana, Kenya, Morocco, Namibia, Nigeria, South Africa, Uganda	Discovery Communications
dNet Education Projects	Children in secondary school	Three different projects: Computer Learning Center (CLC), Smart Class Room (SCR), and English & ICT in "After School Club." These projects attempt to introduce students to ICT, bring educational opportunities to underprivileged youth, and improve attitudes towards English.	ICT Technologies Computers Internet Connectivity eLearning Technologies (CD-ROM)	Bangladesh	dNet, British Council Bangladesh, Computer Literacy Program Volunteers for Underprivileged (CLP)
Early Grade Reading Approach	Children in primary school	The Yemen Early Grade Reading Approach-part of an integrated, community-based program designed to enhance education-introduces a new, phonics-based reading program to schools across the country.	Radios Television Mobile Phone Technologies (SMS)	Yemen	Creative Associates International, Yemen Ministry of Education
EduApp4Syria	Children in primary school	This is a competition to create a smartphone application that can help Syrian children learn how to read and improve their psychosocial wellbeing.	Mobile Phones (SMS) Social Media Applications (Twitter, Facebook) RSS Feeds	Syria	Norwegian University of Science and Technology (NTNU), All Children Reading: A Grand Challenge for Development, Orange, INEE

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
EduTrac	School-age children, teachers, and administrators	EduTrac is a mobile-phone based data-collection system that gives real-time information on schools and collects data like attendance and enrollment. EduTrac helps districts improve their planning for education and provides better and more timely supervision to schools based on the reports received in the system.	Mobile Phone Technologies	Uganda	UNICEF, Uganda's Ministry of Education and Sports
eGranary Digital Library	Anyone lacking Internet access in developing countries	Offline information store that provides instant access to over 32 million digital resources for those lacking adequate Internet access. Through a process of copying web sites (with permission) and putting them on internal networks at partner institutions in developing countries, this digital library delivers instant access to a wide variety of educational resources including video, audio, books, journals, and websites.	ICT Technologies (including servers, offline content, proxy and search engine)	Anywhere	The WiderNet Project
eKitabu	Anyone	eKitabu is an e-reading platform for tablet, computer, or smartphone, as well as an online market for e-books, targeting the Kenyan market.	eReader Technologies	Kenya	eKitabu
eLimu	School-aged children	Curriculum delivered via an application on a wide variety of topics including mathematics, science, language, social studies, and religion that focuses on responsible citizenship. eLimu has now also developed customized tablets for children to use.	Online Learning Technologies Laptop and Tablet Technologies	Kenya	*iHub_, Software Technologies Ltd, Moran Publishers, Vividview, Qualcomm Wireless Reach

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
English and Information Technology for Adolescents (EITA)	Adolescent girls from rural poor areas	EITA develops skills in IT and communicative English by accessing British Council learning content through netbooks and sessions taking place in the safe and secure environment of peer group sessions led by peer group leaders.	Computers	Bangladesh	BRAC and British Council
English in Action	Adults and children in primary school	English in Action is about equipping the poorest people with language skills that will help them find jobs, engage in entrepreneurial activities, and improve their standard of living.	Satellite Broadcast Technologies or Internet Connectivity Mobile Phone Technologies Television	Bangladesh	UKAid, Ministry of Primary and Mass Education (MoPME) and Ministry of Education (MoE), Government of Bangladesh, with consortium of partners including BMB Mott MacDonald, BBC Media Action, The Open University, Underprivileged Children's Educational Programme (UCEP), Friends in Village Development Bangladesh (FIVDB)
eTaleem	Anyone, especially rural adult women	Basic literacy application for Nokia phones that allows people to easily access lessons for Urdu reading, phonetics, word synthesis, sentence making, and basic math.	Mobile Phone Technologies	Pakistan	Nokia, UNESCO Pakistan
FilmAid	Communities living in conflict or crisis areas	FilmAid uses film and other media to bring lifesaving information to communities affected by disaster, displacement, and economic disparity. Activities fall into three broad categories: Media Content, Community Outreach, and Skills Development.	Filmmaking Technologies	Afghanistan, Colombia, Haiti, Hong Kong, Jordan, Kenya, Kosovo And Macedonia, Tanzania, Thailand, Uganda	FilmAid, in partnership with UNHCR, U.S. Department of State's Bureau of Population, Refugees, and Migration (PRM), and World Food Program

