Education in Conflict Zones: a Web and Mobility Approach

Shah Mahmood\textsuperscript{1} and Ismatullah Nazar\textsuperscript{2}

\textsuperscript{1} Department of Computer Science, University College London, United Kingdom
\textsuperscript{2} Brunel Business School, Brunel University, United Kingdom

shah.mahmood@cs.ucl.ac.uk, cb10inn@brunel.ac.uk

Abstract. We propose a new framework for education in conflict zones, considering the explosive growth of social media, web services, and mobile Internet over the past decade. Moreover, we focus on one conflict zone, Afghanistan, as a case study, because of its alarmingly high illiteracy rate, lack of qualified teachers, rough terrain, and relatively high mobile penetration of over 50%. In several of Afghanistan’s provinces, it is hard to currently sustain the traditional bricks-and-mortar school model, due to numerous incidents of schools, teachers, and students being attacked because of the ongoing insurgency and political instability. Our model improves the virtual school model, by addressing most of its disadvantages, to provide students in Afghanistan with an opportunity to achieve standardised education, even when the security situation does not allow them to attend traditional schools. One of the biggest advantages of this model is that it is sufficiently robust to deal with gender discrimination, imposed by culture or politics of the region.

Keywords: Education, Conflict Zone, Social Network, Mobile Internet, Afghanistan

1 Introduction

“Education is a better safeguard of liberty than a standing army.” ~ Edward Everett

The explosive rise in the use of web services has redefined human connectivity in a very significant way. Its influence is evident from the fact that Facebook has registered over 800 million active users \cite{11}, Qzone, the Chinese social network, over 450 million \cite{15}, and Twitter over 300 million \cite{20}. Every month, over 241 million users play social games developed by Zynga \cite{4}. Every day, over 3 billion videos are watched on Youtube and another 48 hours of videos are uploaded every minute \cite{25}. Almost 1.2 billion users are currently using web services over their smart phones, tablets, netbooks, and laptops. On average, 45% of the Internet users are below the age of 25 \cite{14}. 
This unprecedented connectivity and enormous amount of flow of information presents untold opportunity to improve human quality of life worldwide. One such positive use that we focus on, is to aid learning and provide more people with opportunities for education. Presently students use web services including Google searches, forum postings, and social network discussion boards to find answers to their queries. The increasing number of video tutorials have prompted the use of the term Youtube University [10]. Although these examples show that the web services are being used to get help with education, but there is no current framework which utilises web services to provide education in conflict zones. Conflicts zones may include places where seeking education by going to a physical school could risk the lives of students. They could step on explosive devices, get shot in the firefight between insurgents and the government, or be explicitly targeted solely for seeking a type of education which does not conform with the views of particular extremist groups. One such unfortunate country where students and teachers have been reportedly harmed and schools blown up, either by the Taliban [22], other insurgent groups or contractors (Contractors blow up poorly constructed unfurnished schools with no equipment to avoid audit and receive full amount of their contract money).

In this paper, we focus on providing a framework for education in conflict zones, by considering Afghanistan as a model and utilising web and telecommunication services .

The rest of the paper is arranged as follows. First, we provide a background on the negative impact, on education, of Afghanistan’s three decades of war. We also discuss the success of mobile networks in the country, where 50% of the country’s population registered for a mobile connection within the first 8 years (further details are given in Section 2). Second, we provide details of the proposed framework for education in conflict zones. This framework is not meant to completely replace traditional schooling. It is meant to cover for regions where traditional schooling is not feasible due to security or other reasons. Our framework includes the use of mobile Internet, social networks, voice recognition and games (further details about the framework are given in Section 3). Third, we provide the framework’s advantages, including the creation of better education opportunities for both female and male students, quality assurance, resistance to sabotage, transparency and much more (further details in Section 4). Fourth, we discuss some limitations of the work and provide possible corresponding solutions (further details in Section 5). We provide an account of related work in Section 6 and conclude the paper in Section 7.