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Foundations of Teaching for Learning	Teachers with no formal teacher training	Comprehensive interactive online program of study primarily for people who are currently teaching but have no formal education as a teacher. Consists of eight MOOCs (Massive Open Online Courses) on the Coursera® platform. A key element is the use of video clips illustrating interactive practice (produced in Zambian and South African primary classroom contexts) as a stimulus for discussion.	Online course of study (MOOCs) using Coursera® platform	Anywhere	Commonwealth Education Trust
Global Broadband and Innovations (GBI) Alliance	Anyone in developing countries	The primary focus of the GBI Program is to provide leadership on a range of ICT related activities across USAID's development portfolio. This includes not only infrastructure, but also the leveraging of that infrastructure to support broadband and mobile network-enabled applications for programs including education, health, agriculture, and economic growth.	ICT Technologies	Anywhere	USAID, NetHope
Global Connections and Exchange Program	Teachers	Regional Trainers, trained by international and national experts on Information and Communication Technology in education, work intensively with local Education Departments to train teachers to integrate technology and civic education into the curriculum.	ICT Training for Teachers	Tajikistan	Relief International-Schools Online
Global Education Platform	Marginalized youth across the world	The Global Education Platform (GEP) is a multi-sector initiative that seeks to source locally relevant content to improve learning opportunities for youth and teachers, specifically via feature phones. Project PDF	Mobile Phone Technologies Online Learning Technologies	N/A	Global Business Coalition for Education, including technology entrepreneurs, business leaders, global development experts, and educators

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Jesuit Commons: Higher Education at the Margins	Adults pursuing tertiary education	The distance-learning program offers access to higher education resources for refugees, with course subjects including leadership, business, and Jesuit values.	Television Video Projection Technologies	Jordan, Kenya, Malawi	Jesuit Refugee Service, JesuitNet, Jesuit Commons: Higher Education at the Margins, UNICEF
Huawei 4Afrika Phone	Anyone, especially university students, developers, and first-time smartphone users	Low-cost smartphone on Windows platform, designed specifically for Africa.	Mobile Phone Technologies	Angola, Egypt, Ivory Coast, Kenya, Morocco, Nigeria, South Africa	Microsoft, Huawei
Ideas Box	Adults and children living in refugee camps	The Ideas Box is a mobile and flexible resource for teachers used to reach populations lacking access to culture, especially the most vulnerable: young, unstable, migrants, rural populations, etc. Multi-media educational contents are packaged in a compact, portable container, complete with power generator. Project PDF	Educational and entertainment content in a compact, portable container, with power generator and integrated furniture	Burundi, Ethiopia, Jordan, Lebanon	UNHCR, Libraries Without Borders, International Rescue Committee
Instant Network Schools (INS) Program	Teachers	Instant Network Classrooms support teachers in primary, secondary, and vocational programs with pedagogical training, dynamic educational applications, Internet connectivity, localized content, and child-friendly tablets. Project PDF	Laptop and Tablet Technologies Internet Connectivity	Democratic Republic of Congo, Kenya, South Sudan, Tanzania	UNHCR, Vodafone Foundation
InZone	Interpreters in Dadaab refugee camp	InZone is focused on education and training for adult field interpreters working with UNHCR and involves both face-to-face training and online course work.	Online Learning Technologies (Coursera® platform)	Kenya	InZone, University of Geneva, in partnership with Commonwealth Education Trust

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
iSchool	Children in primary school	iSchool is a comprehensive online multi-media eLearning package designed to cover the whole of the Zambian school curriculum (teacher plans and interactive learning for students). iSchool is produced in Zambia with entirely localized content delivered on the ZEduPad educational tablet, on mobile devices (including as an app), and on the web.	Tablet Technologies (solar powered) Online Learning Technologies	Africa, Zambia	iSchool Zambia Ltd
KA Lite	Adults and children	A free, lightweight solution providing high-quality education and the power of online learning to the offline world.	Computers Laptop and Tablet Technologies	Democratic Republic of Congo, Kenya, Ethiopia, and other countries	Foundation for Learning Equality
Kiron	Refugees pursuing tertiary education	Kiron is open higher education, providing refugees with the opportunity to graduate at a university free of charge. The first two years of degree programs are online via MOOCs, and the third (final) year students attend regular courses at a classic university or may continue online. Additional services tailored to the needs of refugees are also provided, including preparation courses for university, language courses, psychological counseling, life coaching, and hardware.	Online Learning Technologies	Anywhere; headquartered in Germany	Kiron