2 Background

In this section, we provide a short overview of the wars in Afghanistan and their impact on education. Following this we discuss the success of mobile networks in presence of the ongoing insurgency.

Afghan wars and their impact on education. The Soviet Union invaded Afghanistan on December 27, 1979 by killing the country’s President, replacing him with a
Soviet client, and marching the Soviet army across the border into Afghanistan. This started a bloody insurgency which continues to this day. Till present, over 2 million Afghans have lost their lives, over 1.5 million sustained serious injuries, over 1 million became widows, and over 3 millions orphans [113]. These wars also destroyed the infrastructure of the country including its healthcare system, security institutions, and education system. According to the United Nations Development Programme, over 68% of the country’s population is under the age of 25 [17]. The alarming rate of illiteracy in the Southern and Eastern provinces is evident from the mere fact that Uruzgan’s, overall literacy rate is 5%, with 10% men and 0% women being literate [6]. After 2001, there has been some attempts to educate Afghanistan by forming a renewed curriculum, building schools, hiring new teachers and providing students with books and basic stationery. In several parts of the country, especially South and the East, numerous incidents of schools being blown up or burnt are reported. Such destruction is either done by extremist insurgents or contractors for school building. Moreover, teachers have been kidnapped, bodily harmed and even killed for their support for education [22]. Children in such parts are mostly strangers to education despite some efforts by the global community, such as, 50 schools being built by Canada, in Kandahar province [9]. Even in the relatively peaceful parts of Afghanistan, teaching standards are low, due to the unavailability of qualified teachers. Students have to study by sitting on the floor because the schools are missing furniture. Teachers are not always present for their classes, busy working in their fields or running their small businesses [8]. There is little proper oversight. The situation is challenging for anyone attempting to provide quality education using traditional schooling.

Emerging mobile connectivity. Despite all problems in Afghanistan, the mobile communication industry has seen an impressive growth, since it first started functioning in 2002. According to Afghanistan Telecom Regulatory Authority, the penetration rate of Afghan mobile market was approximately 50%, with total users exceeding 12.5 million [5], as of May 2010. The use of mobile phones in Afghanistan is not limited to communication. Afghanistan’s rough and complex terrain has prompted the use of mobile phones for money transfer. Mobile payments were first launched by Afghan telecom group Roshan, in partnership with Vodafone. Though it was initially used to pay the salaries of police officers in distant areas, its use has expanded to almost any type of peer to peer money transfers [16].

3 Proposed Framework

It is evidently difficult for interested organisations to maintain traditional schools in conflict zones, when insurgents are consistently destroying schools at a sustained rate. To counter the problem, we propose the use of a new education framework, which includes elements of both traditional and virtual schooling systems.
Fig. 1. Proposed Education Framework
The proposed framework, as shown in Figure 1, comprises of three main parts. The first component is the “Education Center” which registers and enrolls all students, physically, by mail, or online. It also prepares interactive lectures which are then uploaded into the “Mobile Network” so that they could be downloaded by “Students”. Each student is required to have a tablet or any other computing device with mobile connectivity. These devices could be provided by the government or education agencies to students from families having lower incomes. Lectures should be uploaded periodically, i.e., every few days of every week, by the education center. Students should be required to take tests and complete assignments by their deadlines. Quizzes can be monitored by sending the video stream from the inbuilt or attached webcam of the student’s computing device, to the education center. This will prevent any unfair means being adopted and will also give the education center more data about a particular student’s behaviour during a quiz. Such behavioural data accumulated over time can enable the education center to provide each student with targeted material, tailored individually, to enhance each student’s learning experience. Other features of the framework are discussed below.

Teacher-student interactive video sessions. It will not be fair to expect all students to understand everything in the video lectures. They may have some questions which should be answered after being posted on the web page for the relevant course. Each course could be assigned several secondary teachers or teaching assistants, who should have 1-2 hours of interaction with a decent sized group of students. During these sessions, teachers should answer all posted questions, and if time permits, ask students for other queries and give them tips for learning. These interactive sessions could be established through video conferencing between the education center and each student’s computing device. Teachers should also be able to see all their students in order to create an interpersonal bonding. Primary school students who are not able to write questions may express their lack of understanding for the topic by pressing the corresponding button at the end of each sub-topic, which should then be relayed to the teacher and addressed during these sessions. In some cases, teachers may have individual sessions through video conferencing with students.