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Kmobile Schools	Schools in refugee camps, policymakers, and development field workers	With the Kmobile Schools app, field teams use Android-based tablets or smartphones to collect education data on 16 critical education indicators about schools in refugee camps and select urban areas. Once the data is uploaded from the tablets or phones using standard Internet "hot-spots," development organizations and policymakers can view the schools, along with key performance indicators and operating information, via Google Earth.	Mobile Phone Technologies	Ethiopia, Kenya, Liberia, Malaysia, Rwanda, and other countries	FHI360, UNHCR
Knowledge is Power	Illiterate persons, especially women	Supports illiteracy eradication through a mobile application, accredited by the General Authority for Literacy and Adult Education, to enable beneficiaries to practice newly acquired skills. The application is compatible with all types of handsets (J2Me, Android, IOS).	Mobile Phone Technologies	Egypt	Vodafone Egypt Foundation
Kolibri	Children in orphanages, refugee camps, after-school programs, and rural schools	An offline app installed on low-cost devices that enable learners to engage with a vast library of educational content.	Computers Laptop and Tablet Technologies	Anywhere	Foundation for Learning Equality
Kotobi	Anyone	Kotobi is the first dedicated Arabic online bookstore and mobile app. Kotobi aims to make Arabic language e-books more accessible to help raise literacy levels and to provide electronic books for the Arab market and to give readers across the world the opportunity to consume e-books in Arabic on tablets and smartphones seamlessly. Kotobi (which means 'my books' in Arabic) offers e-books, periodicals, and a variety of free titles, as well as translations of well-known classics.	eReader Technologies (app for tablets and smartphones)	Egypt and anywhere	Vodafone Egypt, Intertrust Technologies Corporation

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Learn Syria	Syrian refugee school children	Learn Syria works in schools primarily in Turkey to provide education relevant to Syrian refugee children. Rumie tablets contain an entire curriculum of content, work offline, and can be recharged with solar power. Rumie LearnCloud is a collaborative platform to provide educational content to the tablets.	Tablet Technologies (Rumie tablets) eLearning Technologies (Rumie LearnCloud Collaborative Platform)	Turkey	Rumie
Learning Centers-Mobile Literacy Project	Girls and women	The project supports the use of supplemental mobile literacy curriculum in community-based Learning Centers (both formal and informal) to accelerate learning at the K-12 levels using text messaging.	Mobile Phone Technologies (SMS)	Afghanistan	Afghan Institute of Learning
Lifeplayer MP3s (Lifeline Energy)	Orphans and other vulnerable children, women, refugees, and people who are ill	Lifeline Energy manufactures and distributes solar-powered and wind-up media players and radios for classroom and community listening.	Media Technologies Radios	Sub-Saharan Africa	Lifeline Energy
Millennium Villages Project	Adults and children living in extreme poverty or hunger or with preventable diseases	Millennium Village sites are located in ten countries across sub-Saharan Africa, each featuring a different ecological and geographic profile. Mobile connectivity and ICTs are used to try to achieve the eight Millennium Development Goals.	Satellite Broadcast Technologies or Internet Connectivity Mobile Phone Technologies	Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Rwanda, Senegal, Tanzania, Uganda	Open Society Foundations, UN and other multilateral partners, and individual, corporate, and foundation partners
mLearning with Ustad	Anyone	Open source toolkit to create customizable mLearning program including audio, video, quizzes, and games on smartphones and tablets.	Mobile Phone Technologies (video, games, quizzes, SMS)	Afghanistan	Ustad Mobile
Mobile and Immersive Learning for Literacy in Emerging Economies (MILLEE)	Teachers and children in primary school	Language learning games on cell phones, modeled after the traditional village games that rural children find familiar.	Mobile Phone Technologies (photos and games)	Sub-Saharan Africa, China, India, and other underdeveloped regions	Dr. Matthew Kam, Human Development Lab at Carnegie Mellon University

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Mobile Learning Pilot Project	Students and teachers in remote areas of Pakistan's SWAT region	The mobile learning project will provide access to electronic learning materials on a local server without the need for grid electricity or Internet through the use of the Aptus system designed by COL.	Mobile Learning Technologies eLearning Technologies (offline)	Pakistan	Reach Out To Asia, Commonwealth of Learning
Mobile Mentoring Prototype-Refugee Teacher Working Group	Under-qualified teachers in Kakuma refugee camp	This mobile mentoring prototype uses mobile phones (SMS and WhatsApp Messenger) to provide instructional support tips and quotes to help with classroom management for under- and un-qualified refugee and displaced teachers who have been newly recruited to provide education to the children living in the camps.	Mobile Phone Technologies (SMS) Social Media Applications (WhatsApp)	Kenya	Dr. Mary Mendenhall of Teachers College at Columbia University, UNHCR, Finn Church Aid, IDEO
Mobile Messaging System	Families with school-age children	Souktel's custom messaging system sends SMS alerts from UNESCO staff/school administrators' phones or from a secure web interface to the mobile phones of parents, school staff, and other community members. Alerts can range from emergency notifications to school announcements. The system can also deliver SMS-based surveys to collect data related to UNESCO's Disaster Risk Reduction (DRR) program activities.	Mobile Phone Technologies (SMS, IVR, mobile web alerts) Social Media Applications (WhatsApp)	Gaza (in addition to 30+ countries in Asia and Africa)	Souktel, UNESCO (in addition to 40+ UN agencies and NGOs in Africa and Asia)
Mobitel mLearning	Adults pursuing tertiary education	mLearning allows students to follow a complete university program while in the country or in any other part of the world.	Online Learning Technologies	Maldives, Sri Lanka	Mobitel, University of Colombo, The Open University of Sri Lanka, Edinburgh Napier University, Postgraduate Institute of Management, government partners

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
mTaleem SMS Based Literacy Program	Women in rural areas	Education of rural women via mobile phones.	Mobile Phone Technologies (SMS)	Pakistan	Mobilink Foundation
One Mobile Projector Per Trainer (OMPT)	Trainers, Extension Workers, Teachers	The capacity-building programs give organizations the skills and equipment necessary to create simple videos shown on cordless projectors.	Video Projection Technologies	Bangladesh, Cambodia, Ethiopia, Guatemala, Guinea, Guinea-Bissau India, Liberia, Mozambique, Nepal, Panama, Rwanda, Senegal, South Sudan	OMPT
Open Learning Exchange	Primary schools, community learning centers, and public health clinics	OLE's Open Learning Toolkit provides color tablets that run off-the-grid and are loaded with OLE's Basic Learning Library (BeLL), which provides rich multi-media content as well as some standard textbooks tailored to local needs.	Tablets Online Learning Technologies	Ghana, Mexico, Nepal, Rwanda, Somalia	Open Learning Exchange, in partnership with UNHCR, Oxfam, USAID, U.S. Department of State, World Vision, Swedish Program for ICT, OLE Nepal, OLE Ghana, OLE Rwanda, Alianzas Educativas, Rishi Valley Education Centre, Edify
Outernet	Adults and children in developing markets without regular access to the Internet	Outernet provides a free-to-receive broadcast of essential digital content including news, educational content, emergency messages, and more via satellite.	Satellite Broadcast Technologies	Anywhere	Outernet
RACHEL-Pi	Anyone needing a low-cost server	A plug-and-play solution to run a RACHEL server from a green, low-power, small Raspberry Pi computer.	Computers Educational resources	Anywhere	World Possible

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Raspberry Pi	Anyone needing a low-cost computer	The Raspberry Pi is a credit-card sized computer that plugs into a TV and a keyboard. It can be used in electronics projects, for many standard PC operations like word processing and Internet browsing, and to teach kids programming. Free resources to teach, learn, and make with Raspberry Pi are available to download.	Computers Educational resources	Anywhere	Raspberry Pi Foundation
REACH	Schools and Classrooms in Low Income Countries	To assess the relative status and impact of the literacy, classroom, and health (sanitation/nutrition) environment on attendance and ultimately learning outcomes.	Tablet Technologies, Smart Cellphones	Haiti, Ghana, Liberia, several other countries	**FHI360**
Shaqodoon	Vulnerable and impoverished Somali youth	Shaqodoon (formerly Somali Youth Livelihoods Program) designs innovative programs to support livelihood skills training, education, and health. The program reaches unemployed and out-of-school youth aged 15-24 years old across Somalia.	Mobile Phone Technologies (SMS) Online Learning Technologies	Somalia	Shaqodoon
Skype in the Classroom	Kakuma refugee camp	The Skype in the Classroom platform allows students to connect with experts around the world as well as other classrooms and diaspora graduates.	Skype Computers	Kenya	UNHCR, FilmAid
Smartphone Schools Program	Syrian refugee children between 12 and 16 years of age	This project is fundraising to obtain smartphones, pilot their Smartphone Schools Program, pay for the app and platform development, create online learning content, and train and mentor supervisors.	Mobile Phone Technologies	Lebanon	Aliim