Use of voice recognition. Voice recognition can be used for language classes and early learners. Suppose a child is learning the English alphabet and is hearing a character ‘A’, the program should pause for the child’s feedback and correct him by repeating the correct pronunciation. For natives of certain other languages, pronunciation might not work exactly like natives of the language that they want to learn, so the software program should adapt to such requirements and constraints. This use of technology will save teachers’ time and provide each student with the flexibility of attempting to polish their reading and speaking skills with the help of software tools.

Use of games. About 45% of British children under 12 have used Facebook [7]. They use the social networking site only to play online games. The popularity of
games could be used for education. Quizzes, reading and writing assignments can be made much more interesting by turning them into games. Violent games have been reported to negatively affect the personality of children [3], but educational games with social connections could reverse the negativities and do much more good. Students from conflict zone could use these games to do group assignments and develop their group leadership and management skills.

Use of social networks. Students and their parents should be automatically registered on the educational social networks. Each student should be added to the groups corresponding to his courses. Parents should be added to parents groups. This way students would stay in touch with their peers and create the social bond which is otherwise created in traditional schools. Most students’ parents in countries like Afghanistan are not literate. They can be given the option to record their messages in voice for postings on the parents’ social group. Parents, using these voice messages, can discuss their child’s academic problems and benefit from the feedback they receive from others in the group. This will improve the social bonds between parents enabling them to collectively decide about potentially beneficial decisions for their children’s future.

Students could be further encouraged to share their academic work through social networks. The shared material could be a learning experience for their classmates or others interested, especially those taking the course next season. The opportunity to comment will liberate young minds; this way, the Internet can provide the freedom of speech often sorely lacking in conflict ones. To avoid bullying or other potential harm, students should be allowed to comment under pseudonyms or anonymously. As, the groups are supposed to be administered by the education center, potential for misuse of these pseudonyms is minimal.

Young student should be provided adequate protection over the Internet, by limiting their access to any potentially harmful content. Unauthorised members should not be permitted to join student groups.

Strict deadlines and time management. As the targeted group to be educated ranges from primary school students to university level, they can not be expected to manage their time and complete their tasks without any reminders. Parents of students should be reminded over their phones through voice and text messages about the upcoming deadlines for their child’s school work. Lack of discipline in time management repeated several times, due to the negligence of parents, should be followed by confidentially requesting a respectful figure in the neighbourhood to intervene by advising the negligent parents about the potential harm they may be doing to their children’s future. If neighbours are not successful in convincing the negligent parents, the problem must be forwarded to the local education enforcing government authority or a respectful village chieftain. Peer pressure could be a good motivator to remind irresponsible parents about their duties.

Creating incentives for hard work. Parents of students should be regularly sent mobile messages about their children’s progress. Incentives and constructive
competition should be created between students by announcing best performers within a locality, only when such announcements are considered safe. The announcement should reach all students and their parents. Best students for a year should be awarded by sending them trophies or giving them other types of recognition. Teachers should call high achieving students and their parents to congratulate them and to ensure that they carry on with their hard work.

*Induction workshops for students and their parents.* Students throughout a conflict zone should be divided into small manageable localities. Students and parents should be provided with an induction workshop in their locality by educational organizations either through physical presence or through a video conference. Students and their parents should be fully aware of how to use the tablets or other computing devices and how to download and play the course material. User interface for such programs should be suitable for the respective users, i.e., in regions with higher illiteracy rates, the interface should be more graphical and symbol-oriented, instead of textual.