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Solar Powered Digital Library	School-aged children	Inveneo's Solar Powered Digital Library (Solar Library) is ruggedly designed for schools lacking educational resources, Internet, and power. It includes thousands of e-books, lectures, and other educational resources (e.g. Wikipedia) that can be accessed completely off-the grid.	ICT Technologies (solar-powered computers and tablets) eLearning Technologies (offline)	Haiti	Inveneo
Somali Interactive Radio Instruction	In-school and out-of-school learners	This now completed project supported teachers in providing primary-level instructional content to learners through the use of audio programs and supplementary resources.	Radio and digital media players	Somalia	Education Development Center, Inc.
South Sudan Interactive Radio Instruction	Children, youth, and adults, especially teachers	SSIRI uses radio-based learning and other technologies to deliver high-quality education programs to children, youth, and adults in South Sudan. The three components are the Learning Village, a program to enhance teaching and learning at the primary level; RABEA (Radio-Based Education for All), an English language and civic education program for youth and adults; and a 12-week accelerated in-service teacher training course.	Radios	South Sudan	Education Development Center, Inc., USAID
Syrian Virtual University	Adults pursuing tertiary education	This education institution provides virtual education to students around the world. There are partnership programs, which are provided in cooperation with foreign universities, and domestic programs that are developed and distributed by SVU.	Online Learning Technologies	Anywhere; headquartered in Syria	Syrian Ministry of Higher Education

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
Tamuka	Refugees	Tamuka Hub is a focal meeting place where refugees can gather and discuss ideas or learn about what is going on in the world around them by providing satellite T.V. and free and reliable Internet connectivity for refugees so that they can publish, learn from, and interact with unbiased information anonymously and without necessarily having access to the Internet.	Computers and Laptops Television Satellite or Internet Connectivity	Kenya, Uganda	Xavier Project
text2teach (T2T)	Children in primary school	text2teach's objectives are to use advanced mobile communications technology for education; to encourage cooperation among the public, private, and civil society sectors at the local and global levels; and to complement the indigenous curriculum with high quality educational content delivered through a mobile network, and with integrated teacher training.	Mobile Phone Technologies (SMS and video)	Philippines	Nokia, Ayala Foundation, National Department of Education (Philippines), Globe Telecom, Pearson Foundation (defunct)
Ti Manman Cheri	Mothers with school-age children in primary school	Ti Manman Cheri provides monthly cash support via mobile money transfer to mothers as long as their children in grades 1-6 remain in school. Project PDF	Mobile money transfer for education	Haiti	Government of Haiti, PetroCaribe Fund of Venezuela, Digicel
TV White Spaces	Anyone in remote areas	TV white spaces are frequencies made available for unlicensed use at locations where the VHF and UHF spectrum is not being used by licensed services, such as television broadcasting. Several corporations have initiatives using this technology in combination with other ICT technologies to offer broadband data services in areas with limited access.	Media Technologies ICT Technologies	Several, including Botswana, Ghana, Kenya, Namibia, Philippines, Singapore, South Africa, Tanzania	Various, including Carlson Wireless Technologies, Google, Microsoft, Spectrum Bridge