*Technical support.* With technical equipment, we will have technical problems. Students may break their tablets or the connection might not be working for countless reasons. Such problems should be addressed by a technical support hotline within each province or countrywide. This could be further improved with physical support being available within every few localities. As most people in Afghanistan live in combined family with several children in every house, the breakdown of one piece of equipment will not do much harm. A student with a broken device should use their sibling’s or cousin’s device till their own gets fixed.

## 4 Advantages

Advantages of the proposed framework over the current adoption of traditional school model, in conflict zones like Afghanistan, and other types of virtual school models, in other places, are given as follows.

*Equal opportunities for female and male education.* In places like Afghanistan, over the past few decades, it has been hard to promote education for girls and women due to intimidation from religious fanatics. These problems are coupled due to cultural constraints. It is not considered a virtuous practice for females to leave their homes, even for the sole aim of education. In Afghanistan, there is no cultural/religious opposition to girls and women education, if the process does not involve getting in contact with marriageable men other than one’s husband. As the model uses interactive learning through videos, social networks, games, etc., it should not create any opposition either from the hardline religious leaders or the strict followers of cultural norms. Even if some fanatics have a problem with the fundamental right of getting educated, they would not be able to enforce
their will on people in their houses. Lectures heard through headphones and watched on a tablet could remain a private affair. When such privacy is expected by any parents or students, then it should be made sure that the achievements, as explained in Section 3, of such students are not publicised to others.

**Quality assurance.** One big problem for education in conflict zones is the lack of availability of qualified teaching staff. Those available generally are unwilling to travel in a poor security environment. This forces the hiring of sub-standard teaching staff for most schools. When teaching staff are not suitable for the job, students end up being disheartened. Their parents look into alternatives and force them into jobs or housework.

With the proposed framework, we can assure that the lectures recorded are delivered by well qualified teachers and the course material is same for the entire region. The direct interaction sessions are also expected to be delivered by well qualified teachers or their assistants.

**Economic advantages.** The proposed framework is economically much more viable since it can scale to a large number of students. The basic interactive software material and lecture videos, once created, could be used by any number of students throughout an entire country, or an entire region where a particular language is spoken and understood. For the question and answer sessions, one teacher or teaching assistant can handle many more students than in a physically interactive group. Government and education promoting organisations will not need to invest in printing books and building expensive traditional schools, which may well be attacked within days, in areas of active insurgency.

**Reachability.** Countries like Afghanistan, with very rough terrain, are very hard to completely reach, especially in harsh winters when roads connecting some of the villages are completely blocked for months. With the proposed framework, teachers do not need to physically be present in the locality of their students, moreover, school supplies need not be shipped on regular bases. Everything could be monitored and controlled, from easily accessible and convenient centralised locations.

**Hard to sabotage.** Insurgents in conflict zones can destroy physical schools and pause the progress of education for the local students for time spanning over one or more year (time required rebuild a new school). As there will be no traditional school buildings, in high risk areas, insurgents will not be able to do much physical damage. Sabotaging connectivity for our framework can happen in two ways. Firstly, insurgents will require to destroy the mobile network. Insurgents also use the same network for their day to day operations, so they can not afford harming the network. Moreover, mobile networks have enough redundancy to withstand attacks by insurgents in Afghanistan. Secondly, they may use jammers to temporarily disrupt the signal, but jammers will expose their location. So, in both cases insurgents will find it much harder to inflict significant harm.
Avoiding time wastage. In some regions of Afghanistan, students need to travel several hours to reach their schools. Students need to travel through rivers on bridges that are not well maintained or through hard mountainous terrain. According to Oxfam, some students walk up to three hours to get to school in Balk province.

Security. As discussed in the Introduction of this paper, there has been several incidents of teachers and student being harmed only because of their thirst for education. Students and teachers were exposed to attacks due to the known location of schools and well defined periods of study. With education being available at home, insurgent intimidation will lessen.