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
U-Report	Youth and adults	U-Report is a free SMS social monitoring tool for community participation, designed to address issues that people care about. SMS polls and alerts are sent out to U-Reporters and real-time response information is collected. Issues polled include health, education, water, sanitation and hygiene, youth unemployment, HIV/AIDS, disease outbreaks and social welfare sectors.	Mobile Phone Technologies (SMS)	Uganda	UNICEF Uganda, Network Providers in Uganda
Ushahidi	Individuals living in hard-to-reach places	Open source platform that crowdsources crisis information from multiple sources and allows geospatial visualization of this data by plotting reports on interactive maps.	Mobile Phone Technologies Social Media Applications	Gaza, Haiti, Kenya	Ushahidi, with funding partners including Omidyar Network, Cisco, Ford Foundation, Google.org, Humanity United, MacArthur Foundation, Rockefeller Foundation, Knight Foundation
VOTO Mobile	Citizens, NGOs, and researchers	Account holders send SMS and voice notifications and surveys to populations they serve. It is a web-based platform, but can be accessed on mobile appliances. Users are able to download reports, visualize data, and record and send content in multiple local languages.	Mobile Phone Technologies (SMS)	22 countries including Ghana, India, Nigeria, Uganda; headquartered in Ghana	VOTO Mobile, with partners including UNICEF, Innovations for Poverty Action, JHR, Cowater International Inc., SEND West Africa, Engineers without Borders Canada, RackAfrica, Busy, Facebook, World Bank, Equal Access, IRI, Oxfam, UNFPA
Way-C	Anyone	Low-cost tablet. VMK Tech also has a low-cost smartphone called Elikia as well as a feature phone, and is working on an even lower cost tablet designed especially for the educational, health, and agricultural sectors.	Tablet Technologies	Republic of Congo, DRC, Cameroon	**VMK Tech**

Project Name	Target Group	Purpose of Intervention	Technology*	Location of Project(s)	Implementing Organizations
WinjiGo E-Learning	Syrian refugee school-age children	Project in Lebanon is a non-traditional educational initiative that capitalizes on technology to provide extended access to self-learning opportunities that address the needs, challenges, and potentials of Syrian refugees.	Online Learning Technologies	Lebanon	ITWorx Education
Worldreader	Children and their families	The mission of Worldreader is to unlock the potential of millions of people through the use of digital books in places where access to reading materials is very limited. Worldreader provides e-books and digital reading apps to transform the lives of people in the developing world.	eReader and Tablet Technologies	Ethiopia, Kenya, Malawi, Nigeria, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, Zimbabwe	Worldreader, with partners including Stavros Niarchos Foundation, Opera Software, Pearson Foundation (defunct)
YOBIS-Foreign Students' Education Management Information System	Syrian refugee school-age children	YOBIS is an online education management information system that allows monitoring of Syrian refugee children's school attendance as well as collecting other information on education process, child health, and socio-economic status of a child's family.	Online Learning Technologies	Turkey	Ministry of National Education of Turkey, UNICEF
ZEduPad	School-age children, teachers, and adult learners	Child-friendly tablet computer pre-loaded with multimedia lessons based on the Zambian curriculum (in English and 8 local languages) as well as other computing tools. WiFi enabled with filtered, child-safe browsing and 6+ hours of battery life. Comes in Home, Pupil, and Teacher editions. Pupil edition converts to Community edition after school hours to accommodate adult education.	Tablet Technologies	Zambia	iSchool Zambia Ltd

*** Definitions for broad ICT terms:**

1. *ICT Technologies* – ICT stands for "information and communications technology" and is an extended definition of "information technology" as it includes the ways in which humans communicate with one another. These technologies include – but are not limited to – mobile phones, television, radios, computers and their networks, satellites, the Internet, etc. Where you see this listed for "technology" in the table, there may be many technologies used or the project may not have specified exact resources.

2. *Mobile Phone Technologies* – This category may be used to cover a wide variety of features on mobile phones, from the simple connectivity of calling, texting, or messaging another person through SMS (also known as short message service) to phone-based games and applications. Where possible, the specifics of mobile phone technologies have been called out on this list, but this category may have been used for projects that include many aspects of the device or where aspects were not specified.

3. *Social Media Applications* – This category includes - but is not limited to – applications like Facebook, Twitter, and Skype. These websites and applications allow people to connect with one another via social networks or to create and share information.

4. *Media Technologies* – Some projects focus specifically on radios, television, projection, and video-production without connecting to a broader network. This category is used to refer to such projects.

5. *Online Learning Technologies* – Online learning technologies are computer-supported and collaborative learning technologies. These technologies may take the form of Internet-based learning platforms with lesson plans broken down into modules or MOOCs (massive open online courses). Online Learning Technologies make distance learning possible.

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