Transparency. It is hard to monitor corruption in conflict zones, and Afghanistan has been no different. Powerful warlords can force school teachers to award their children the best grades while failing the children of anyone who every opposed them. Officials at the Ministry of Higher Education in Afghanistan have been found biased, favouring students’ of their own ethnicity and opposing others, in the allocation of foreign scholarships. With the proposed framework, there will be a digital record of a students work throughout the year or longer and any drastic changes for university entry exams or scholarship allocation could be easily detected, thus creating more transparency.

5 Limitations and Solutions

There are several limitations, which need to be addressed in order to fairly construct the proposed framework. First, the user interface for the educational kit, including downloading and playing of lectures, use of educational social networks, establishing the interactive video conference for question and answer session, etc., needs to be very simple for early students and their parents, who may not be well educated. Secondly, the mobile network in Afghanistan have very limited Internet download rates. This should not be a big problem for our framework because most of the content will not be on the Internet but on the local network of the education center. Lectures for each week can be cached at the mobile network’s local base station level for easy and quicker download. Social networks on the education center network will be designed for use between parents and students within the conflict zone, so that should also be feasible with current setup of mobile companies in Afghanistan. Mobile companies are slowly and gradually improving their Internet bandwidth, so wider sharing over the Internet should become feasible relatively quickly.

Thirdly, electricity is insufficient and unreliable in most parts of Afghanistan. Most such areas have access to generators, powered by oil or solar energy, run for a limited time each day. These generators or the rarely available electricity could be used to power up the batteries of student tablets in the same way as they are used to recharge the mobile phone batteries for their parents, presently.

Fourthly, the Internet contains lots of content that could be harmful for students, or wasteful, at best. Education center’s social network should be carefully
monitored and access to inappropriate material should be limited by the service providers.

Fifthly, secondary teachers who help students during teacher-student interaction sessions must also be well qualified. We, through the Afghan Students Union UK, were able to convince 50 expatriate Afghan teachers based in the Netherlands and over a dozen teachers based in the United Kingdom, to teach Afghan students through video conferencing. In our discussion with UCL’s Department of Political Science, they mentioned the possibility of establishing web-based and podcast sessions between UCL and universities in Afghanistan. They also suggested exchange programmes of students and staff and possible joint research.

6 Related work

Massachusetts Institute of Technology, in October 2002, took the initiative of making all its undergraduate and graduate course material available on the Internet, under the open courseware Project. The material available includes lecture notes, assignments, course syllabi and past exams [18]. Though the step taken by MIT was a revolutionary one, problems get raised due to the non-interactive nature. There is no well defined way for students to ask teachers, questions about the available open courseware material. It is more of an aid to self study or as an aid to classroom material. In our opinion, it is not a full package that could be adopted at earlier phases of the educational cycle, e.g. for primary or secondary schooling.

Khan Academy, started in 2006, offers free educational videos accessible to anyone on the Internet on a wide range of subjects [2]. Like MIT’s Open Course Ware Project, Khan’s Academy is an impressive project with a step towards promoting education, using the emerging web services. Unfortunately, it has the same problems of being used as a secondary learning tool, in parallel to proper brick and mortar schooling. Its non-interactive nature with no strict deadlines, make it hard for primary school students to completely cover required courses.

Stanford University offered Computer Science courses online which were completed by almost 32,000 students. For some of the modules, the included homework, midterm exams, final exams, and the award of a successful completion certificate at the end of the course [12]. Stanfords courses were more interactive than those offered by MIT and Khan’s Academy but still targeted students aiming for specialisation in a particular branch of computer science. Our framework is tailored for students in conflict zones, with difficult access to quality traditional schools due to security threats and the lack of qualified teachers.

7 Conclusion

We propose a new framework for education in conflict zones, where traditional schooling is not feasible. It will combine the positive features of both traditional and virtual schools with an interactive program of video lectures, teacher-student interactive video sessions, use of voice recognition, social networks, and
games for enhanced learning. Students will be provided with quizzes monitored through their webcam and with strict deadlines for homework. Parents will regularly be updated about the status of their children’s education through voice and text messages. This framework will have many advantages including equal opportunity of education for both male and female students, measures to assure and maintain education quality, economic feasibility, reachability, resistance to sabotage, and transparency. We also discussed some of its limitations and provided mitigating solutions. This framework is not intended to replace traditional schooling but to provide an alternative more feasible and sustainable education framework for conflict zones.

Acknowledgements

The authors would like to thank Ashraf Ghani, former finance minister of Afghanistan, Clare Lockhart, former UN advisor for Afghanistan, and Paul Smith, director of the British Council in Afghanistan, for discussions about frameworks for education in Afghanistan. The authors would also like to thank Alex Braithwaite, for suggestions about joint research between UCL Department of Political Science and Afghan Universities.

References

1. Death tolls for the major wars and atrocities of the twentieth century. http://necrometrics.com/20c1m.htm#Afghanistan. Accessed: February 8, 2012.
2. Khan Academy. http://www.khanacademy.org/. Accessed: February 9, 2012.
3. C. A. Anderson and B. J. Bushman. Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. Psychological Science, 12, September 2001.
4. AppData. Zynga statistics. http://www.appdata.com/devs/10-zynga. Accessed: February 7, 2012.
5. ATRA. A glance at the telecom developments in Afghanistan. Afghanistan Telecom Regulatory Authority, May 2010.
6. AusAID. Australia’s strategic approach to aid in Afghanistan 2010-2012. Australia’s Aid Program, 2012.
7. E. Barnett. Safer Internet day: almost half of under-12s using Facebook. The Telegraph, February 07, 2012.
8. D. Burde. It takes a village to raise a school. New York Times, September 16, 2010.
9. Canada. Canadas achievements in Afghanistan to date (November 16, 2010). http://www.afghanistan.gc.ca/canada-afghanistan/news-nouvelles/2010/2010_11_16d.aspx?lang=eng&view=d. Accessed: February 13, 2012.
10. L. B. Cohen. Library 2.0 Initiatives in Academic Libraries. American Library Association, 2007.
11. Facebook. Facebook statistics. http://newsroom.fb.com/content/default.aspx?NewsAreaId=22. Accessed: February 7, 2012.
12. M. Guzdial. Online Stanford classes explore new models for CS learning. Blogs@ACM, December 21, 2011.
13. A. Hilali. US-Pakistan relationship: Soviet Intervention in Afghanistan. Ashgate Publishing Co., 2005.
14. ITU. ICT facts and figures. http://www.itu.int/ITU-D/ict/facts/2011/material/ICTFactsFigures2011.pdf. Accessed: February 7, 2012.
15. J. Keath. Facebook dwarfs all other social activity combined. http://socialfresh.com/facebook-dwarfs-all-other-social-activity-combined/. Accessed: February 7, 2012.
16. M-Paisa. About M-Paisa. http://www.roshan.af/Roshan/M-Paisa.aspx. Accessed: February 13, 2012.
17. E. Mayel, Y. Helaman, and M. Khabir. National Joint Youth Programme (NJYP), annual report 2008. United Nations Development Programme, 2008.
18. MIT. MIT Open Courseware Project. http://ocw.mit.edu/donate/why-donate/. Accessed: February 9, 2012.
19. R. Nordland. Discrimination against Pashtuns: A letter to President Obama. Open Letter to US President, June 12, 2010.
20. R. Nordland. Aid agencies in Afghanistan fear reversals after U.S. exit. The New York Times, December 5, 2011.
21. Oxfam. Title of resource: Girls’ education in Afghanistan. http://www.oxfam.org.uk/education/resources/December_education/files/afghanistan_girls_education_lesson.pdf. Accessed: February 13, 2012.
22. J. Palmer. Taliban kill Afghan students, burn schools. The Washington Times, May 28, 2009.
23. C. Taylor. Social networking ‘utopia’ isn’t coming. CNN, June 27, 2011.
24. UNHCR. Education under attack 2010 - Afghanistan. UN Educational, Scientific and Cultural Organisation, 2010.
25. Youtube. Youtube statistics. http://www.youtube.com/t/press_statistics. Accessed: February 7, 2012.